

# Sudhakar Rao 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, pharmaceuticals, 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
BP 101T	Human Anatomy and Physiology I	Upon completion of this course the student should be able to <ul style="list-style-type: none"> <li>• Explain the gross morphology, structure and functions of various organs of the human body.</li> <li>• Describe the various homeostatic mechanisms and their imbalances.</li> <li>• Identify the various tissues and organs of different systems of human body.</li> <li>• Perform the various experiments related to special senses and nervous system.</li> <li>• Appreciate coordinated working pattern of different organs of each system.</li> </ul>
BP 102T	Pharmaceutical analysis-I	Upon completion of the course the student shall be able to <ul style="list-style-type: none"> <li>• Learning this subject content will develop the ideas with the fundamental of analytical chemistry among the pupil.</li> <li>• It constructs the fundamental methodology to prepare different strength of solutions.</li> <li>• It facilitates the fellow pupil to predict the sources of mistakes and errors.</li> <li>• It helps to develop the fundamentals of volumetric analytical skills.</li> <li>• It peculates the basic knowledge in the principles of electrochemical analytical techniques.</li> <li>• The student interpretation skills will be improve by the course content in terms of choice of analytical techniques to perform the estimation of different category drugs.</li> </ul>
BP 103T	Pharmaceutics-I	Upon completion of the course the student shall be able to <ul style="list-style-type: none"> <li>• Know the history of profession of pharmacy</li> <li>• Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations</li> <li>• Understand the professional way of handling the prescription</li> <li>• Preparation of various conventional dosage forms.</li> </ul>
BP 104T	Pharmaceutical Inorganic Chemistry	Upon completion of the course the student shall be able to <ul style="list-style-type: none"> <li>• Know the fundamental principles of Inorganic chemistry that include chemical properties, structure, and reaction of main group compound.</li> <li>• Know the sources of impurities and methods to determine the impurities in inorganic Drugs and pharmaceuticals.</li> <li>• Understand the medicinal and pharmaceutical importance of inorganic compounds.</li> </ul>
BP 105T	Comunication skills	Upon completion of the course the student shall be able to <ul style="list-style-type: none"> <li>• Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation</li> <li>• Communicate effectively (Verbal and Non Verbal)</li> <li>• Manage the team effectively as a team player</li> <li>• Develop interview skills</li> <li>• Develop Leadership qualities and essentials.</li> </ul>

### Semester-II

Course Code	Course title	Course Outcomes
BP 201T	Human Anatomy and Physiology-II	Upon completion of the course the student shall be able to <ul style="list-style-type: none"> <li>• Understand gross anatomy and physiology of different organs associated with respiratory system, digestive system, muscular system, urinary system, reproductive system, nervous system and integumentary system.</li> <li>• Know physiological processes associated with respiratory system, digestive system, muscular system, urinary system, reproductive system, nervous system and integumentary system.</li> <li>• Able to record body temperature, breathing rate, ECG, identify different bones and their body location.</li> </ul>
BP202T	Pharmaceutical Organic chemistry-I	Upon completion of the course the student shall be able to <ul style="list-style-type: none"> <li>• Know the fundamental principles of organic chemistry that include chemical bonding, nomenclature, structural isomerism,</li> </ul>

		<p>stereochemistry, chemical reaction and mechanism.</p> <ul style="list-style-type: none"> <li>• Understand the basic practical skills for synthesis and analysis of organic compounds.</li> <li>• Understand the professional way of handling the instrument such as melting point apparatus, boiling point apparatus.</li> </ul>
<b>BP203T</b>	Pharmaceutical Biochemistry	<p>Upon completion of the course the student shall be able to</p> <ul style="list-style-type: none"> <li>• Understand metabolism of lipids and nitrogen containing monomer in physiological and pathological conditions.</li> <li>• Understand the concept of nutrition, balanced diet and energy metabolism.</li> <li>• Know Account of acid-base balance and mineral metabolism, Biological oxidation.</li> <li>• Recognize methods and applications of biosignaling.</li> </ul>
<b>BP204T</b>	Pathophysiology	<p>Upon completion of the course the student shall be able to</p> <ul style="list-style-type: none"> <li>• Understand the etiology, pathogenesis and clinical manifestations of the selected disease states.</li> <li>• Know the signs, symptoms and complications of the diseases.</li> <li>• Get baseline knowledge required to practice medicine safely, confidently, rationally and effectively.</li> <li>• Understand detailed study of cardiovascular, respiratory, gastrointestinal, nervous, urinary, endocrine systems of diseases.</li> </ul>
<b>BP205T.</b>	Computer applications in pharmacy	<p>Upon completion of the course the student shall be able to</p> <ul style="list-style-type: none"> <li>• Understand metabolism of lipids and nitrogen containing monomer in physiological and pathological conditions.</li> <li>• Understand the concept of nutrition, balanced diet and energy metabolism.</li> <li>• Know Account of acid-base balance and mineral metabolism, Biological oxidation.</li> <li>• Recognize methods and applications of biosignaling.</li> </ul>
<b>BP206T</b>	Environmental Science	<p>Upon completion of the course the student shall be able to:-</p> <ul style="list-style-type: none"> <li>• Create the awareness about environmental problems among learners.</li> <li>• Impart basic knowledge about the environment and its allied problems.</li> <li>• Develop an attitude of concern for the environment.</li> <li>• Motivate learner to participate in environment protection and environment improvement.</li> <li>• Acquire skills to help the concerned individuals in identifying and solving environmental problems.</li> <li>• Strive to attain harmony with Nature.</li> </ul>

### Semester-III

Course Code	Course title	Course Outcomes
<b>BP301T</b>	Pharmaceutical Organic chemistry-II	<p>Upon completion of the course the student shall be able to</p> <ul style="list-style-type: none"> <li>• Write the structure, name and the type of isomerism of the organic compound.</li> <li>• Write the reaction, name the reaction and orientation of reactions.</li> <li>• Account for reactivity/stability of compounds.</li> <li>• Prepare organic compounds.</li> </ul>
<b>BP302T</b>	Physical Pharmaceutics-I	<p>Upon completion of the course the student shall be able to</p> <ul style="list-style-type: none"> <li>• Understand the different physical properties of drug or</li> <li>• Define and recall fundamental physical theories of matter in the development of dosage form.</li> <li>• Explain the concept of formulation and stabilization suspensions and emulsions.</li> <li>• Demonstrate the types and properties of colloids</li> <li>• Define the rate and order of reaction involved in stabilization of medicinal agents.</li> <li>• Illustrate the knowledge of solubility in pharmaceutical preparations.</li> <li>• Outline the concept of thermodynamics.</li> </ul>
<b>BP303T</b>	Pharmaceutical Microbiology	<p>Upon completion of the subject student shall be able to;</p> <ul style="list-style-type: none"> <li>• Understand methods of identification, cultivation and preservation of</li> </ul>

		<ul style="list-style-type: none"> <li>• various microorganisms</li> <li>• To understand the importance and implementation of sterilization in pharmaceutical processing and industry</li> <li>• Learn sterility testing of pharmaceutical products.</li> <li>• Carried out microbiological standardization of Pharmaceuticals.</li> <li>• Understand the cell culture technology and its applications in pharmaceutical industries.</li> </ul>
<b>BP304T</b>	Pharmaceutical Engineering	<p>Upon completion of the course, the student shall be able to</p> <ul style="list-style-type: none"> <li>• To know various unit operations used in Pharmaceutical industries.</li> <li>• To understand the material handling techniques.</li> <li>• To perform various processes involved in pharmaceutical manufacturing process.</li> <li>• To carry out various test to prevent environmental pollution.</li> <li>• To appreciate and comprehend significance of plant lay out design for optimum use of resources.</li> <li>• To appreciate the various preventive methods used for corrosion control in Pharmaceutical industries.</li> </ul>

#### Semester-IV

Course Code	Course title	Course Outcomes
<b>BP401T</b>	Pharmaceutical Organic chemistry-III	<p>Upon completion of the course the student shall be able to</p> <ul style="list-style-type: none"> <li>• Understand the methods of preparation and properties of organic compounds.</li> <li>• Explain the stereo chemical aspects of organic compounds and stereo chemical Reactions.</li> <li>• know the medicinal uses and other applications of organic compounds.</li> </ul>
<b>BP402T</b>	Medicinal Chemistry-I	<p>Upon completion of the course the student shall be able to</p> <ul style="list-style-type: none"> <li>• understand the chemistry of drugs with respect to their pharmacological activity</li> <li>• understand the drug metabolic pathways, adverse effect and therapeutic value of</li> <li>• drugs</li> <li>• know the Structural Activity Relationship (SAR) of different class of drugs</li> <li>• write the chemical synthesis of some drugs</li> </ul>
<b>BP403T</b>	Physical Pharmaceutics II	<p>Upon completion of the course the student shall be able to</p> <ul style="list-style-type: none"> <li>• Understand various physicochemical properties of drug molecules in the designing the dosage forms</li> <li>• Know the principles of chemical kinetics &amp; to use them for stability testing nad determination of expiry date of formulations</li> <li>• Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.</li> </ul>
<b>BP404T</b>	Pharmacology-I	<p>Upon completion of the course the student shall be able to</p> <ul style="list-style-type: none"> <li>• Identify the route of drug administrating, mechanism of action, combined effects of drug and pharmacological actions.</li> <li>• Understand Official bioassay of drugs as per IP</li> <li>• Recognize the Pharmacokinetics and pharmacodynamics of drug.</li> <li>• Demonstrate a fundamental knowledge in the field of cholinergic, adrenergic, serotonergic and dopamine path in CNS.</li> <li>• Demonstrate a mastery of technical and experimental methodologies required to conduct research in the field of animal study.</li> </ul>
<b>BP405T</b>	Pharmacognosy and phytochemistry I	<p>Upon completion of the course the student shall be able to</p> <ul style="list-style-type: none"> <li>• to know the techniques in the cultivation and production of crude drugs</li> <li>• to know the crude drugs, their uses and chemical nature</li> <li>• know the evaluation techniques for the herbal drugs</li> <li>• to carry out the microscopic and morphological evaluation of crude drugs</li> </ul>

**Semester-V**

<b>Course Code</b>	<b>Course title</b>	<b>Course Outcomes</b>
<b>BP501T</b>	Medicinal Chemistry II	Upon completion of the course the student shall be able to <ul style="list-style-type: none"> <li>• Understand the chemistry of drugs with respect to their pharmacological activity</li> <li>• Understand the drug metabolic pathways, adverse effect and therapeutic value of drugs</li> <li>• Know the Structural Activity Relationship of different class of drugs</li> <li>• Study the chemical synthesis of selected drugs</li> </ul>
<b>BP502T</b>	Formulative Pharmacy	Upon completion of the course the student shall be able to <ul style="list-style-type: none"> <li>• Know the various pharmaceutical dosage forms and their manufacturing techniques.</li> <li>• Know various considerations in development of pharmaceutical dosage forms</li> <li>• Formulate solid, liquid and semisolid dosage forms and evaluate them for their quality</li> </ul>
<b>BP503T</b>	Pharmacology II	Upon completion of this course the student should be able to <ul style="list-style-type: none"> <li>• Understand the mechanism of drug action and its relevance in the treatment of different diseases</li> <li>• Demonstrate isolation of different organs/tissues from the laboratory animals by simulated experiments</li> <li>• Demonstrate the various receptor actions using isolated tissue preparation</li> <li>• Appreciate correlation of pharmacology with related medical sciences</li> </ul>
<b>BP504T</b>	Pharmacognosy and Phytochemistry II	Upon completion of the course the student shall be able to <ul style="list-style-type: none"> <li>• To know the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents.</li> <li>• To understand the preparation and development of herbal formulation.</li> <li>• To understand the herbal drug interactions</li> <li>• To carryout isolation and identification of phytoconstituents</li> <li>• Illustrate the drugs of natural origin with systematic practical approach.</li> <li>• Identify the drugs of natural origin by morphological, microscopical, chemical and chromatography analysis.</li> <li>• To know the Biosynthetic pathways of plants for secondary metabolites</li> </ul>
<b>BP505T</b>	Pharmaceutical Jurisprudence	Upon completion of the course, the student shall be able to <ul style="list-style-type: none"> <li>• Know Pharmaceutical legislations and their implications in the development and Marketing of Pharmaceuticals.</li> <li>• Understand various Indian pharmaceutical Acts and Laws.</li> <li>• Know regulatory authorities and agencies governing the manufacture and sale of Pharmaceuticals.</li> <li>• Acquire knowledge of code of ethics during the pharmaceutical practice.</li> </ul>

**Semester-VI**

<b>Course Code</b>	<b>Course title</b>	<b>Course Outcomes</b>
<b>BP601T</b>	Medicinal Chemistry III	Upon completion of the course the student shall be able to <ul style="list-style-type: none"> <li>• Understand the importance of drug design and different techniques of drug design..</li> <li>• Understand the chemistry of drugs with respect to their biological activity.</li> <li>• Understand the drug metabolism ,adverse effect and therapeutic value of drugs.</li> <li>• Know the importance of Structural Activity Relationship (SAR) of different class of drugs.</li> </ul>

<b>BP602T</b>	Pharmacology III	Upon completion of this course the student should be able to: <ul style="list-style-type: none"> <li>• understand the mechanism of drug action and its relevance in the treatment of different infectious diseases</li> <li>• comprehend the principles of toxicology and treatment of various poisonings and</li> <li>• appreciate correlation of pharmacology with related medical sciences.</li> </ul>
<b>BP603T</b>	Herbal Drug Technology	Upon completion of the course the student shall be able to <ul style="list-style-type: none"> <li>• To understand raw material as source of herbal drugs from cultivation to herbal drug product</li> <li>• To know the WHO and ICH guidelines for evaluation of herbal drugs</li> <li>• To know the herbal cosmetics, natural sweeteners and nutraceuticals.</li> <li>• To appreciate patenting of herbal drugs, GMP .</li> <li>• To Know the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents</li> <li>• To Understand Alternative System of Medicine along with important drugs in Ayurvedic system of medicine.</li> </ul>
<b>BP604T</b>	Biopharmaceutics and Pharmacokinetics	Upon completion of the course student shall be able to: <ul style="list-style-type: none"> <li>• Understand the basic concepts in biopharmaceutics and pharmacokinetics.</li> <li>• Use plasma data and derive the pharmacokinetic parameters to describe the process of drug absorption, distribution, metabolism and elimination.</li> <li>• Critically evaluate biopharmaceutic studies involving drug product equivalency</li> <li>• Design and evaluate dosage regimens of the drugs using pharmacokinetic and biopharmaceutic parameters.</li> <li>• detect potential clinical pharmacokinetic problems and apply basic pharmacokinetic principles to solve them</li> </ul>
<b>BP605T</b>	Pharmaceutical Biotechnology	Upon completion of the subject student shall be able to; <ul style="list-style-type: none"> <li>• Understanding the importance of Immobilized enzymes in Pharmaceutical Industries</li> <li>• Genetic engineering applications in relation to production of pharmaceuticals</li> <li>• Importance of Monoclonal antibodies in Industries</li> <li>• Appreciate the use of microorganisms in fermentation technology</li> </ul>
<b>BP606T</b>	Quality Assurance	Upon completion of the course student shall be able to: <ul style="list-style-type: none"> <li>• understand the cGMP aspects in a pharmaceutical industry</li> <li>• appreciate the importance of documentation</li> <li>• understand the scope of quality certifications applicable to pharmaceutical industries</li> <li>• understand the responsibilities of QA &amp; QC departments</li> </ul>

#### Semester-VII

Course Code	Course title	Course Outcomes
<b>BP701T</b>	Instrumental Methods of Analysis	Upon completion of the course the student shall be able to <ul style="list-style-type: none"> <li>• Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis</li> <li>• Understand the chromatographic separation and analysis of drugs.</li> <li>• Perform quantitative &amp; qualitative analysis of drugs using various analytical instruments.</li> </ul>
<b>BP702T</b>	Industrial Pharmacy	Upon completion of the course, the student shall be able to: <ul style="list-style-type: none"> <li>• Know the process of pilot plant and scale up of pharmaceutical dosage forms</li> <li>• Understand the process of technology transfer from lab scale to commercial batch</li> <li>• Know different laws and acts that regulate pharmaceutical industry in India and US</li> <li>• Understand the approval process and regulatory requirements for drug products</li> </ul>

<b>BP703T</b>	Pharmacy Practice	<p>Upon completion of the course, the student shall be able to</p> <ul style="list-style-type: none"> <li>• know various drug distribution methods in a hospital</li> <li>• appreciate the pharmacy stores management and inventory control</li> <li>• monitor drug therapy of patient through medication chart review and clinical review</li> <li>• obtain medication history interview and counsel the patients</li> <li>• identify drug related problems and detect and assess adverse drug reactions</li> <li>• interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states</li> <li>• know pharmaceutical care services and do patient counseling in community pharmacy;</li> <li>• Appreciate the concept of Rational drug therapy.</li> </ul>
<b>BP704T</b>	Novel Drug Delivery System	<p>Upon completion of the course student shall be able</p> <ul style="list-style-type: none"> <li>• To understand various approaches for development of novel drug delivery systems.</li> <li>• To understand the criteria for selection of drugs and polymers for the development of Novel drug delivery systems, their formulation and evaluation</li> <li>• To understand Concepts and approaches for targeted drug delivery systems</li> <li>• To understand design of drug delivery system for various routes of administration</li> </ul>

#### Semester-VIII

Course Code	Course title	Course Outcomes
<b>BP801T</b>	Biostatistics and Research Methodology	<p>Upon completion of the course the student shall be able to</p> <ul style="list-style-type: none"> <li>• Know basics of Statistics and Biostatistics</li> <li>• Understand the importance ethics of research</li> <li>• Know the operation of M.S. Excel, SPSS, R and MINITAB®, DoE (Design of Experiment)</li> <li>• Know the various statistical techniques to solve statistical problems</li> <li>• Appreciate statistical techniques in solving the problems.</li> </ul>
<b>BP802T</b>	Social and Preventive Pharmacy	<p>After successful completion this course, the student shall be able to</p> <ul style="list-style-type: none"> <li>• Acquire high consciousness / realization of current issues related to health and pharmaceutical problems within the country and worldwide.</li> <li>• Had a critical way of thinking based on current healthcare development.</li> <li>• Evaluation of alternative ways of solving problems related to health.</li> </ul>
<b>BP803ET</b>	Pharmaceutical Marketing	<p>Upon completion of the course the student shall be able to</p> <ul style="list-style-type: none"> <li>• Understand marketing concepts and techniques</li> <li>• Know Product management in pharmaceutical industry</li> <li>• Understand Pharmaceutical marketing channels</li> <li>• Know Emerging concepts in marketing</li> </ul>
<b>BP 805ET</b>	Pharmacovigilance	<p>At completion of this paper it is expected that students will be able to</p> <ul style="list-style-type: none"> <li>• Know History and development of pharmacovigilance</li> <li>• Know importance of drug safety monitoring</li> <li>• Understand Basic terminologies used in pharmacovigilance</li> <li>• Know various methods of Pharmacovigilance</li> <li>• Know Pharmacovigilance Program of India</li> </ul>
<b>BP809ET</b>	Cosmetic Science	<p>Upon completion of the course the student shall be able to</p> <ul style="list-style-type: none"> <li>• Know the criteria for selection of polymers for the development of cosmeceutical products</li> <li>• Understand Principles of formulation of skin care products</li> <li>• Understand Principles of formulation of Hair care products</li> <li>• Know Role of herbs in cosmetics</li> <li>• Know various problems associated with Cosmetics</li> </ul>

## Course Outcomes [M.Pharm]

### Semester- I M. Pharm [Pharmaceutics]

Course Code	Course title	Course Outcomes
MPH101T	Modern Pharmaceutical Analytical Techniques	<p>Upon completion of the course, student shall be able to</p> <ul style="list-style-type: none"> <li>• Chemicals and Excipients.</li> <li>• The analysis of various drugs in single and combination dosage forms.</li> <li>• Theoretical and practical skills of the instruments.</li> </ul>
MPH102T	Drug Delivery System	<p>At the completion of this subject it is expected that students will be able to</p> <ul style="list-style-type: none"> <li>• The various approaches for development of novel drug delivery systems.</li> <li>• The criteria for selection of drugs and polymers for the development of delivering system</li> <li>• The formulation and evaluation of Novel drug delivery systems.</li> </ul>
MPH103T	Modern Pharmaceutics	<p>At completion of this course it is expected that students will be able to</p> <ul style="list-style-type: none"> <li>• The elements of preformulation studies.</li> <li>• The Active Pharmaceutical Ingredients and Generic drug Product development</li> <li>• Industrial Management and GMP Considerations.</li> <li>• Optimization Techniques &amp; Pilot Plant Scale Up Techniques</li> <li>• Stability Testing, sterilization process &amp; packaging of dosage forms.</li> </ul>
MPH104T	Regulatory Affair	<p>At completion of this course it is expected that students will be able to</p> <ul style="list-style-type: none"> <li>• The Concepts of innovator and generic drugs, drug development process</li> <li>• The Regulatory guidance's and guidelines for filing and approval process</li> <li>• Preparation of Dossiers and their submission to regulatory agencies in different countries</li> <li>• Post approval regulatory requirements for actives and drug products</li> <li>• Submission of global documents in CTD/ eCTD formats</li> <li>• Clinical trials requirements for approvals for conducting clinical trials</li> <li>• Pharmacovigilence and process of monitoring in clinical trials.</li> </ul>

**Semester- II M. Pharm [Pharmaceutics]**

Course Code	Course title	Course Outcomes
MPH201T	Molecular Pharmaceutics(Nano Tech and Targeted DDS)	Upon completion of this course it is expected that students will be able to, <ul style="list-style-type: none"> <li>The various approaches for development of novel drug delivery systems.</li> <li>The criteria for selection of drugs and polymers for the development of NTDS</li> <li>The formulation and evaluation of novel drug delivery systems.</li> </ul>
MPH202T	Advanced Biopharmaceutics & Pharmacokinetics	Upon completion of this course it is expected that students will be able to, <ul style="list-style-type: none"> <li>The basic concepts in biopharmaceutics and pharmacokinetics.</li> <li>The use raw data and derive the pharmacokinetic models and parameters the best describe the process of drug absorption, Distribution, metabolism and elimination.</li> <li>The critical evaluation of biopharmaceutic studies involving drug product equivalency.</li> <li>The design and evaluation of dosage regimens of the drugs using pharmacokinetic and biopharmaceutic parameters.</li> <li>The potential clinical pharmacokinetic problems and application of basics of pharmacokinetic</li> </ul>
MPH203T	Computer Aided Drug Delivery System	On completion of this course it is expected that students will be able to understand- <ul style="list-style-type: none"> <li>History of Computers in Pharmaceutical Research and Development</li> <li>Computational Modeling of Drug Disposition</li> <li>Computers in Preclinical Development</li> <li>Optimization Techniques in Pharmaceutical Formulation</li> <li>Computers in Market Analysis</li> <li>Computers in Clinical Development</li> <li>Artificial Intelligence (AI) and Robotics</li> <li>Computational fluid dynamics(CFD)</li> </ul>
MPH204T	Cosmetic and Cosmeceuticals	Upon completion of the course, student shall be able to <ul style="list-style-type: none"> <li>Key ingredients used in cosmetics and cosmeceuticals.</li> <li>Key building blocks for various formulations.</li> <li>Current technologies in the market</li> <li>Various key ingredients and basic science to develop cosmetics and cosmeceuticals</li> <li>Scientific knowledge to develop cosmetics and cosmeceuticals with desired Safety, stability, and efficacy.</li> </ul>

**Semester- I M. Pharm [Industrial Pharmacy]**

Course Code	Course title	Course Outcomes
MIP101T	Modern Pharmaceutical Analytical Techniques	After completion of course student is able to know, <ul style="list-style-type: none"> <li>The analysis of various drugs in single and combination dosage forms</li> <li>Theoretical and practical skills of the instruments</li> </ul>
MIP102T	Pharmaceutical Formulation Development	On completion of this course it is expected that students will be able to understand- <ul style="list-style-type: none"> <li>The scheduled activities in a Pharmaceutical firm.</li> <li>The pre formulation studies of pilot batches of pharmaceutical industry.</li> <li>The significance of dissolution and product stability</li> </ul>
MIP103T	Novel drug delivery systems	On completion of this course it is expected that students will be able to understand, <ul style="list-style-type: none"> <li>The need, concept, design and evaluation of various customized, sustained and controlled release dosage forms.</li> <li>To formulate and evaluate various novel drug delivery systems</li> </ul>
MIP104T	Intellectual Property Rights	On completion of this course it is expected that students will be able to understand, <ul style="list-style-type: none"> <li>Assist in Regulatory Audit process.</li> <li>Establish regulatory guidelines for drug and drug products</li> <li>The Regulatory requirements for contract research organization</li> </ul>

## Semester- II M. Pharm [Industrial Pharmacy]

Course Code	Course title	Course Outcomes
MIP201T	Advanced Biopharmaceutics and Pharmacokinetics	After graduation on a more specialized field, a PG student has <ul style="list-style-type: none"> <li>• The basic concepts in Biopharmaceutics and pharmacokinetics.</li> <li>• The use of raw data and derive the pharmacokinetic models and parameters the best describe the process of drug absorption, distribution, metabolism and elimination.</li> <li>• To critically evaluate Biopharmaceutics studies involving drug product equivalency.</li> <li>• To design and evaluate dosage regimens of the drugs using pharmacokinetic and biopharmaceutic parameters.</li> </ul>
MIP202T	Scale up and Technology Transfer	On completion of this course it is expected that students will be able to understand, <ul style="list-style-type: none"> <li>• Manage the scale up process in pharmaceutical industry.</li> <li>• Assist in technology transfer.</li> <li>• To establish safety guidelines, which prevent industrial hazards.</li> </ul>
MIP203T	Pharmaceutical Production Technology	On completion of this course it is expected that students will be able to understand, <ul style="list-style-type: none"> <li>• Handle the scheduled activities in a Pharmaceutical firm.</li> <li>• Manage the production of large batches of pharmaceutical formulations.</li> </ul>
MIP204T	Entrepreneurship Management	On completion of this course it is expected that students will be able to understand, <ul style="list-style-type: none"> <li>• The Role of enterprise in national and global economy</li> <li>• Dynamics of motivation and concepts of entrepreneurship</li> <li>• Demands and challenges of Growth Strategies And Networking</li> </ul>

## Semester – I M.Pharm [Pharmacology]

Course Code	Course title	Course Outcomes
MPL101T	Modern Pharmaceutical Analytical Techniques	After completion of course student is able to know about, <ul style="list-style-type: none"> <li>• Chemicals and Excipients</li> <li>• The analysis of various drugs in single and combination dosage forms</li> <li>• Theoretical and practical skills of the instruments</li> </ul>
MPL102T	Advanced Pharmacology-	Upon completion of the course the student shall be able to : <ul style="list-style-type: none"> <li>• Discuss the pathophysiology and pharmacotherapy of certain diseases</li> <li>• 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</li> </ul>
MPL103T	Pharmacological and Toxicological Screening Methods-I	Upon completion of the course the student shall be able to, <ul style="list-style-type: none"> <li>• Appraise the regulations and ethical requirement for the usage of experimental animals.</li> <li>• Describe the various animals used in the drug discovery process and good laboratory practices in maintenance and handling of</li> </ul>

		<p>experimental animals</p> <ul style="list-style-type: none"> <li>• Describe the various newer screening methods involved in the drug</li> <li>• discovery process</li> <li>• Appreciate and correlate the preclinical data to humans</li> </ul>
MPL104T	Cellular and Molecular Pharmacology	<p>Upon completion of the course, the student shall be able to,</p> <ul style="list-style-type: none"> <li>• Explain the receptor signal transduction processes.</li> <li>• Explain the molecular pathways affected by drugs.</li> <li>• Appreciate the applicability of molecular pharmacology and biomarkers in drug discovery process.</li> <li>• Demonstrate molecular biology techniques as applicable for pharmacology</li> </ul>

## Semester- II

Course Code	Course title	Course Outcomes
MPL201T	Advanced Pharmacology	<p>Upon completion of the course the student shall be able to:</p> <ul style="list-style-type: none"> <li>• Explain the mechanism of drug actions at cellular and molecular level</li> <li>• Discuss the Pathophysiology and pharmacotherapy of certain diseases Understand the adverse effects, contraindications and clinical uses of drugs used in treatment of diseases</li> </ul>
MPL102T	Pharmacological and Toxicological Screening Methods-II	<p>Upon completion of the course, the student shall be able to,</p> <ul style="list-style-type: none"> <li>• Explain the various types of toxicity studies.</li> <li>• Appreciate the importance of ethical and regulatory requirements for toxicity studies.</li> <li>• Demonstrate the practical skills required to conduct the preclinical toxicity studies.</li> </ul>
MPL203T	Principles of Drug Discovery	<p>Upon completion of the course, the student shall be able to,</p> <ul style="list-style-type: none"> <li>• Explain the various stages of drug discovery.</li> <li>• Appreciate the importance of the role of genomics, proteomics and bioinformatics in drug discovery</li> <li>• Explain various targets for drug discovery.</li> <li>• Explain various lead seeking method and lead optimization</li> <li>• Appreciate the importance of the role of computer aided drug design in drug discovery</li> </ul>
MPL204T	Clinical research and pharmacovigilance	<p>Upon completion of the course, the student shall be able to,</p> <ul style="list-style-type: none"> <li>• Explain the regulatory requirements for conducting clinical trial</li> <li>• Demonstrate the types of clinical trial designs</li> <li>• Explain the responsibilities of key players involved in clinical trials</li> <li>• Execute safety monitoring, reporting and close-out activities Explain the principles of Pharmacovigilance</li> <li>• Detect new adverse drug reactions and their assessment</li> <li>• Perform the adverse drug reaction reporting systems and communication in Pharmacovigilance</li> </ul>

**Semester III M. Pharm.(Common for All Specializations)**

Course Code	Course title	Course Outcomes
MRM301T	Research Methodology and Biostatistics	After graduation on a more specialized field, a PG student has <ul style="list-style-type: none"><li>• Learn general research methodology</li><li>• Understand the basic concepts of biostatistics</li><li>• Learn different parametric and non-parametric tests</li><li>• Understand the functions of ethics committees in medical research</li><li>• Learn the guidelines for developing animal facilities</li><li>• Explain the guidelines and importance of medical research</li><li>• Learn the guidelines for the experimentation on animals</li><li>• Understand the genesis of bioethics with special reference to Helsinki declaration.</li></ul>
	Discussion/Final Presentation	After graduation on a more specialized field, a PG student has <ul style="list-style-type: none"><li>• To obtain skills and techniques for professional scientific research</li><li>• To be able to establish research problems in the specific research area of and provide original solutions.</li><li>• To manage data collection and analysis methodologies.</li><li>• To have a high level of analytical and critical skills.</li><li>• To be able to write scientific articles in international level</li><li>• To be able to protect the basic research positions, both in speaking and in writing.</li></ul>

**Semester IV M. Pharm.(Common for All Specializations)**

	Discussion/Final Presentation	<ul style="list-style-type: none"><li>• To be able to defend the basic research positions and give oral presentations related to the work completed.</li></ul>
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