



VISHAL JUNNAR SEVA MANDAL'S

VISHAL INSTITUTE OF PHARMACEUTICAL EDUCATION & RESEARCH

Dr. S. L. Jadhav
Principal

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P.C.I. Inst. Code : PCI-2620 | D.T.E. Inst. Code : 6361 | University I.D. No. : CPHP012670

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PRINCIPAL
VISHAL INSTITUTE OF PHARMACEUTICAL
EDUCATION AND RESEARCH
ALE TAL-JUNNAR DIST-PUNE 412411



ज्ञानमंगा घरोघरी

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PROGRAMME OUTCOMES (POS)

1. PROGRAMME OUTCOMES

Program Outcome enlisted below:

- PO1: 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.
- PO2: 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
- PO3: 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.
- PO4: Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations
- PO5: 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 wellbeing.
- PO6: 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).
- PO7: 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.
- PO08: 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

PO9: 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.

PO10: 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.

PO11: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. 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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COURSE OUTCOMES (COS)

B. PHARMACY

BP210P COMPUTER APPLICATION IN PHARMACY [Practical | regular]**CO ID. Course Outcome**

C210.1	To Know the Various Applications of Computer In Pharmacy
C210.2	To Know the Various Generations Of Computes
C210.3	To Know the Various Applications Of Databases In Pharmacy

BP205T COMPUTER APPLICATION IN PHARMACY [Theory | regular]**CO ID. Course Outcome**

C205.1	To study the various types of application of computers in pharmacy
C205.2	To know the various types of databases
C205.3	To know the various applications of databases in pharmacy
C205.4	To study the significance of computer application in the field of pharmacy
C205.5	To study and exercise different computer languages

BP 201T HUMAN ANATOMY & PHYSIOLOGY –II [Theory | regular]**CO ID. Course Outcome**

C201.1	To study the gross morphology, structure and functions of various organ of the human body.
C201.2	To identify the various tissues and organs of different system of human body.
C201.3	To describe the various homeostatic mechanisms and their imbalances
C201.4	To appreciate coordinated working pattern of different organs of each system.
C201.5	To appreciate the interlinked mechanisms in the maintenance of normal functioning of human body.

BP 207P HUMAN ANATOMY & PHYSIOLOGY –II [Practical | regular]**CO ID. Course Outcome**

C207.1	To study principals and theoretical aspects of the experiments as per curriculum.
C207.2	To assimilate skilled hands-on experimental techniques.
C207.3	To elaborate, discuss and document the principles, methodology and results of the experimental works.

202T PHARMA ORGANIC CHEMISTRY-I [Theory | regular]**CO ID. Course Outcome**

C202.1	Basic Principles of Organic Chemistry, Classification, Nomenclature and Isomerism
C202.2	Alkanes, Alkenes and Conjugated dienes
C202.3	Alkyl halides, Alcohols
C202.4	Carbonyl compounds (Aldehydes and ketones)
C202.5	Carboxylic acids, Aliphatic amines

BP 203T BIOCHEMISTRY [Theory | regular]

CO ID.	Course Outcome
C203.1	Explain the scope of Biochemistry in pharmacy. Explain the scope of Experimental Biochemistry in pharmacy and allied health sciences.
C203.2	Understand basics like bioenergetics, role of biochemical processes, cell metabolism, chemistry, function, classification, biological importance, qualitative identification tests & applications of carbohydrates.
C203.3	Understand the metabolism of nutrient molecules in physiological and pathological
C203.4	Understand the genetic organization of mammalian genome and functions of DNA in
C203.5	Understand the catalytic role of enzymes and importance of enzyme in biochemical process.

BP 206T ENVIROMENTAL SCIENCES [Theory | regular]

CO ID.	Course Outcome
C206.1	To know about the Multidisciplinary nature of environment and Natural Resources
C206.2	To study the concept of ecosystem
C206.3	To know about environment pollution and its types

BP 209P BIOCHEMISTRY [Practical | regular]

CO ID.	Course Outcome
C209.1	To study the principal and theoretical aspect of the experiment as per the curriculum
C209.2	To assimilate skilled hands-on experimental techniques
C209.3	To elaborate discuss the principles, methodology and result of the experimental work

P204T PATHOPHYSIOLOGY [Theory | regular]

CO ID.	Course Outcome
C204.1	Revise basic principles of cell injury and adaptation along with mechanism involved in process of inflammation and repair.
C204.2	Summarise pathophysiology involved in Cardiovascular System, Respiratory System, Renal System diseases.
C204.3	Describe etiology, pathogenesis and sign symptoms of diseases associated with bone liver and cancer.
C204.4	Discuss various diseases which cover endocrine, nervous and GI system.
C204.5	Explain pathophysiology of various infectious diseases.

BP205T COMPUTER APPLICATION IN PHARMACY [Theory | regular]

CO ID.	Course Outcome
C205.1	To study the various types of application of computers in pharmacy
C205.2	To know the various types of databases
C205.3	To know the various applications of databases in pharmacy
C205.4	To Study the significance of computer applications in the field of pharmacy

C205.5 To study and exercise different computer languages

BP208P PHARMA ORGANIC CHEMISTRY-I [Practical | regular]

CO ID. Course Outcome

C208.1 To study Principles and Theoretical Aspects of the Experiments as per Curriculum

C208.1 To assimilate skilled hands-on Experimental Techniques.

C208.1 To elaborate, discuss and document the Principles, Methodology and Results of the Experimental work

BP210P COMPUTER APPLICATION IN PHARMACY [Practical | regular]

CO ID. Course Outcome

C210.1 To know the various types of application of computers in pharmacy

C210.1 2. know the various types of application of computers in pharmacy

C210.1 To know the various applications of databases in pharmacy

BP402T PHYSICAL PHARMACEUTICS-II [Theory | regular]

CO ID. Course Outcome

C402.1 Understand the basic concepts in biopharmaceutics and pharmacokinetics and their significance.

C402.2 Studying pharmacokinetic processes and their relevance in efficacy of dosage form.
Use plasma drug concentration-time data to calculate the pharmacokinetic parameters to describe the kinetics of drug absorption, distribution, metabolism, excretion, elimination.

C402.3 Understand the concepts of bioavailability and bioequivalence of drug products and their significance.

C402.4 Understand the concept of dissolution and application of in vitro in vivo correlation in drug product development.

BP407T PHYSICAL PHARMACEUTICS-II [Practical | regular]

CO ID. Course Outcome

C407.1 To study principles and theoretical aspects of the experiments as per curriculum.

C407.2 To assimilate skilled hands-on Experimental Techniques.

C407.3 To elaborate, discuss and document the principles, methodology and results of the experimental work.

BP404T PHARMACOLOGY-I [Theory | regular]

CO ID. Course Outcome

C404.1 General Pharmacology

C404.2 General Pharmacology Pharmacodynamics

C404.3 Pharmacology of drugs acting on Peripheral Nervous System

C404.4 Pharmacology of drugs acting on central nervous system

C404.5 Psychopharmacological agent

BP 408 P PHARMACOLOGY I [Practical | regular]

CO ID. Course Outcome

C408.1 To study principles and theoretical aspects of the experiments as per curriculum.

C408.2 To assimilate skilled hands on experimental techniques.

C408.3 To elaborate ,discuss and document the principles, methodology and results of the experimental works.

BP401T PHARMACEUTICAL ORGANIC CHEMISTRY-III [Theory | regular]

CO ID. Course Outcome

C401.1 Stereo isomerism

C401.2 Geometrical isomerism

C401.3 Heterocyclic compounds

C401.4 Chemistry, Synthesis, Reactions and medicinal uses of heterocyclic compounds.

C401.5 Name Reactions of synthetic importance

BP402T MEDICINAL CHEMISTRY-I [Theory | regular]

CO ID. Course Outcome

C402T.2 Understand the general aspects of design of the drugs, history, classification, nomenclature, chemistry with reference to pharmacological activity, structure activity relationship (SAR), metabolic pathways, mechanism of action, therapeutic uses, adverse effects and recent developments in the Drugs acting on Autonomic Nervous system.

C402T.3 Understand the general aspects of design of the drugs, history, classification, nomenclature, chemistry with reference to pharmacological activity, structure activity relationship (SAR), metabolic pathways, mechanism of action, therapeutic uses, adverse effects and recent developments in the Cholinergic neurotransmitters and sympathomimetic agents.

C402T.1 Introduction to medicinal chemistry, its history and development, understand physicochemical properties in relation to biological action and concept of drug metabolism

C402T.4 Understand the general aspects of design of the drugs, history, classification, nomenclature, chemistry with reference to pharmacological activity, structure activity relationship (SAR), metabolic pathways, mechanism of action, therapeutic uses, adverse effects and recent developments in the Drugs acting on Central Nervous System.

C402T.5 Understand the general aspects of design of the drugs, history, classification, nomenclature, chemistry with reference to pharmacological activity, structure activity

relationship (SAR), metabolic pathways, mechanism of action, therapeutic uses, adverse effects and recent developments in the Centrally acting analgesics.

BP406P MEDICINAL CHEMISTRY I [Practical | regular]

CO ID.	Course Outcome
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|--------|---|
| C406.1 | To study principles & theoretical aspects of experiments as per curriculum |
| C406.2 | To assimilate skilled hands on experimental techniques. |
| C406.3 | To elaborate, discuss and document the principles, methodologies and results of experimental work |

BP405T PHARMCOGNOSY AND PHYTOCHEMISTRY-I [Theory | regular]

CO ID.	Course Outcome
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|--------|--|
| C405.1 | To provide the knowledge about the crude drugs. |
| C405.2 | To established the principle and uses of the crude drugs |
| C405.3 | To study the various adulteration processing. |
| C405.4 | To give he knowledge about the medicinal plants and their applications |
| C405.5 | To understanding the all plants hormones. |

BP409P PHARMCOGNOSY AND PHYTOCHEMISTRY-I [Practical | regular]

CO ID.	Course Outcome
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|--------|---|
| C409.1 | To study the medicinal drugs and their principles, uses etc. |
| C409.2 | To study the crude drugs and their observation under the microscope by using eyepiece and stage micrometer. |
| C409.3 | To elaborate, discuss and practically knowledge gain by using various processing conducted. |

BP603T HERBAL DRUG TECHNOLOGY [Theory | regular]

CO ID.	Course Outcome
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|--------|--|
| C603.1 | To study herb, herbal medicine, herbal medicinal product, herbal drug preparation and identification and authentication of herbal materials . |
| C603.2 | To study different herbal Nutraceuticals and understand the concept of herbal drug an herbal food interactions. |
| C603.3 | To study herbal cosmetics and their dosage forms and naturally obtain herbal excipient like natural sweetners and colorants also know the different herbal formulations. |
| C603.4 | understand the assessment of herbal drugs, Patenting and Regulatory requirements of natural products and Regulation of manufacture of ASU drugs - Schedule Z of Drugs & Cosmetics Act for ASU drugs. |
| C603.5 | To know the Good Manufacturing Practice of Indian systems of medicine for development of herbal drug industry in India. |

P605T PHARM. BIOTECHNOLOGY [Theory | regular]

CO ID.	Course Outcome
C605.1	Introduction to Biotechnology, Enzyme immobilization, Biosensors, Use of microbes in industry, Production of Enzymes, Basic principles of genetic engineering.
C605.2	Recombinant DNA technology, cloning vectors, various techniques used in recombinant DNA technology, PCR- types & applications, production of Interferons, hepatitis B vaccine & Insulin.
C605.3	Immunity, types of immunity, various defence mechanisms of host, Structure of Immunoglobulins, Hypersensitivity reactions, General method of the preparation of vaccines, Hybridoma technology- Production and Applications
C605.4	Immuno blotting techniques- ELISA, Western blotting, Southern blotting, Microbial genetics, Introduction to Microbial biotransformation and application, Mutation.
C605.5	General requirements of Fermentation, fermentor design and its various controls, Study of the production of - penicillins, Vitamin B12, Glutamic acid, Blood Products.

BP602T PHARMACOLOGY-III [Theory | regular]

CO ID.	Course Outcome
C602.1	Pharmacology of drugs acting on Respiratory system
C602.2	Pharmacology of drugs acting on the Gastrointestinal Tract
C602.3	Chemotherapy, Antibiotics
C602.4	Chemotherapy, Immunopharmacology, Anti-infective
C602.5	Principle of Toxicology

BP608P PHARMACOLOGY-III [Practical | regular]

CO ID.	Course Outcome
C608.1	To study principals and theoretical aspects of the experiments as per curriculum.
C608.2	To assimilate skilled hands-on experimental techniques.
C608.3	To elaborate, discuss and document the principles, methodology and results of the experimental works.

BP609P HERBAL DRUG TECHNOLOGY [Practical | regular]

CO ID.	Course Outcome
C609.1	To study Principles and Theoretical Aspects of the Experiments as per Curriculum.
C609.2	To assimilate skilled Hands-on Experimental Techniques.
C609.3	To elaborate, discuss and document the principles, Methodology and Results of the Experimental work

BP601T MEDICINAL CHEMISTRY -III [Theory | regular]

CO ID.	Course Outcome
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C601.1	ANTIBIOTICS
C601.2	Antibiotics and Antimalarials
C601.3	Antimycobacterial and Antiviral agents
C601.4	Synthetic anti-infective agents, Antifungal agents, Anti-protozoal Agents, Anthelmintics
C601.5	Anti-neoplastic agents

BP604T BIOPHARM AND PHARMACOKINETICS [Theory | regular]

CO ID.	Course Outcome
C604.1	Understand the basic concepts in biopharmaceutics and pharmacokinetics and their significance
C604.2	Studying pharmacokinetic processes and their relevance in efficacy of dosage form
C604.3	Use plasma drug concentration-time data to calculate the pharmacokinetic parameters to describe the kinetics of drug absorption, distribution, metabolism, excretion, elimination
C604.4	Understand the concepts of bioavailability and bioequivalence of drug products and their significance
C604.5	Understand the concept of dissolution and application of in vitro in vivo correlation in drug product development

BP606T QUALITY ASSURANCE [Theory | regular]

CO ID.	Course Outcome
C606.1	To understand the concept of QA, QC TQM, ICH guidelines, QbD
C606.2	To study quality control Organisation and personnel, premises, equipment and raw materials
C606.3	To understand the concept of Quality control and good laboratory practices
C606.4	To study about Complaints, document maintenance in pharmaceutical industry
C606.5	To understand about Calibration and validation, Warehousing

BP607P MEDICINAL CHEMISTRY -III [Practical | regular]

CO ID.	Course Outcome
C607.1	To study Principles and Theoretical Aspects of the Experiments as per Curriculum
C607.2	To assimilate skilled hands on Experimental Techniques.
C607.3	To elaborate, discuss and document the Principles, Methodology and Results of the Experimental work*

BP801T BIOSTATISTICS AND RESEARCH METHODOLOGY [Theory | regular]

CO ID.	Course Outcome
C801.1	To study biostatistics, mean mode measures of dispersion and correlations
C801.2	To study probability regression and parametric test

C801.3	To study non parametric test ,introduction to research
C801.4	To study regression modeling
C801.5	To study design and analysis of experiments

BP802T SOCAIL AND PRVENTIVE PHARMACY [Theory | regular]

CO ID.	Course Outcome
	Recognize the concepts and evaluation of public health,relate food to nutrition health,balanced diet, deficiencies and its prevention.Illustrate sociocultural factors and its relation with health. Identify avoidable habits for personal hygiene and health.
C802.1	
C802.2	Explain the principles on the prevention and control of communicable and noncomm.unicable diseasess
C802.3	Identify national health programmesits objectives functioning and outcomes.
C802.4	Recognize the community services in rural, urban , and school health.
C802.5	Explain the general measures and strategies to be followed in social and preventive pharmacy.

BP803ET. PHARM MARKETING MANGEMENT [Theory | regular]

CO ID.	Course Outcome
C803.1	Understand the general concept and scope of marketing and able to learn about anlaysing consumer and industrial buying behaviour.
C803.2	To know about product line and product mix decision and to study about product life cycle to study about branding, packaging and labelling decision of product.
C803.3	Understand methods, determinants of promotional mix and promotional budget get overview about personal selling, advertising, direct mail, journal, sampling, retailing, medical exhibition, public relations, online promotion technique for OTC products.
C803.4	To understand designing of channel including delection of suitable channel and channel members, possible conflicts in channels, physical distribution management in terms of planning and work distribution. duties of professional sales representative.
C803.5	Understanding of pricing concept and importance.

BP809ET COSMETIC SCIENCE [Theory | regular]

CO ID.	Course Outcome
	To understand Cosmetics, Cosmeceuticals and its Classification, Regulations. Detailed knowledge about excipients used in Cosmetics, and also in the Skin, Hair and Oral cavity preparations
C809.1	
C809.2	To gain a knowledge about Principles of formulation and building blocks of Skin Care Products, Antiperspirants and Deodorants and Hair Care Products
C809.3	Detailed knowledge about Sun protection. Study of role of Herbs in cosmetics and Analytical Cosmetics.

C809.4	Able to understand Cosmetic Evaluation with its principles.
C809.5	To study oily and dry skin and its causes. Cosmetics problems associated with skin etc. Mechanism of Antiperspirants

DIRECT SECOND YEAR

BP105T COMMUNICATION SKILLS [Theory | regular]

CO ID.	Course Outcome
C105.1	To study the communication skills
C105.2	To understand the communication process
C105.3	To study and understand the communication skills In the communication skills direct and indirect communication with the
C105.4	students
C105.5	To study the communication and soft skill development

BP111P COMMUNICATION SKILLS [Practical | regular]

CO ID.	Course Outcome
	To study principal and theoretical aspects of the experiments as per
C111.1	curriculum.
C111.2	To assimilate skilled handles on experimental methods To elaborate, discuss and documents the principles, methodology and results
C111.3	of the experimental works.

BP101T HUMAN ANATOMY AND PHYSIOLOGY I [Theory | regular]

CO ID.	Course Outcome
	Explain the gross morphology, structure and functions of various organs of the
C101.1	body
C101.2	Describe the various homeostatic mechanisms and their imbalance.
C101.3	Identify the various tissues of the human body
C101.4	Identify the organs of the human body
C101.5	Perform the various experiments related to special senses and nervous system.

BP102T PHARMACEUTICAL ANALYSIS-I [Theory | regular]

CO ID.	Course Outcome
C102.1	To study and understand instrumental methods of Analysis
C102.2	To study and understand acid base titration and non-aqueous titration
C102.3	To study and understand precipitation, complexometric and gravimetric titration
C102.4	To study and understand redox titrations
C102.5	To study and understand electrochemical methods and refractometry

BP107P HUMAN ANATOMY AND PHYSIOLOGY I [Practical | regular]

CO ID.	Course Outcome
	To study principals and theoretical aspects of the experiments as per curriculum.
C107.1	
C107.2	To assimilate skilled hands on experimental techniques.
	To elaborate, discuss and document the principles, methodology and results of the experimental works.
C107.3	

BP109P PHARMACEUTICS I [Practical | regular]

CO ID.	Course Outcome
	To study Principles and Theoretical Aspects of the Experiments as per Curriculum
C109.1	
C109.2	To assimilate skilled hands-on Experimental Techniques.
	To elaborate, discuss and document the Principles, Methodology and Results of the Experimental work
C109.3	

BP110P PHARMACEUTICAL INORGANIC CHEMISTRY [Practical | regular]

CO ID.	Course Outcome
	To study principal and theoretical aspects of the experiments as per curriculum.
C110.1	
C110.2	To assimilate skilled handles on experimental methods
	To elaborate, discuss and documents the principles, methodology and results of the experimental works.
C110.3	

BP108P PHARMA ANALYSIS-I [Practical | regular]

CO ID.	Course Outcome
	To study Principles and Theoretical Aspects of the Experiments as per Curriculum
C108.1	
C108.2	To assimilate skilled hands-on Experimental Techniques
C108.3	To elaborate, discuss and document the Principles, Methodology and Results of the Experimental work

BP112RBP RM. BIOLOGY [Practical | regular]

CO ID.	Course Outcome
	To study Principles and Theoretical Aspects of the Experiments as per Curriculum.
C112.1	
C112.2	To assimilate skilled Hands on Experimental Techniques.
	To elaborate, discuss and document the principles, Methodology and Results of the Experimental work
C112.3	

BP103T PHARMACEUTICS I [Theory | regular]

CO ID.	Course Outcome
C103.1	To study the history of pharmacy profession.
C103.2	To Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculation.
C103.3	To understand the professional way of handling the prescription & to study posology.
C103.4	To study the preparation of various dosage forms such as Powders, Suppositories, Liquid dosage forms and semisolid dosage forms.and
C103.5	To study the Monophasic & Biphasic liquid dosage forms.

BP 106RMT. REMEDIAL BIOLOGY [Theory | regular]

CO ID.	Course Outcome
C106.1	Understand diversity, characteristics of living organism. Binomial nomenclature and five kingdom classification. Study on different phyla, to differentiate all plants and understand anatomical features and differentiation of dicot and monocot root, stem and leaf.
C106.2	To know the importance of circulatory system in human body. Study function and composition of blood, process of blood coagulation, cardiac output, ECG. Understand process of digestion, absorption, assimilation of digested food, mechanism of breathing and its regulation.
C106.3	Understand excretory products and their elimination, human nervous system chemical co-ordination and regulation, human reproductive system.
C106.4	Study on plant and mineral nutrition with its application in photosynthesis. Understand plant respiration process, plant growth and development cell and tissue.
C106.5	

BP103T PHARMACEUTICAL INORGANIC CHEMISTRY [Theory | regular]

CO ID.	Course Outcome
C103.1	Illuminate relevance & significance of Inorganic Chemistry to Pharmaceutical Sciences.
C103.2	Explain basic concepts and principles, theories of aqueous acid base, complexation, solubility product and its relevance to titrations.
C103.3	General methods of preparation, assay for the compounds, properties and of inorganic compounds belonging to the different classes of inorganic pharmaceuticals like GI agents, dental products, major intra and extracellular electrolytes, expectorants, emetics, haematinics, antidotes, astringents, antimicrobials and radiopharmaceuticals.
C103.4	Know the sources of impurities and methods to determine the impurities in

inorganic drugs and pharmaceuticals.

- C103.5 Understand the aetiology of several diseases and disorder and pharmaceutical importance of inorganic compounds used in their treatment.

BP105T COMMUNICATION SKILLS [Theory | regular]

CO ID.	Course Outcome
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- | | |
|--------|--|
| C105.1 | To study the communication skills |
| C105.2 | To understand the communication processing and barriers in communication |
| C105.3 | To study and understand the communication skills, styles, and basic listening skills |
| C105.4 | In the communication skills direct and indirect communication with the students |
| C105.5 | To study the communication and soft skill development. |

BP111P COMMUNICATION SKILLS [Practical | regular]

CO ID.	Course Outcome
---------------	-----------------------

- | | |
|--------|--|
| | To study principal and theoretical aspects of the experiments as per curriculum. |
| C111.1 | |
| C111.2 | To assimilate skilled handles on experimental methods |
| | To elaborate, discuss and documents the principles, methodology and results |
| C111.3 | of the experimental works. |

BP303T PHARMACEUTICAL MICROBIOLOGY [Theory | regular]

CO ID.	Course Outcome
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- | | |
|--------|---|
| | History of microbiology, ultra-structure and morphological classification of bacteria, culture media, growth, growth curve, methods of cultivation and preservation of bacteria. |
| C303.1 | |
| C303.2 | Identification of bacteria using staining techniques and biochemical tests. Procedure and applications of various sterilization methods, efficiency of sterilization methods, equipments employed Sterility indicators. |
| C303.3 | Study of morphology, reproduction and cultivation of Fungi and Viruses. Classification and mode of action of disinfectants, Sterility testing of products |
| C303.4 | Designing of aseptic area, study of different sources of contamination in an aseptic area. Microbiological assay. |
| C303.5 | Microbial spoilage of pharmaceutical products, Cell culture technology and its applications in pharmaceutical industries. |

BP307P PHARMACEUTICAL MICROBIOLOGY [Practical | regular]

CO ID.	Course Outcome
---------------	-----------------------

- | | |
|--------|--|
| C307.1 | To study principles & theoretical aspects of experiments as per curriculum |
|--------|--|

C307.2	To assimilate skilled hands on experimental techniques
C307.3	To elaborate, discuss and document the principles, methodologies and results of experimental work.

BP306P PHYSICAL PHARMACEUTICS - I [Practical | regular]

CO ID.	Course Outcome
	To study principles and theoretical aspects of the experiments as per curriculum.
C306.1	
C306.2	To assimilate skilled hands on Experimental Techniques.
	To elaborate, discuss and document the principles, methodology and results of the experimental work.
C306.3	

308P PHARMACEUTICAL ENGINEERING [Practical | regular]

CO ID.	Course Outcome
	To study Principles and Theoretical Aspects of the Experiments as per Curriculum
C308.1	
C308.2	To assimilate skilled hands on Experimental Techniques.
	To elaborate, discuss and document the Principles, Methodology and Results of the Experimental work
C308.3	

304T PHARMACEUTICAL ENGINEERING [Theory | regular]

CO ID.	Course Outcome
C304.1	To study the flow of fluids, size reduction and size separation technique.
	To understand the process of heat transferred, Evaporation, distillation involved in pharmaceutical manufacturing process.
C304.2	
	Study Objectives, applications, mechanism & instrument used for drying & Mixing process
C304.3	
	To know about Objectives, applications, Theories & Factors influencing to filtration centrifugation technique
C304.4	
	To Study the Materials used for pharmaceutical plant construction & Corrosion and its prevention:
C305.5	

BP301T PHARMACEUTICAL ORGANIC CHEMISTRY II [Theory | regular]

CO ID.	Course Outcome
	To understand orbital structure of benzene, aromaticity, reactions of benzene and its orientation.
C301.1	
C301.2	To understand reactivity, stability and methods of preparations for Phenols and aromatic amines.
C301.3	To identify structure, name and the type of isomerism of the organic compounds, stereoisomerism and geometrical isomerism.

C301.4	Importance of Polynuclear hydrocarbons
C301.5	Stability, methods of preparation for cycloalkanes and study of fats and oils.

BP302T PHYSICAL PHARMACEUTICS - I [Theory | regular]

CO ID.	Course Outcome
	Investigate and apply various theories, laws and equations related to different states of matter
C302.1	
C302.2	Explain principles of complexation/protein binding and use them for calculations of drug release and stability constant.
C302.3	Understand the solubility and distribution phenomenon
C302.4	Demonstrate use of physicochemical properties of drugs in the formulation development and evaluation of dosage forms.
C302.5	Study surface tension, interfacial phenomenon, buffers and isotonic solutions.

BP305P PHARMACEUTICAL ORGANIC CHEMISTRY II [Practical | regular]

CO ID.	Course Outcome
	To study Principles and Theoretical Aspects of the Experiments as per Curriculum
C305.1	
C305.2	To assimilate skilled hands on Experimental Techniques.
	To elaborate, discuss and document the Principles, Methodology and Results of the Experimental work
C305.3	

BP502T INDUSTRIAL PHARMACY-I [Theory | regular]

CO ID.	Course Outcome
	Preformulation Studies, study of physicochemical characteristics of drug substances.
C502.1	
C502.2	Tablets, formulation of tablets, granulation methods, compression problems, equipments and tablet tooling, quality control tests. Tablet coating, types of coating, equipment employed and defects in coating, liquid orals.
C502.3	Hard gelatin capsules, production, filling & quality control tests. Soft gelatin capsules, pellets, pelletization process.
C502.4	Parenteral Products, vehicles, additives, formulation, production, quality control tests of parenteral products. Containers and closures. Ophthalmic Preparations.
C502.5	Pharmaceutical aerosols, cosmetics, packaging material science.

BP503T PHARMACOLOGY - II [Theory | regular]

CO ID.	Course Outcome
C503.1	The essential pharmacotherapy & pharmacological features of common &

	important drugs used in cardiovascular diseases
C503.2	The essential pharmacotherapy & pharmacological features of common & important drugs used in cardiovascular and Blood related disease.
C503.3	The essential pharmacotherapy & pharmacological features of diuretics & antidiuretics
C503.4	The essential pharmacotherapy & pharmacological features of Autocoids and related drugs
C503.5	pharmacological features of endocrine system

BP506P INDUSTRIAL PHARMACY-I [Practical | regular]

CO ID.	Course Outcome
C506.1	To study principles and theoretical aspects of Experiments as per curriculum.
C506.2	To assimilate skilled hands-on experimental techniques
C506.3	To elaborate discuss and document the principles methodology and results of the experimental work

BP508P PHARMACOGNOSY AND PHYTOCHEMISTRY II [Practical | regular]

CO ID.	Course Outcome
C508.1	To study principles and theoretical aspects of Experiments as per curriculum.
C508.2	To assimilate skilled hands on experimental techniques
C508.3	To elaborate discuss and document the principles methodology and results of the experimental work

BP501T MEDICINAL CHEMISTRY-II [Theory | regular]

CO ID.	Course Outcome
C501.1	Antihistaminic agents and autacoidsa) Antihistaminic agentsb) H1-antagonistsc) H2-antagonistsd) Gastric Proton pump inhibitorse) Autacoids[Diphenhydramine hydrochloride, Cetirizine, Promethazine hydrochloride, Ranitidine]
C501.2	Antidiabetic agents and Local anaesthetics
C501.3	Drugs acting on cardiovascular system
C501.4	Drugs acting on cardiovascular system
C501.5	Drugs acting on Endocrine system

BP504T PHARMACOGNOSY AND PHYTOCHEMISTRY II [Theory | regular]

CO ID.	Course Outcome
C504.1	To study different metabolic pathways in plants for secondary metabolites and utilization of radioactive isotopes in the investigation of Biogenetic studies.

C504.2	To study General introduction, composition, chemistry & chemical classes, biosources, therapeutic uses and commercial applications of following secondary metabolites:
C504.3	To study different technique for Isolation, Identification and Analysis of Phytoconstituents Terpenoids, Glycosides, Alkaloids and resins.
C504.4	To study the Industrial production, estimation and utilization of the following phytoconstituents: Forskolin, Sennoside, Artemisinin, Diosgenin, Digoxin, Atropine, Podophyllotoxin, Caffeine, Taxol, Vincristine and Vinblastine.
C504.5	To study Modern methods of extraction, application of latest techniques like Spectroscopy, chromatography and electrophoresis in the isolation, purification and identification of crude drugs.

BP505T PHARMACEUTICAL JURISPRUDENCE [Theory | regular]

CO ID.	Course Outcome
	Upon completion of this course the student should be able to:To knowledge about Objectives, Definitions, Import of drugs, Manufacture of drugs, Conditions for grant of license and conditions of license for manufacture of
C505.1	drugs as per Drug and Cosmetic Act 1940 Upon completion of this course the student should be able to:To understand different Schedules, sale of Drug and Administration of the Drug and
C505.2	Cosmetic Act 1940 and rules Knowledge about objectives, definitions, Authorities and Officers etc of Various Acts and Laws such as Pharmacy Act; Medicinal and Toilet
C505.3	Preparation Act; Narcotic Drugs and Psychotropic substances Act Knowledge about objectives, definitions, Salient Features, Authorities and Officers etc of Acts such as Drugs and Magic Remedies Act, Prevention of
C505.4	Cruelty to animals Act; NPPA Upon completion of this course the student should be able to:Understand The code of ethics during the pharmaceutical practice, Pharmaceutical Legislation
C505.5	in India, IPR, RTI.

BP507 PHARMACOLOGY - II [Practical | regular]

CO ID.	Course Outcome
C507.1	To study principles and theoretical aspects of Experiments as per curriculum.
C507.2	To assimilate skilled hands on experimental techniques To elaborate discuss and document the principles methodology and results of
C507.3	the experimental work

BP704T NOVEL DRUG DELIVERY SYSTEM [Theory | regular]

CO ID.	Course Outcome
C704.1	Controlled drug delivery systems: and polymer
C704.2	Microencapsulation, Mucosal and Implantable Drug Delivery Systems
C704.3	Transdermal, Gastroretentive and Nasopulmonary drug delivery system
C704.4	Targeted drug Delivery
C704.5	Ocular and Intrauterine Drug Delivery Systems

BP701T INSTRUMENTAL METHOD OF ANALYSIS [Theory | regular]

CO ID.	Course Outcome
C701.1	UV Visible spectroscopy, Fluorimetry
C701.2	IR spectroscopy, Flame Photometry, Atomic absorption spectroscopy, Nepheloturbidometry
C701.3	Introduction to chromatography
C701.4	Gas chromatography, High performance liquid chromatography (HPLC)
C701.5	Ion exchange chromatography, Gel chromatography, Affinity chromatography

BP702 T INDUSTRIAL PHARMACY [Theory | regular]

CO ID.	Course Outcome
C702.1	Know the process of pilot plant and scale up of pharmaceutical dosage forms Study of Granulation technology and transfer, WHO guideline QMS and TT agency like APCTD NDC TIFAC BCIL TBSE SIDBI
C702.2	TO Study and understand history role responsibility and authority of regulatory affairs.
C702.3	To understand concept QMS QbD Six Sigma OOS Change Control ISO Series NABL GLP
C702.4	To study regulatory requirement of CDSCO State licensing authority and new drug approval requirement

BP705P INSTRUMENTAL METHOD OF ANALYSIS [Practical | regular]

CO ID.	Course Outcome
C705.1	To understand and perform qualitative and quantitative analysis of drug by UV-VIS Spectroscopy
C705.2	To understand and perform qualitative and quantitative analysis by colorimetry
C705.3	To understand and perform qualitative and quantitative analysis of drug by using fluorimetry and flame photometry.
C705.4	To understand and perform qualitative and quantitative analysis of drug by nepheloturbidimetry

C705.5 To understand and perform qualitative and quantitative analysis of drug by paper, TLC ,Column ,GC,HPLC

BP703T PHARMACY PRACTICE [Theory | regular]

CO ID. Course Outcome

- Students will demonstrate knowledge of and ability to use principles of therapeutics, quality improvement, communication, economics, health behavior, social and administrative aspects, health policy and legal issues in the practice of pharmacy.
- C703.1
- C703.2 Students will use knowledge of drug distribution methods in hospital and apply it in the practice of pharmacy.
- C703.3 Students will effectively apply principles of drug store management and inventory control to medication use.
- C703.4 Students will provide patient-centered care to diverse patients using the best available evidence and monitor drug therapy of patient through medication chart review, obtain medication history interview and counsel the patients, identify drug related problems.
- C703.5 Students will engage in innovative activities by making use of the knowledge of clinical trials.
- C703.6 Students will exhibit professional ethics by producing safe and appropriate medication use throughout society.




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COURSE OUTCOMES (COS)
M. PHARMACY
(PHARMACEUTICS)

SEM III

MRM301T Research Methodology and Biostatistics [Theory | Regular]

CO ID.	Course Outcome
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	Understand the concept of General Research Methodology which consist of Research, Objectives, Requirements, practical difficulties etc.,
C301.1	Study of definitions, application, sample size, importance of sample size, factors affecting of Biostatistics
C301.2	Understand History, Value in medical ethics, beneficence, autonomy etc of medical research
C301.3	Describe CPCSEA Guidelines for lab animal facility
C301.4	Understand the concept of Declaration of Helsinki, its introduction, basic principles etc.
C301.5	

SEM I

MPH 103T Modern Pharmaceutics [Theory | Regular]

CO ID.	Course Outcome
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	Understand the concept of Preformulation. Different theories of dispersion and pharmaceutical Dispersion. Concept of LVP-Physiological and formulation consideration
C103.1	Study the concept, parameters and techniques of Optimization. Explain the concept of Factorial Design
C103.2	Explain Scope Merits of Validation, ICH Guidelines. Study of Validation of different manufacturing equipment's. Concept of technology transfer
C103.3	Study Objective and Policies of cGMP, Layout of Building, Production organization, sales forecasting, budget etc. Concept of Total Quality Management
C103.4	Study of Compression and compaction and Consolidation parameters and also different dissolution and Pharmacokinetic Parameters. Explain different Dissolution models.
C103.5	

MPH101T Modern Pharmaceutical Analytical Techniques [Theory | Regular]

CO ID.	Course Outcome
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	Study of Analytical techniques such as UV-Visible Spectroscopy, IR Spectroscopy, Spectroflurometry,
C101.1	Understand Theoretical concept of NMR Spectroscopy. Describe Spin-Spin Coupling, FT NMR, 13C NMR
C101.2	Study of Principle, Instrumentation, Application of Mass Spectroscopy. Describe Simple structure elucidation problem
C101.3	Study of Principles, instrumentation, Chromatographic parameters and application of
C101.4	

HPLC, HPTLC, Ion Exchange, Gas etc

C101.5 Understand concept of Electrophoresis, X-ray Crystallography involved Principles, instrumentation, working Condition, application. Study of Thermal techniques such as TGA, DSC and DTA

MPH102T Drug Delivery System [Theory | regular]

CO ID.	Course Outcome
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C102.1	To study the fundamentals of Sustained Release and Controlled Release Formulations. Various Approaches for SR/CR formulation. Study of Polymers and Dosage form for Personalized Medicine
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C102.2	Explain the concept of Rate Controlled Drug Delivery System. Study of Activation approaches.
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C102.3	Describe the Principles and Fundamentals of Gastroretentive Drug Delivery System. Study of Buccal Drug Delivery
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C102.4	Understand the concept of Occular Drug Delivery Systems, different barriers of Drug Permeation. Study Concept of Transdermal Drug Delivery System.
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C102.5	Explain barriers of Protein delivery, Formulation and Evaluation in Protein and Peptide Delivery system. Study of Vaccines, Concept of Mucosal and Trandermal Delivery of Vaccines
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MPH104T Regulatory Affairs [Theory | regular]

CO ID.	Course Outcome
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C104.1	Understand documentation in pharmaceutical industry and generic product development. Explain the concept of Hatch-Waxman Act, ANDA Regulatory approvals and BA. Study Regulatory requirement for product approvals
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C104.2	Describe the concept of CMC, Post approval regulatory affairs also study the different regulatory requirements of EU, NHRA, TGA and ROW countries.
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C104.3	Study of global submission of IND, NDA, ANDA, Investigation of Medicinal Product dossier and IB
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C104.4	Describe Clinical trials, developing its protocol, Institutional review board, HIPAA etc.
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MPH105P Pharmaceutics Practical I [Practical | regular]

CO ID.	Course Outcome
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MPH105P.1	To study Principles and Theoretical Aspects of the Experiments as per Curriculum
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MPH105P.2	To Assimilate skilled hands on Experimental Techniques.
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MPH105P.3	Elaborate, Discuss and Document the Principles, Methodology and Results of the Experimental Work.
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SEM II**MPH201T Molecular Pharmaceutics (Nanotech and Targeted DDS) [Theory | regular]**

CO ID.	Course Outcome
	Describe concept, biological process involved in Tumour Targeting and Brain specific drug delivery
C201.1	
C201.2	Understand the concept of targeting method of Nanoparticles and Liposomes.
	Study Types, preparation and evaluation of monoclonal antibodies, Niosomes, aquasomes, phytosomes etc.
C201.3	
	Study aerosol, propellents, Container types preparation and evaluation of pulmonary drug delivery system and Intranasal Route drug delivery system.
C201.4	
	Explain Gene therapy, Potential target diseases for gene therapy, gene expression systems in Nuclein Acid Based Therapeutics Delivery System. Study Biodistribution and Pharmacokinetics
C201.5	

MPH202T Advanced Biopharmaceutics and Pharmacokinetics [Theory | regular]

CO ID.	Course Outcome
	To understand the concept of drug absorption, factors affecting drug absorption, dissolution methods, In vitro dissolution testing models and Invitro In vivo correlation.
C202.1	
	Explain Biopharmaceutics factors affecting drug bioavailability, formulation factor affecting drug product performance, In vitro-In vivo correlation.
C202.2	
	Study Basic Pharmacokinetic consideration, pharmacokinetic models and compartment modeling. Describe Drug Interactions
C202.3	
	Understand the concept of Bioavailability and Bioequivalence, Drug Product Performance, Permeability under the topic Drug product performance.
C202.4	
	Study application of pharmacokinetics in relation to Modified-Release Drug Products. Introduction to Pharmacokinetic and pharmacodynamic and study of Gene Therapies.
C202.5	

MPH203T Computer Aided Drug Development [Theory | regular]

CO ID.	Course Outcome
CO1	To study history of computers in pharmaceutical research and development
CO2	Computational modelling in drug disposition
CO3	To study Computers in preclinical Development
CO4	To study optimization techniques in pharmaceutical formulation
CO5	TO study computers in clinical development

MPH204T Cosmetics and Cosmeceuticals [Theory | regular]

CO ID.	Course Outcome
	Understand the Regulatory requirements of cosmetics, Study Regulatory provisions related to import, concept of misbranded and spurious cosmetics, Regulatory provision related to manufacturing of cosmetics
C204.1	
C204.2	Explain Biological aspects of Cosmetics
	Understand the Formulation building blocks for different formulations of Cosmetics/ cosmeceuticals. Study Surfactants, Perfumes etc.
C204.3	
	Study design of different cosmeceutical products Sunscreen, mouth odor, bleeding gum dental cavities etc.
C204.4	
C204.5	Study concept of Herbal Cosmetics

MPH205P Pharmaceutics Practical II [Practical | regular]

CO ID.	Course Outcome
MPH205P.1	To study Principles and Theoretical Aspects of the Experiments as per Curriculum
MPH205P.2	To Assimilate skilled hands-on Experimental Techniques. Elaborate, Discuss and Document the Principles, Methodology and Results of the
MPH205P.3	Experimental Work.




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COURSE OUTCOMES (COS)

M. PHARMACY

(PHARMACEUTICAL QUALITY ASSURANCE)

SEM III

MRM301T Research Methodology and Biostatistics [Theory | regular]

CO ID.	Course Outcome
	Understand the concept of General Research Methodology which consist of
C301.1	Research, Objectives, Requirements, practical difficulties etc.,
	Study of definations, application, sample size, importance of sample size, factors
C301.2	affecting of Biostatistics
	Understand History, Value in medical ethics, beneficience, autonomy etc of
C301.3	medical research
C301.4	Describe CPCSEA Guidelines for lab animal facility
	Understand the concept of Declaration of Helsinki, its introduction, basic
C301.5	principles etc.

SEM I

MPA 104T Product Development and Technology Transfer [Theory | regular]

CO ID.	Course Outcome
C104.1	TO study Principles of Drug discovery and development
C104.2	Describe Pre-formulation studies
C104.3	Pilot plant scale up
C104.4	Pharmaceutical packaging
C104.5	Technology transfer

MPA 103T Quality Control and Quality Assurance [Theory | regular]

CO ID.	Course Outcome
	Understand the concept and evaluation and scope of QC and QA, GLP, GMP,
C103.1	ICH Guidelines. Study of GLP, CPCSEA Guidelines
	Knowledge about cGMP guidelines according to schedule M, USFDA (inclusive
	ofCDER and CBER) Pharmaceutical Inspection Convention (PIC), WHO and
C103.2	EMA covering
	Understand IPQC, Development specification, purchase specification and IPQC
C103.3	and finished product quality control for pharmaceutical dosage form.
C103.4	Study about documentation in pharmaceutical industry and distribution records.
	To know about manufacturing operation and controls consisting of sanitization,
C103.5	IPQC, Process deviation etc.

MQA 105P Pharmaceutical Quality Assurance Practical I [Practical | regular]

CO ID.	Course Outcome
C105.1	To study principles and theoretical aspects of Experiments as per curriculum.

C105.2	To assimilate skilled hands-on experimental techniques
C105.3	To elaborate discuss and document the principles methodology and results of the experimental work

MQA101T Modern Pharmaceutical Analytical Techniques [Theory | regular]

CO ID.	Course Outcome
C101.1	Study of Analytical techniques such as UV-Visible Spectroscopy, IR Spectroscopy, Spectrofluorometric, Understand Theoretical concept of NMR Spectroscopy. Describe Spin-Spin Coupling, FT NMR, ¹³ C NMR
C101.2	Study of Principle, Instrumentation, Application of Mass Spectroscopy. Describe Simple structure elucidation problem
C101.3	Study of Principles, instrumentation, Chromatographic parameters and application of HPLC, HPTLC, Ion Exchange, Gas etc
C101.4	Understand concept of Electrophoresis, X-ray Crystallography involved Principles, instrumentation, working Condition, application. Study of Thermal techniques such as TGA, DSC and DTA
C101.5	

MQA102T Quality Management System [Theory | regular]

CO ID.	Course Outcome
C102.1	To study the importance of Quality, strategic quality management, customer focus, and cost of quality.
C102.2	To study the concept of QMS, TQM, Six sigma ISO, ICH, 21 CFR, WHO GMP Guideline.
C102.3	To study Six System Inspection model: QMS facility, quality system changes control CAPA, OOS, OOT, complaint handling and investigation, IPQC, area clearance line clearance.
C102.4	To study drug stability ICH Q8 and Q9 guidelines
C102.5	To Understand the concept of SPC and Bench marking

SEM II

MQA 204T Pharmaceutical Manufacturing Technology [Theory | regular]

CO ID.	Course Outcome
C204.1	Pharmaceutical industry developments
C204.2	Aseptic process technology
C204.3	Non sterile manufacturing process technology
C204.4	Containers and closures for pharmaceuticals
C204.5	Quality by design (QbD) and process analytical technology

MQA201T Hazards and Safety Management [Theory | regular]

CO ID.	Course Outcome
C201.1	To know about multidisciplinary nature of environment and Ecosystem.
C201.2	To study Air based Hazards and fire protection system
C201.3	understand the chemical-based hazards and management of combustible gases
C201.4	To study the preventive and protective management from fire and Explosions.
C201.5	To study hazards and risk management

MQA202T Pharmaceutical Validation [Theory | regular]

CO ID.	Course Outcome
C202.1	To study the concept of calibration, qualification and validation
C202.2	To study the qualification of various equipments and instruments
C202.3	To study the process validation of different dosage form
C202.4	Validation of analytical method for estimation of drugs
C202.5	To study the cleaning validation of equipments employed in manufacturing of pharmaceuticals

MQA203T Audit and Regulatory Compliance [Theory | regular]

CO ID.	Course Outcome
C203.1	Introduction Objectives, Management of audit, Responsibilities, planning process, information gathering, administration, Classifications of deficiencies
C203.2	Role of quality systems and audits in pharmaceutical manufacturing environment: cGMP Regulations, Quality assurance functions, Quality systems approach, Management responsibilities, Resource, Manufacturing operations, Evaluation activities, transitioning to quality system approach, Audit checklist for drug industries.
C203.3	To understand Auditing of vendors and production department: Bulk Pharmaceutical Chemicals and packaging material Vendor audit, Warehouse and weighing, Dry Production: Granulation, tableting, coating, capsules, sterile production and packaging
C203.4	Auditing of Microbiological laboratory: Auditing the manufacturing process, Product and process information, General areas of interest in the building raw materials, Water, Packaging materials.
C203.5	To know Auditing of Quality Assurance and engineering department: Quality Assurance Maintenance, Critical systems: HVAC, Water, Water for Injection systems, ETP.

MQA205P Pharmaceutical Quality Assurance Practical II [Practical | regular]

CO ID.	Course Outcome
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- MQA205P.1 To study Principles and Theoretical Aspects of the Experiments as per Curriculum
- MQA205P.2 To Assimilate skilled hands-on Experimental Techniques.
- Elaborate, Discuss and Document the Principles, Methodology and Results of the
- MQA205P.3 Experimental Work.




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