



2.6.1

Course Outcome and Program Outcome

Attainment

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PROGRAM OUTCOMES



PROGRAM OUTCOMES

1. **Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences, pharmaceutical sciences, behavioral, social, and administrative pharmacy sciences and manufacturing practices.
2. **Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.
3. **Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.
4. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.
5. **Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well-being.
6. **Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).



7. **Pharmaceutical Ethics** : Honor personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks. Apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.
8. **Communication**: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.
9. **The Pharmacist and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal Issues and the consequent responsibilities relevant to the professional pharmacy practice.
10. **Environment and sustainability**: Understand the Impact of the professional pharmacy solutions In societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development .
11. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in Independent and life-long learning In the broadest context of technological change. Self-assess and use feedback effectively from others to Identify learning needs and to satisfy these needs on an ongoing basis.



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PROGRAM SPECIFIC OUTCOMES (PSOs)



Program Specific Outcomes (PSOs)

PSO 1:

Inculcate basic and applied knowledge with an understanding of the inter-relationship among subjects like pharmaceuticals, pharmaceutical and medicinal chemistry, pharmacology, and pharmacognosy.

PSO 2:

Implementing the learned expertise for the design, synthesis, preclinical testing, analysis, formulation, and development of medicinal products as per the current market and industrial needs

PSO 3:

Development of skills and utilisation of knowledge in drug laws, professional ethics, quality control, drug distribution, and marketing of drugs and cosmetics



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COURSE OUTCOMES

B. PHARM. SEMESTER-I



Course : HUMAN ANATOMY AND PHYSIOLOGY - (C 101)

CO1	Explain the gross morphology, structure and functions of various organs of the human body.
CO2	Describe the various homeostatic mechanisms and their imbalances.
CO3	Identify the various tissues and organs of different systems of human body.
CO4	Perform the various experiments related to special senses and nervous system.
CO5	Appreciate coordinated working pattern of different organs of each system.

Course : PHARMACEUTICAL ANALYSIS - (C 102)

CO1	Understand the principles of volumetric and electro chemical analysis
CO2	Carryout various volumetric and electrochemical titrations
CO3	Develop analytical skills

Course : PHARMACEUTICS- I - (C 103)

CO1	Know the history of profession of pharmacy
CO2	Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations
CO3	Understand the professional way of handling the prescription
CO4	Preparation of various conventional dosage form

Course : PHARMACEUTICAL INORGANIC CHEMISTRY (104)

CO1	Know the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals
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CO2	Understand the medicinal and pharmaceutical importance of inorganic compounds
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Course : COMMUNICATION SKILLS (105)

CO1	Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation
CO2	Communicate effectively (Verbal and Non Verbal)
CO3	Effectively manage the team as a team player
CO4	Develop interview skills
CO5	Develop Leadership qualities and essentials

Course : RBT.REMEDIAL BIOLOGY (106)

CO1	Know the classification and salient features of five kingdoms of life
CO2	Understand the basic components of anatomy & physiology of plant
CO3	Know understand the basic components of anatomy & physiology animal with special reference to human

Course : RMT.REMEDIAL MATHEMATICS (C 106)

CO1	Know the theory and their application in Pharmacy
CO2	Solve the different types of problems by applying theory
CO3	Appreciate the important application of mathematics in Pharmacy

Course : HUMAN ANATOMY AND PHYSIOLOGY I (PRACTICAL) - [P107]

CO1	Outline microscopic and macroscopic study of different types of tissues
CO2	Determination of different blood associated parameters
CO3	Explain anatomy and physiology of different human system through



	models/charts/specimen
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Course : PHARMACEUTICAL ANALYSIS I (PRACTICAL) - [P108]

CO1	Compute molar concentration of given solution and calculate the concentration and purity of given sample by acid base and non-aqueous and redox titration.
CO2	Experiment with an analyte to compute its concentration by precipitation, complexometric and gravimetric analysis

Course : PHARMACEUTICS- I - (PRATCICAL) [P 109]

CO1	Develop various dosage form and its formulation, preparation and labeling of solid dosage form
CO2	Develop various dosage form and its formulation preparation and labeling of semisolid and liquid dosage form

**Course : PHARMACEUTICAL INORGANIC CHEMISTRY- (PRACTICAL)
[P 110]**

CO1	To introduce the glassware's used in pharmaceutical laboratory
CO2	Outline the limit test of chloride sulphate, iron and heavy metal.
CO3	Outline the method of preparation and identification test of inorganic pharmaceuticals (boric acid, calcium carbonate, barium sulphate, aluminium hydroxide, potassium citrate and ferrous sulphate)

Course : COMMUNICATION SKILLS - (PRACTICAL) [P 111]

CO1	Communicate effectively (Verbal and Non Verbal)
CO2	Develop interview skills
CO3	Develop Leadership qualities and essentials



Course : RBT.REMEDIAL BIOLOGY - (PRACTICAL) [P112]	
CO1	Determination of B.P and Oxygen capacity.
CO2	Macroscopic and microscopic study of Plant (All parts)
CO3	Know understand the basic components of anatomy & physiology animal with special reference to human



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COURSE OUTCOMES

B. PHARM. SEMESTER-II



Course : HUMAN ANATOMY AND PHYSIOLOGY-II (C 201)

CO1	Explain the gross morphology, structure and functions of various organs of the human body
CO2	Describe the various homeostatic mechanisms and their imbalances
CO3	Identify the various tissues and organs of different systems of human body.
CO4	Perform the hematological tests like blood cell counts, haemoglobin estimation, bleeding/clotting time etc. and also record blood pressure, heart rate, pulse and respiratory volume
CO5	Appreciate coordinated working pattern of different organs of each system
CO6	Appreciate the interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body

Course : PHARMACEUTICAL ORGANIC CHEMISTRY –I (C 202)

CO1	Write the structure, name and the type of isomerism of the organic compound
CO2	Write the reaction, name the reaction and orientation of reactions
CO3	Account for reactivity/stability of compounds,
CO4	Identify/confirm the identification of organic compound

Course : BIOCHEMISTRY (C 203)

CO1	Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.
CO2	Understand the metabolism of nutrient molecules in physiological and pathological conditions.
CO3	Understand the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins.



Course : PATHOPHYSIOLOGY (C 204)

CO1	Describe the etiology and pathogenesis of the selected disease states;
CO2	Name the signs and symptoms of the diseases; and
CO3	Mention the complications of the diseases.

Course : COMPUTER APPLICATIONS IN PHARMACY (C 205)

CO1	Know the various types of application of computers in pharmacy
CO2	Know the various types of databases
CO3	Know the various applications of databases in pharmacy

Course : ENVIRONMENTAL SCIENCES (C 206)

CO1	Create the awareness about environmental problems among learners.
CO2	Impart basic knowledge about the environment and its allied problems.
CO3	Develop an attitude of concern for the environment.
CO4	Motivate learner to participate in environment protection and environment improvement.
CO5	Acquire skills to help in identifying and solving environmental problems.
CO6	Strive to attain harmony with Nature.

Course : HUMAN ANATOMY AND PHYSIOLOGY-II (PRACTICAL) [P 207]

CO1	Outline of human skeleton system and demonstration of simple muscle curve, recording of body temperature , lung capacity by spirometer
CO2	Record basal mass index, neurological examination and reflex activity.
CO3	Identify smell, test and vision of the object by using Snellen's and jaegers chart.
CO4	Demonstrate microscopic section of different types of tissues.



Course : PHARMACEUTICAL ORGANIC CHEMISTRY –II (PRACTICAL)

[P 208]

CO1	Explain various apparatus used in laboratory.
CO2	Outline about safety in laboratory practices.
CO3	Calculate melting point and boiling point
CO4	Identify unknown organic compound.
CO5	Synthesize various compounds.

Course : BIOCHEMISTRY- (PRACTICAL) [P 209]

CO1	To introduce carbohydrates with its identification test.
CO2	Explain concept of test of lipids.
CO3	To introduce protein and amino acids with identification test.
CO4	To estimate glucose and creatinine concentration.

Course : COMPUTER APPLICATIONS IN PHARMACY (PRACTICAL)

[P 210]

CO2	Illustrate basic understanding of computer fundamentals
CO3	Outline knowledge of operating system, MS-office, excess and internet networking and notepad.
CO4	Explain application of computers in pharmacy and operate word file, excel.



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COURSE OUTCOMES

B. PHARM. SEMESTER-III



Course : PHARMACEUTICAL ORGANIC CHEMISTRY - II (C 301)

CO1	Write the structure, name and the type of isomerism of the organic compound
CO2	Write the reaction, name the reaction and orientation of reactions
CO3	Account for reactivity/stability of compounds,
CO4	Prepare organic compounds

Course : PHYSICAL PHARMACEUTICS-I (C 302)

CO1	Understand various physicochemical properties of drug molecules in the designing the dosage forms
CO2	Know the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations
CO3	Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.

Course : PHARMACEUTICAL MICROBIOLOGY (C 303)

CO1	Understand methods of identification, cultivation and preservation of various microorganisms
CO2	To understand the importance and implementation of sterilization in pharmaceutical processing and industry
CO3	Learn sterility testing of pharmaceutical products
CO4	Carried out microbiological standardization of Pharmaceuticals.
CO5	Understand the cell culture technology and its applications in pharmaceutical industries.



Course : PHARMACEUTICAL ENGINEERING (C 304)

CO1	To know various unit operations used in Pharmaceutical industries.
CO2	To understand the material handling techniques.
CO3	To perform various processes involved in pharmaceutical manufacturing process.
CO4	To carry out various test to prevent environmental pollution.
CO5	To appreciate and comprehend significance of plant lay out design for optimum use of resources.
CO6	To appreciate the various preventive methods used for corrosion control in Pharmaceutical industries.

**Course : PHARMACEUTICAL ORGANIC CHEMISTRY II (PRACTICAL)
[P 305]**

CO1	Understand the methods of preparation and properties of organic compound from the known reactant
CO2	Outline and summarize reactions, mechanism, and orientation of some organic compound
CO3	Analyze and standardize the oils and fats using various identification tests
CO4	Learn techniques like recrystallization and steam distillation

Course : PHYSICAL PHARMACEUTICS – I (PRACTICAL) [P 306]

CO1	Determination the solubility of drug at room temperature
	Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.
CO2	Inculcate skill for the determination of pKa, partition co-efficient, HLB number using standard procedures.
CO4	Evaluate properties of surfactant using Freundlich and Langmuir, critical micellar



	concentration concept
CO5	Understand the process of stability constant and donor acceptor ratio determination using solubility and pH titration method

Course : PHARMACEUTICAL MICROBIOLOGY (PRACTICAL)

[P 307]

CO1	Summarize methods of sterilization and sterility testing as per I.p
CO2	Know various equipment used in microbiological studies with their general details
CO3	Learn the techniques of sterilization of culture media and glassware Study of disinfection factors and evaluation of disinfectants
CO4	Understand the concept of culturing, sub-culturing, isolation, and staining used in microbiology
CO5	Analyze sample for its microbiology aspects

Course :PHARMACEUTICAL ENGINEERING (PRACTICAL) [P 308]

CO1	Develop skill for determination of radiation constant, moisture content, loss on drying, humidity of air.
CO2	Analyze and reduce particle size of given solid material
CO3	Demonstration of colloid mill, planetary mixer, fluidized bed dryer, freeze dryer and such other major equipment.
CO4	Evaluate efficiency of heat transfer coefficient, steam distillation, rate of crystallization, and factors affecting rate of Filtration and Evaporation (Surface area, Concentration and Thickness/ viscosity).



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COURSE OUTCOMES

B. PHARM. SEMESTER-IV



Course : PHARMACEUTICAL ORGANIC CHEMISTRY –III (C 401)

CO1	Understand the methods of preparation and properties of organic compounds
CO2	Explain the stereo chemical aspects of organic compounds and stereo chemical reactions
CO3	Know the medicinal uses and other applications of organic compounds

Course : MEDICINAL CHEMISTRY-I (C 402)

CO1	Understand the chemistry of drugs with respect to their pharmacological activity
CO2	Understand the drug metabolic pathways, adverse effect and therapeutic value of drugs
CO3	Know the Structural Activity Relationship (SAR) of different class of drugs
CO4	Write the chemical synthesis of some drugs

Course : PHYSICAL PHARMACEUTICS-II (C 403)

CO1	Understand various physicochemical properties of drug molecules in the designing the dosage forms
CO2	Know the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations
CO3	Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.

Course : PHARMACOLOGY-I (C 404)



CO1	Understand the pharmacological actions of different categories of drugs
CO2	Explain the mechanism of drug action at organ system/sub cellular/macromolecular levels.
CO3	Apply the basic pharmacological knowledge in the prevention and treatment of various diseases.
CO4	Observe the effect of drugs on animals by simulated experiments.
CO5	Appreciate correlation of pharmacology with other bio medical sciences.

Course : PHARMACOGNOSY AND PHYTOCHEMISTRY I (C 405)

CO1	Know the techniques in the cultivation and production of crude drugs
CO2	Understand the details of crude drugs, their uses and chemical nature
CO3	Know the evaluation techniques for the herbal drugs
CO4	Carry out the microscopic and morphological evaluation of crude drugs

Course : MEDICINAL CHEMISTRY – I ((PRACTICAL) [P 406]

CO1	Prepare or synthesize various drug and intermediates from the suitable reactant
CO2	Understand the methods of partition coefficient method
CO3	Analyze the physicochemical properties of synthesized medicinal compounds as per the official procedures.

Course : PHYSICAL PHARMACEUTICS- II ((PRACTICAL) [P 407]

CO1	Describe various micrometrics properties of powder like particle size, particle size distribution, density, porosity using various techniques
CO2	Outline the influence of temperature ,light solvent, catalyst and other factors on rate of reaction
CO3	Outline measurement of various rheological properties and factors influencing of dispersed system.



CO4	Understand the kinetics properties or order of reaction for compound
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Course : PHARMACOLOGY-I ((PRACTICAL) [P 408]

CO1	Summarized different laboratory instruments and animals used in experimental pharmacology
CO2	Illustrate dissection of animal and isolation of different tissues for experimental pharmacology
CO3	Know methods of PSS preparation and determination of concentration of Ach using isolated preparations
CO4	Learn the pharmacological screening methods for muscle relaxant, antiparkinsonian, antipsychotic, Anxiolytic, local anaesthetics, locomotor, and anticonvulsant drugs
CO5	Describe various common laboratory techniques and various guideline by CPCSEA for animal experimentation

**Course :PHARMACOGNOSY AND PHYTOCHEMISTRY I (PRACTICAL)
[P 409]**

CO1	Analyze various crude drugs by using chemical tests
CO2	Understand the microbial characteristics of crude drug like stomatal number and index, vein islet number, vein islet termination and palisade ratio, size of starch grains, calcium oxalate crystals by eye piece micrometer.
CO3	Illustrate properties of crude drug like ash value, extractive values, moisture content, swelling index and foaming of crude drugs.



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COURSE OUTCOMES

B. PHARM. SEMESTER-V



Course: MEDICINAL CHEMISTRY II(C501)

CO1	Understand the chemistry of drugs with respect to their pharmacological activity.
CO2	Understand the drug metabolic pathways, adverse effect and therapeutic value of drugs.
CO3	Know the Structural Activity Relationship of different class of drugs.
CO4	Study the chemical synthesis of selected drugs.

Course: INDUSTRIAL PHARMACY-I (C502)

CO1	Know the various pharmaceutical dosage forms and their manufacturing techniques.
CO2	Know various considerations in development of pharmaceutical dosage forms
CO3	Formulate solid, liquid and semisolid dosage forms and evaluate them for their quality

Course: PHARMACOLOGY-II (C503)

CO1	Understand the mechanism of drug action and its relevance in the treatment of different diseases
CO2	Demonstrate isolation of different organs/tissues from the laboratory animals by simulated experiments
CO3	Demonstrate the various receptor actions using isolated tissue preparation
CO4	Appreciate correlation of pharmacology with related medical sciences

Course: PHARMACOGNOSY AND PHYTOCHEMISTRY II (504)

CO1	Know the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents
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CO2	Understand the preparation and development of herbal formulation
CO3	Understand the herbal drug interactions
CO4	Carryout isolation and identification of phytoconstituents

Course: PHARMACEUTICAL JURISPRUDENCE (C505)

CO1	Understand the concept of Pharmaceutical legislations and their implications in the development and marketing of pharmaceuticals.
CO2	Know various Indian pharmaceutical Acts and Laws
CO3	Know various regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals
CO4	Summarize code of ethics during the pharmaceutical practice

Course : INDUSTRIAL PHARMACY-I-Practical (C 506)

CO1	Understand the pre-formulation techniques for various dosage form
CO2	Know formulation and evaluation methods for various dosage forms
CO3	Summarize various coating techniques as well as quality control tests of manufactured dosage form
CO4	Develop skill for selection and evaluation of glass containers for storage of pharmaceutical products

Course : Pharmacology-II-Practical (C 507)

CO1	Demonstrate isolation of different organs/tissues from the laboratory animals by simulated experiments
CO2	Appreciate correlation between in vitro and in vivo experiments
CO3	Estimate the potency of the unknown sample using suitable bioassay method
CO4	Understand the concept of experimental pharmacology; demonstrate and identify the biological activity of unknown drug samples using basic behavioral pharmacology experimentation model for analgesic and anti-inflammatory drugs



CO5	Determine the P _{Ax} value of antagonist using isolated muscle preparation
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Course : PHARMACOGNOSY AND PHYTOCHEMISTRY-II (C 508)

CO1	Understand various concepts like morphology, histology, extraction, and detection of pharmacognostic principles
CO2	Develop skill required for the isolation, detection, and distillation of phytoconstituents
CO3	Learn various chromatographic techniques including TLC
CO4	Analyze crude drugs by using various chemical tests



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COURSE OUTCOMES

B. PHARM. SEMESTER-VI



Course: MEDICINAL CHEMISTRY – III (C601)

CO1	Understand the importance of drug design and different techniques of drug design
CO2	Understand the chemistry of drugs with respect to their biological activity.
CO3	Know the metabolism, adverse effects and therapeutic value of drugs.
CO4	Know the importance of SAR of drugs.

Course: PHARMACOLOGY-III (C602)

CO1	Understand the mechanism of drug action and its relevance in the treatment of different infectious diseases
CO2	Comprehend the principles of toxicology and treatment of various poisonings
CO3	Appreciate correlation of pharmacology with related medical sciences.

Course: HERBAL DRUG TECHNOLOGY (C603)

CO1	Understand raw material as source of herbal drugs from cultivation to herbal drug product
CO2	Know the WHO and ICH guidelines for evaluation of herbal drugs
CO3	Know the herbal cosmetics, natural sweeteners, nutraceuticals
CO4	Appreciate patenting of herbal drugs, GMP .

Course: BIOPHARMACEUTICS AND PHARMACOKINETICS (C604)

CO1	Understand the basic concepts in biopharmaceutics and pharmacokinetics and their significance.
CO2	Use of plasma drug concentration-time data to calculate the pharmacokinetic parameters to describe the kinetics of drug absorption, distribution, metabolism, excretion, elimination.
CO3	To understand the concepts of bioavailability and bioequivalence of drug products and their significance.



CO4	Understand various pharmacokinetic parameters, their significance & applications.
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Course: PHARMACEUTICAL BIOTECHNOLOGY (C605)	
CO1	Understanding the importance of Immobilized enzymes in Pharmaceutical Industries.
CO2	Genetic engineering applications in relation to production of pharmaceuticals.
CO3	Importance of Monoclonal antibodies in Industries.
CO4	Appreciate the use of microorganisms in fermentation technology.

Course: PHARMACEUTICAL QUALITY ASSURANCE (C606)	
CO1	Understand the cGMP aspects in a pharmaceutical industry.
CO2	Appreciate the importance of documentation.
CO3	Understand the scope of quality certifications applicable to pharmaceutical industries.
CO4	Understand the responsibilities of QA & QC departments.

Course : PHARMACEUTICAL MEDICINAL CHEMISTRY-III-Practical (C 607)	
CO1	Relate the pharmacopoeial assay of selected drugs
CO2	Analyze the physiochemical properties of synthesized medicinal compounds.
CO3	Drawing structures and reactions using chem draw
CO4	Learn the methodology for the preparation of the medicinal product intermediate using the microwave irradiation technique.

Course : PHARMACOLOGY-III-Practical (C 608)	
CO1	Demonstrate and identify the biological activity of unknown drug samples using an experimental pharmacological model.



CO2	Demonstrate and identify the biological activity of unknown drug samples using various isolated tissue preparations.
CO3	Determination of the acute toxicity of the test substance
CO4	Explain, apply, and interpret the biostatistical methods used in pharmacological research.

Course : HERBAL DRUG TECHNOLOGY-Practical (C 609)

CO1	Perform phytochemical screening of crude drugs.
CO2	Analyze various samples for their alcohol, aldehyde, phenol, and alkaloid content.
CO3	Incorporate standardized extracts in various formulations.



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COURSE OUTCOMES

B. PHARM. SEMESTER-VII



Course: INSTRUMENTAL METHODS OF ANALYSIS (C701)

CO1	Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis.
CO2	Understand the chromatographic separation and analysis of drugs.
CO3	Perform quantitative & qualitative analysis of drugs using various analytical instruments.

Course: INDUSTRIAL PHARMACY-II (C702)

CO1	Know the process of pilot plant and scale up of pharmaceutical dosage forms.
CO2	Understand the process of technology transfer from lab scale to commercial batch.
CO3	Know different Laws and Acts that regulate pharmaceutical industry.
CO4	Understand the approval process and regulatory requirements for drug products.

Course: PHARMACY PRACTICE (703)

CO1	Know various drug distribution methods in a hospital.
CO2	Appreciate the pharmacy stores management and inventory control.
CO3	Monitor drug therapy of patient through medication chart review and clinical review.
CO4	Obtain medication history interview and counsel the patients.
CO5	Identify drug related problems.
CO6	Detect and assess adverse drug reactions.
CO7	Interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states.
CO8	Know pharmaceutical care services.
CO9	Do patient counseling in community pharmacy.



CO10	Appreciate the concept of Rational drug therapy.
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Course: NOVEL DRUG DELIVERY SYSTEMS (C704)

CO1	Understand various approaches for development of novel drug delivery systems.
CO2	Emphasize the criteria for selection of drugs and polymers for the development of Novel drug delivery systems, their formulation and evaluation.

Course : INSTRUMENTAL METHODS OF ANALYSIS-Practical (C 705)

CO1	Estimate various samples using colorimetry and UV- Spectrophotometry
CO2	Develop skills to separate various amino acids, sugars, and pigments.
CO3	Demonstrate various chromatographic techniques.
CO4	Understand the method for determining the absorption maximum.



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COURSE OUTCOMES

B. PHARM. SEMESTER-VIII



Course: BIOSTATISTICS AND RESEARCH METHODOLOGY (C801E)

CO1	Know the operation of M.S. Excel, SPSS, R and MINITAB ® , DoE (Design of Experiment)
CO2	Know the various statistical techniques to solve statistical problems.
CO3	Appreciate statistical techniques in solving the problems.

Course: SOCIAL AND PREVENTIVE PHARMACY (C802E)

CO1	Acquire high consciousness/realization of current issues related to health and pharmaceutical problems within the country and worldwide.
CO2	Develop critical way of thinking based on current healthcare development.
CO3	Evaluate alternative ways of solving problems related to health and pharmaceutical issues.

Course: PHARMA MARKETING MANAGEMENT(C803E)

CO1	Understanding of marketing concepts and techniques and their applications in the pharmaceutical industry.
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Course: PHARMACEUTICAL REGULATORY SCIENCE (C804E)

CO1	Know about the process of drug discovery and development.
CO2	Know the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals.
CO3	Know the regulatory approval process and their registration in Indian and international markets.

Course: PHARMACOVIGILANCE (C805E)

CO1	Know why drug safety monitoring is important?
CO2	Appreciate history and development of pharmacovigilance.



CO3	Do detection of new adverse drug reactions and their assessment.
CO4	Know drug safety evaluation in paediatrics, geriatrics, pregnancy and lactation.

Course: QUALITY CONTROL AND STANDARDIZATION OF HERBALS (C806E)

CO1	Know WHO guidelines for quality control of herbal drugs.
CO2	Know Quality assurance in herbal drug industry.
CO3	Know the regulatory approval process and their registration in Indian and international markets.
CO4	Appreciate EU and ICH guidelines for quality control of herbal drugs.

Course: COMPUTER AIDED DRUG DESIGN (C807E)

CO1	Design and discovery of lead molecules.
CO2	Understand the concept of drug design, QSAR, and docking in drug discovery process.
CO3	Learn molecular docking technique and strategies for drug development

Course: CELL AND MOLECULAR BIOLOGY (C808E)

CO1	Summarize cell and molecular biology history
CO2	Summarize cellular functioning, composition and cell cycle
CO3	Describe the chemical foundations of cell biology.
CO4	Summarize the DNA properties of cell biology.
CO5	Describe protein, cellular membrane structure and function
CO6	Describe basic molecular genetic mechanisms.



Course: COSMETIC SCIENCE (C809E)

CO1	Describe the applications of cosmetics and cosmeceutical products especially for skin, hair, oral cavity.
CO2	Know the principles of formulation and building block of skin care and hair care products including antiperspirants and deodorants.
CO3	Appreciate the role of herbs in cosmetics.

Course: PHARMACOLOGICAL SCREENING METHODS (C810E)

CO1	Summarize the applications of various commonly used laboratory animals.
CO2	Demonstrate the various screening methods used in preclinical research.
CO3	Appreciate and demonstrate the importance of biostatistics and research methodology
CO4	Design and execute a research hypothesis independently.

Course: ADVANCED INSTRUMENTATION TECHNIQUES (C811E)

CO1	Illustrate advanced instruments used and its applications in drug analysis.
CO2	Develop skill for separation and analysis of drugs using the chromatography.
CO3	Understand the calibration of various analytical instruments.
CO4	Know analysis of drugs using various analytical instruments.

Course: DIETARY SUPPLEMENTS AND NUTRACEUTICALS (C812E)

CO1	Understand the need of supplements by the different group of people to maintain healthy life.
CO2	Understand the outcome of deficiencies in dietary supplements.
CO3	Appreciate the components in dietary supplements and the application.
CO4	Appreciate the regulatory and commercial aspects of dietary supplements including health.



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COURSE ATTAINMENT



To assess the attainment of course outcomes the institution adopts various direct and indirect assessment tools.

Direct assessment tools:	Indirect assessment tools:
<p>a. Student performance in examination (percentage of students passing in final year B. Pharm / M.Pharm examination)</p> <p>b. Student performance in Final semester M.Pharm Project</p>	<p>a. Graduate exit Feedback</p> <p>b. Interview assessment record</p> <p>c. Placement Record</p> <p>d. Alumni surveys</p> <p>e.. Percentage of students opting for higher studies</p>

These tools are implemented in different ways and then the course outcomes can be monitored as follows:

Implementation mechanism:	Outcome:
<ol style="list-style-type: none">1. Sessional examinations conducted by institute.2. Annual examination conducted by RTM Nagpur University3. Poster presentation competition4. Seminar delivered by students5. Assesment of students by corporate employees conducting interviews6. Alumni meet7. GPAT/CET examination for higher studies8. Exposure of students to sophisticated instruments9. Guest lectures/Seminar/ Workshops/Conferences10. Tutorial classes	<ul style="list-style-type: none">• Percent of students qualifying final year B.Pharm/M.Pharm exam.• Subject knowledge assessment in interviews.• Assessment of presentation and communication skill in seminar• Percent of students benefited by the professional training imparted by the institute.• Percent of employers satisfied by the performance of the graduates.• Percent of employers satisfied with graduate's ability to identify problems and provide remedy for the same.• Graduate feedback on academic ambience, co-curricular and extracurricular activities at the institute• Percent of students involved in social activity



11. Industrial visits/training 12. Co-curricular and Extracurricular activities 13. Projects on Environmental Sciences 14. Feedback activities	<ul style="list-style-type: none"> • Percent of students employed • Percent of student inclined to adapt new technology
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The course outcomes for all the courses can be summarized as follows:

No.	Name of the course	Course outcome
1.	Ph. D.	<ul style="list-style-type: none"> • Attainment of knowledge and skills leading to a better employability in various pharmaceuticals
2.	M. Pharm (Pharmaceutics)	<ul style="list-style-type: none"> • Higher knowledge in areas of production and quality control of pharmaceuticals • Capability of handling any project independently in areas of dosage form technology • Enhancement of communication skills through seminars • Overall personality development
3.	M. Pharm (Pharmaceutical Chemistry)	<ul style="list-style-type: none"> • Capability in handling of sophisticated analytical instruments • Capability of handling any project independently in areas of drug synthesis and analysis • Enhancement of communication skills through seminars • Overall personality development
4.	M. Pharm (Pharmacognosy)	<ul style="list-style-type: none"> • Enhancement of knowledge in areas of herbal drug research and development • Capability of handling any project independently in areas of herbal drug research • Enhancement of communication skills through seminars



		<ul style="list-style-type: none">• Overall personality development
5.	M. Pharm (Pharmacology)	<ul style="list-style-type: none">• Capability enhancement in animal handling and experimentation• Capability of handling any project independently in areas clinical trials, drug research etc• Enhancement of communication skills through seminars• Overall personality development
5	B. Pharm	<ul style="list-style-type: none">• Attainment of knowledge in areas related to drug development, design, dosage form development, herbal drugs etc• Students can work as registered pharmacists• Students develop entrepreneurship and innovative skills• They develop as a socially responsible human being since during the course they participate in issues such as swachta abhiyan, adult education• Students excel in the examinations conducted by the university and get placed in the pharmaceutical companies in different sectors• Students become capable to pursue higher education



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