



## NANDED PHARMACY COLLEGE, NANDED

### **2.6 STUDENT PERFORMANCE & LEARNING OUTCOMES**

**2.6.1 Program Outcomes (POS) and Course Outcomes (COS) for all Programs offered by the institution are stated and displayed on website**

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Shyam Nagar, Nanded - 431 605 Maharashtra India (19.175868,77.307992)

Phone – 91 2462 254347 Tele fax No. 91 2462 254445 (O)

Visit: [www.nandedpharmacycollege.org.in](http://www.nandedpharmacycollege.org.in); Email: [ssbesnpc146@gmail.com](mailto:ssbesnpc146@gmail.com)

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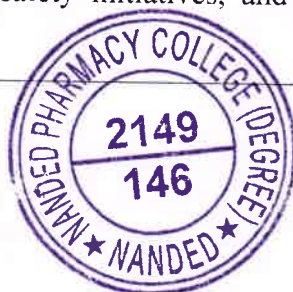
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## PHARMACY PROGRAM OUTCOMES

### (B. PHARM & M. PHARM)

Program Outcomes	Statement/Description
PO1	<b>Pharmacy Knowledge:</b> Understand the core and fundamental knowledge associated with the pharmacy profession, such as pharmaceutical sciences, biomedical sciences, Ethical and Professional Behaviour, administrative pharmacy sciences, and manufacturing practises.
PO2	<b>Planning Abilities:</b> Proper planning skills, including time management, professional activity management, resource management, delegation skills, and organisational skills, must be exhibited. Planning of implementation strategies, as well as set up tasks to accomplish deadlines.
PO3	<b>Problem analysis:</b> Students will be able to critically analyze and solve complex pharmaceutical problems using logical reasoning, scientific principles, and evidence-based approaches.
PO4	<b>Design/development of solutions:</b> Design solutions, system and processes for complex problems or that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO5	<b>Modern tool usage:</b> Students will be proficient in utilizing modern technologies, software applications, and information systems pertinent to pharmacy practice while being aware of their limitations.
PO6	<b>Leadership skills:</b> The program will equip students with leadership qualities, enabling them to effectively manage and lead interprofessional teams, contribute to medication safety initiatives, and drive innovative pharmacy practice.



  
Prof. (Dr.) N. B. Ghiware  
PRINCIPAL  
Nanded Pharmacy College,  
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PO7	<b>Professional Identity:</b> Program will develop a strong professional identity, demonstrating ethical behaviour, integrity, and accountability in all aspects of pharmacy practice.
PO8	<b>Pharmaceutical Ethics:</b> Maintain personal morals and apply them in social and professional situations. Make moral decisions and accept responsibility for the consequences of those decisions. Maintain Patient confidentiality, informed consent together with responsible use of medications.
PO9	<b>Communication:</b> Possess excellent communication skills, enabling effective interaction with patients, healthcare professionals, stakeholders and with society at large to provide clear and concise medication counselling, drug information, and pharmaceutical care. Able to understand and write effective reports, make effective presentations and documentation, and give and receive clear instructions.
PO10	<b>The Pharmacist and society:</b> Understand the role of the pharmacist as a healthcare professional and the impact of pharmacy practice on public health, community education, and patient advocacy.
PO11	<b>Environment and sustainability:</b> The program will foster an awareness in societal and environmental contexts of pharmacy practice, emphasizing the proper disposal of pharmaceutical waste, promoting green initiatives, and optimizing medication use to minimize environmental impact.
PO12	<b>Life-long learning:</b> Recognize the importance of continuous learning and professional development in the dynamic field of pharmacy. Possess the ability to adapt emerging pharmaceutical trends, technologies, evolving pharmacy regulations and research advancements by engaging in ongoing education and self-directed learning.



  
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## PHARMACY PROGRAM SPECIFIC OUTCOMES

### (B. PHARM & M. PHARM)

Program Specific Outcomes (PSO)	Statement/Description
PSO1	To train the students in various branches like Pharmaceutics, Pharmacology, Pharmaceutical Chemistry, Pharmacognosy and Pharmacy Practice in order to develop competent professionals, future leaders and responsible citizens.
PSO2	To impart various practical skills and training to the aspiring pharmacist to cater the industry and society in order to create employment opportunities.
PSO3	To develop students' entrepreneurial skills and encourage them to start commercial production of drugs and formulations, sales and marketing, packaging, retail, and wholesale businesses.
PSO4	To enable student to peruse for higher education and research in pharmaceutical and healthcare field.
PSO5	To develop the expertise right from the drug discovery up to its final administration to patient to alleviate suffering of humanity through the practice of pharmacy and to bring happiness to all.



  
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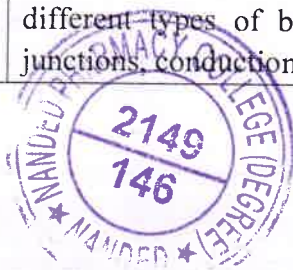
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## COURSE OUTCOMES

### PROGRAM: B. PHARMACY

B. PHARM FIRST YEAR-I <sup>ST</sup> SEMESTER			
SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Human Anatomy and Physiology I (Theory)	BP101TCO1	<b>Knowledge</b> of various homeostatic mechanisms and their imbalances, Body fluids, Systems.	L 1
	BP101TCO2	<b>Understand</b> the concepts of human body allowing verification of physiological processes through the experiments on living tissues, intact animal or normal human beings.	L 2
	BP101TCO3	<b>Apply</b> the skills to Appreciate coordinated working pattern of different organs of each system	L 3
	BP101TCO4	<b>Illustrate</b> the intracellular signalling pathway activation by extracellular signal molecule & functions of various nerves based on the information gained	L 4
	BP101TCO5	<b>Evaluate</b> the various tissues and organs of different systems of human body.	L 5
	BP101TCO6	<b>Developing</b> the models or charts to identify the different types of bones in human body, Muscles, junctions, conduction system in the human body	L 6
Human Anatomy and Physiology I (Practical)	BP107PCO1	<b>Knowledge</b> of determination of different parameters related to blood.	L 1
	BP107PCO2	<b>Understand</b> the concepts of human body allowing verification of physiological processes through the experiments on living tissues, intact animal or normal human beings.	L 2
	BP107PCO3	<b>Identify</b> the various tissues of different systems of human body.	L 3
	BP107PCO4	<b>Illustrate</b> the various experimental techniques related to physiology	L 4
	BP107PCO5	<b>Evaluate</b> the various tissues, bones and organs of different systems of human body.	L 5
	BP107PCO6	<b>Developing</b> the models or charts to identify the different types of bones in human body, Muscles, junctions, conduction system in the human body	L 6



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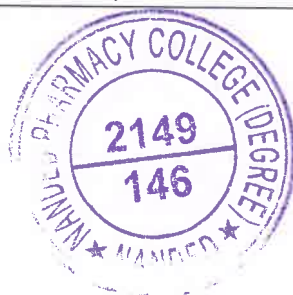
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B. PHARM FIRST YEAR-I <sup>ST</sup> SEMESTER			
SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Pharmaceutical Analysis I (Theory)	BP102T-CO1	<i>Knowledge</i> and importance of chemical analysis in pharmaceutical industry.	L1
	BP102T-CO2	<i>Understand</i> fundamental principles of Titrimetric and electro analytical methods.	L2
	BP102T-CO3	<i>Develop</i> problem solving skill required during preparation and standardization of chemical solutions.	L3
	BP102T-CO4	<i>Operate</i> the electroanalytical instruments and implement the analytical procedure in correct manner	L4
	BP102T-CO5	<i>Examine</i> the purity of substance to ascertain its usefulness.	L5
	BP102T-CO6	<i>Propose</i> new analytical methods & correct implementation of official analytical method.	L6
Pharmaceutical Analysis I (Practical)	BP108PCO1	<i>Knowledge</i> of official titrimetric methods & limit test use in pharmaceutical industry.	L1
	BP108PCO2	<i>Understand</i> principle & procedure of Titrimetric and electro analytical methods.	L2
	BP108PCO3	<i>Apply</i> practical skill & problem-solving skills required during preparation and standardization of chemical solutions.	L3
	BP108PCO4	<i>Operate</i> and handle critically the electroanalytical instruments	L4
	BP108PCO5	<i>Evaluate</i> the purity of substance to assure its utility.	L5
	BP108PCO6	<i>Propose</i> way to minimize errors come across throughout analysis.	L6



  
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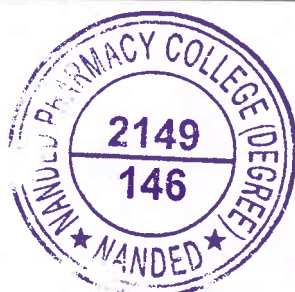
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B. PHARM FIRST YEAR-I <sup>ST</sup> SEMESTER			
SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Pharmaceutics I (Theory)	BP103T-CO1	<i>Knowledge</i> of pharmacy, development of pharmacy and the role of pharmacists in health care	L1
	BP103T-CO2	<i>Understanding</i> dose and dose calculation, routes of drug administration. Importance of prescription	L2
	BP103T-CO3	<i>Practising</i> preparation technique for various dosage forms, and selection of excipients	L3
	BP103T-CO4	<i>Analyse</i> basics of incompatibilities and various additives used for drug product.	L4
	BP103T-CO5	<i>Evaluate</i> the compounding & dispensing processes of dosage forms.	L5
	BP103T-CO6	<i>Summarize</i> the techniques used for the characterization of pharmaceutical dosage forms,	L6
Pharmaceutics I (Practical)	BP109P-CO1	<i>Knowledge</i> about the principle and preparation procedure related to conventional dosage forms	L1
	BP109P-CO2	<i>Understanding</i> the type of conventional dosage forms.	L2
	BP109P-CO3	<i>Practising</i> application to create safe, effective, and patient-friendly medications	L3
	BP109P-CO4	<i>Analyse</i> dosage form involves assessing various factors and intended use.	L4
	BP109P-CO5	<i>Evaluate</i> conventional dosage forms.	L5
	BP109P-CO6	<i>Develop</i> technique in compounding and dispensing of different dosage forms	L6



  
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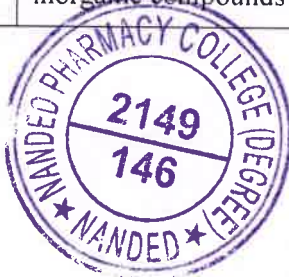
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B. PHARM FIRST YEAR-I <sup>ST</sup> SEMESTER			
SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Pharmaceutical Inorganic Chemistry (Theory)	BP104TCO1	<i>Knowledge</i> of the principle of purity and recognizing qualitative and quantitative test	L1
	BP104TCO2	<i>Understand</i> , Summarize, and Relate pharmacopeial description.	L2
	BP104TCO3	<i>Modify</i> and develop methods to determine the impurities in inorganic drugs and pharmaceuticals	L3
	BP104TCO4	<i>Classify</i> inorganic compounds with their activity	L4
	BP104TCO5	<i>Determine</i> the structure, properties, reactions, and synthesis of various inorganic compounds.	L5
	BP104TCO6	<i>Estimate</i> medicinal and pharmaceutical importance of inorganic compounds	L6
Pharmaceutical Inorganic Chemistry (Practical)	BP110PCO1	<i>Knowledge</i> of the limit test use in the pharmaceutical industry.	L1
	BP110PCO2	<i>Understand</i> the principle and procedure of synthesis of different compounds	L2
	BP110PCO3	<i>Apply</i> practical skill & problem-solving skills required during the preparation	L3
	BP110PCO4	<i>Develop</i> problem-solving skills required during the preparation of chemical solutions	L4
	BP110PCO5	<i>Determine</i> different anions, cations, and different inorganic pharmaceuticals.	L5
	BP110PCO6	<i>Estimate</i> the medicinal and pharmaceutical importance of inorganic compounds	L6



  
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## B. PHARM FIRST YEAR-I<sup>ST</sup> SEMESTER

SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Communication skills (Theory)	BP105T CO1	<b>Knowledge</b> Make acquainted with various communication skills.	L1
	BP105T CO2	<b>Comprehend</b> the concepts pertaining to general communication.	L2
	BP105T CO3	<b>Apply</b> of concept of communication process.	L3
	BP105T CO4	<b>Analyse</b> the importance of various aspects of communication.	L4
	BP105T CO5	<b>Explain</b> and explore different facets of communication, (Barriers, Elements and styles of Communication)	L5
	BP105T CO6	<b>Create</b> establish and summarise the correlation between communication skills in terms of professional development.	L6
Communication skills (Practical)	BP111P CO1	<b>Knowledge</b> Make acquainted with various practical approaches of communication skills.	L1
	BP111P CO2	<b>Comprehend</b> the concepts pertaining to application of communication skills at professional level.	L2
	BP111P CO3	<b>Apply</b> of concept of communication process in professional life at different professional level.	L3
	BP111P CO4	<b>Analyse</b> the importance of various aspects of communication.	L4
	BP111P CO5	<b>Explain</b> and explore different facets of communication-basic and advanced.	L5
	BP111P CO6	<b>Create</b> establish and summarise the correlation between communication skills in terms of professional development (Listen write & Presentation)	L6



Prof. Dr. J. N. B. Ghiware  
PRINCIPAL  
Nanded Pharmacy College 8  
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B. PHARM FIRST YEAR-I <sup>ST</sup> SEMESTER			
SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Remedial Biology (Theory)	BP 106 T CO1	<i>Remember</i> the basic aspects of botany and zoology and their relation with pharmaceutical sciences.	L1
	BP 106 T CO2	<i>Understand</i> the characters of living organisms and classification of kingdoms	L2
	BP 106 T CO3	<i>Identify</i> structure of living cells and their significance	L3
	BP 106 T CO4	<i>Classify</i> system for living things.	L4
	BP 106 T CO5	<i>Determine</i> role of hormones in regulation of various organs functioning in the body and process of oogenesis and spermatogenesis.	L5
	BP 106 TCO6	<i>Elaborate</i> the physiology, nutrient requirements for plants and to predict plant/animal tissues.	L6
Remedial Biology (Practical)	BP 112 PCO3	<i>Remembering</i> list components of anatomy & physiology animal with special reference to human	L1
	BP 112 PCO2	<i>Understanding</i> basic components of anatomy & physiology of plant	L2
	BP 112 PCO1	<i>Identify</i> various body component	L3
	BP 112 PCO4	<i>Examine</i> experiment with microscopic study of plant.	L4
	BP 112 PCO5	<i>Interpret</i> study of frog by using computer models	L5
	BP 112 PCO6	<i>Estimate</i> the different test of blood sample.	L6



  
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## B. PHARM FIRST YEAR-II<sup>ND</sup> SEMESTER

SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Human Anatomy and Physiology II (Theory)	BP 201 TCO1	<b>Describe</b> the general morphology, structure, and purposes of the various human body organs.	L1
	BP 201 TCO2	<b>Explain</b> physiology of different system.	L2
	BP 201 TCO3	<b>Identify</b> the different tissues and organs of various systems in the human body.	L3
	BP 201 TCO4	<b>Categorize</b> the physiology of urine production, micturition and the anatomy of the excretion system.	L4
	BP 201 TCO5	<b>Explain</b> the physiology of male and female reproductive organs and concepts of genetics.	L5
	BP 201 TCO6	<b>Elaborate</b> the different homeostatic mechanisms and their imbalances.	L6
Human Anatomy and Physiology II (Practical)	BP 207PCO1	<b>Describe</b> the interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body.	L1
	BP 207PCO2	<b>Understand</b> the construction, working, care and handling of instruments, glassware's and equipment's required for practical.	L2
	BP 207PCO3	<b>Identify</b> the haematological tests like blood cell counts, haemoglobin estimation, bleeding/clotting time etc. and also record blood pressure, heart rate, pulse and respiratory volume.	L3
	BP 207PCO4	<b>Interpret</b> structural and microscopically aspects various organs of human body.	L4
	BP 207 PCO5	<b>Determine</b> the techniques for the identification, counting of various integral components of the body.	L5
	BP 207PCO6	<b>Elaborate</b> working pattern of different organs of each system	L6



  
Prof. Dr. N. B. Ghiware  
PRINCIPAL  
Nanded Pharmacy College,  
Nanded.



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Ref. No. NPC / B. Pharm/

Date:

B. PHARM FIRST YEAR-II <sup>ND</sup> SEMESTER			
SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Pharmaceutical Organic Chemistry I (Theory)	BP202TCO1	<i>Knowledge</i> of the structure, properties, and reactions of various organic functional groups and their relevance to the design and synthesis organic compounds.	L1
	BP202TCO2	<i>Understand</i> , Summarize and Relate rules of IUPAC nomenclature system	L2
	BP202TCO3	<i>Predict</i> the isomerism of organic compounds	L3
	BP202TCO4	<i>Classify</i> organic compounds with Structure, Functional group and Reactivity	L4
	BP202TCO5	<i>Evaluate</i> the stability and chemical reactivities of organic compounds	L5
	BP202TCO6	<i>Interpret</i> mechanism of chemical reactions and develop skills to predict the progress of reaction	L6
Pharmaceutical Organic Chemistry I (Practical)	BP208PCO1	<i>Knowledge</i> & Importance Qualitative Analysis of organic compounds.	L1
	BP208PCO2	<i>Understand</i> and Learn Physical Properties of Organic Compounds.	L2
	BP208PCO3	<i>Apply</i> practical skill & problem-solving skills required during qualitative analysis of organic compounds.	L3
	BP208PCO4	<i>Classify</i> organic compounds as per functional group and perform their identification test.	L4
	BP208PCO5	<i>Examine</i> the progress of chemical reactions.	L5
	BP208PCO6	<i>Develop</i> molecular models' organic compounds.	L6



  
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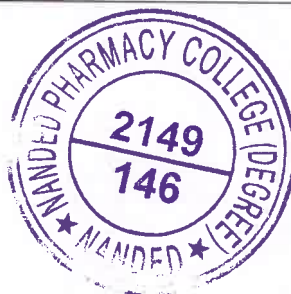
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B. PHARM FIRST YEAR-II <sup>ND</sup> SEMESTER			
SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Biochemistry (Theory)	BP203TCO1	<i>knowledge</i> of the molecular machinery of living cells.	L1
	BP203TCO2	<i>Understanding</i> of the principles that determine the structures of macromolecules and their participation in molecular recognition	L2
	BP203TCO3	<i>Predict</i> how the genetic information is stored and transferred from generation to generation	L3
	BP203TCO4	<i>Compare</i> the principles underlying enzymes and hormones and how they regulate biochemical pathways	L4
	BP203TCO5	<i>Explain</i> the metabolic pathways involved in regulation, energy production, and utilization, and how the alteration of one pathway affects the other	L5
	BP203TCO6	<i>Asses</i> the requirement of micro and macronutrients by humans and how improper intake leads to various clinical conditions.	L6
Biochemistry (Practical)	BP209P CO1	<i>Knowledge</i> in qualitative and quantitative estimation of the biological macromolecule	L1
	BP209P CO2	<i>Understand</i> the influence and role of structure in the reactivity of biomolecules	L2
	BP209P CO3	<i>Apply</i> practical skill & problem-solving skills required during the preparation of chemical solutions.	L3
	BP209P CO4	<i>Operate</i> and handle critically the electroanalytical instruments	L4
	BP209P CO5	<i>Asses</i> the metabolism of nutrient molecules in physiological and pathological conditions.	L5
	BP209P CO6	<i>Estimate</i> the Role and importance of biological macromolecules	L6



  
Prof.(Dr.)N.B.Ghiware  
PRINCIPAL  
Nanded Pharmacy College,  
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SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Pathophysiology (Theory)	BP204TCO1	<i>Knowledge</i> of signs and symptoms of the diseases.	L 1
	BP204TCO2	<i>Understand</i> the concepts of basic principles of various injury, the etiology and pathogenesis of the selected disease states	L 2
	BP204TCO3	<i>Identify</i> the steps of progression of diseases and their complications based on the gained information.	L 3
	BP204TCO4	<i>Apply</i> the skills to Appreciate the basic mechanisms involved in processes of inflammation and various disease or disorders of different systems.	L 4
	BP204TCO5	<i>Evaluate</i> the homeostasis mechanisms, pathogenesis and treatment of diseases of systems.	L 5
	BP204TCO6	<i>Evaluate</i> the most commonly encountered pathophysiological state(s) and/or disease mechanism(s)	L 6



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B. PHARM FIRST YEAR-II <sup>ND</sup> SEMESTER			
SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Computer Applications in Pharmacy (Theory)	BP205TCO1	<i>Knowledge</i> of computer fundamentals to pharmaceutical applications	L1
	BP205TCO2	<i>Understanding</i> different types of databases, language, applications of computers for data analysis in Pharmaceutical related activities.	L2
	BP205TCO3	<i>Practising</i> efficiently the contemporary IT tools to all Pharmaceutical related activities.	L3
	BP205TCO4	<i>Analyse</i> the pharmaceutical problems using computers.	L4
	BP205TCO5	<i>Evaluate</i> different application software in community and dispensing pharmacy.	L5
	BP205TCO6	<i>Summarize</i> solutions to analyze pharmaceutical problems using computers.	L6
Computer Applications in Pharmacy (Practicals)	BP210PCO1	<i>Knowledge</i> of word processing programs like MS WORD, MS Access and computer languages like HTML.	L1
	BP210PCO2	<i>Understand</i> the concept of Questionnaire, Web page and use of computers in pharmaceutical industry.	L2
	BP210PCO3	<i>Developing</i> skills to prepare Questionnaire, HTML web page, different types of Databases and creating and exporting tables, forms etc. to web pages and XML pages.	L3
	BP210PCO4	<i>Generating</i> Questionnaires for different diseases and different types of data bases.	L4
	BP210PCO5	<i>Explaining and comparing</i> various online tools for collecting drug information and their adverse effects.	L5
	BP210PCO6	<i>Creating and modifying</i> various computerized documents like Questionnaire, HTML web page, databases, mailing labels etc.	L6



  
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B. PHARM FIRST YEAR-II <sup>ND</sup> SEMESTER			
SUBJECT	CO NO	CO OUTCOME	LEVEL
Environmental Sciences (Theory)	BP206TCO1	<i>Knowledge</i> of general aspects of environment like food chain, food web, trophic levels, energy transfer etc.	L1
	BP206TCO2	<i>Understand</i> the concept of multidisciplinary nature of environment and basic concept of ecosystem.	L2
	BP206TCO3	<i>Developing</i> skills to help people identifying and solving environmental problems.	L3
	BP206TCO4	<i>Categorizing different</i> ecosystems, resources and problems associated with them.	L4
	BP206TCO5	<i>Explaining</i> effects of environmental pollution and various human practices responsible for pollution.	L5
	BP206TCO6	<i>Creating</i> awareness about environmental problems and motivating to participate in protection and improvement of environment.	L6



  
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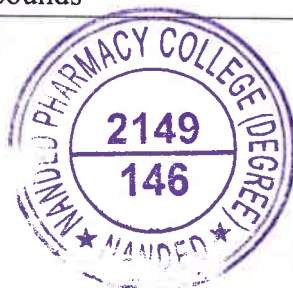
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B. PHARM SECOND YEAR-III <sup>RD</sup> SEMESTER			
SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Pharmaceutical Organic Chemistry II (Theory)	BP301T CO1	<i>Knowledge</i> about structure, numbering, naming, uses of different organic compounds	L1
	BP301T CO2	<i>Understand</i> the physical properties, stabilities, classification, and uses of the organic/aromatic compounds.	L2
	BP301T CO3	<i>How to develop</i> different methods of preparation of organic/aromatic compounds	L3
	BP301T CO4	<i>How to test</i> , analyse, categorise, and distinguish chemically different organic/aromatic compounds	L4
	BP301T CO5	<i>Determine</i> and prove the principle / mechanism of behind synthetic and chemical reactions	L5
	BP301T CO6	<i>Synthesize</i> different derivatives of organic/aromatic compounds	L6
Pharmaceutical Organic Chemistry II (Practical)	BP305P CO1	<i>Knowledge</i> about structure, numbering, naming, uses of different organic compounds/organic reactions	L1
	BP305P CO2	<i>Understand</i> the physical properties, stabilities, classification, and uses of the organic/aromatic compounds involved in reactions	L2
	BP305P CO3	<i>How to develop</i> different methods of preparation (organic reaction) of organic/aromatic compounds	L3
	BP305P CO4	<i>How to test</i> , analyse, categorise, and distinguish chemically different organic/aromatic compounds	L4
	BP305P CO5	<i>Determine</i> physical constants of prepared products / prove the principle / mechanism of behind synthetic and chemical reactions	L5
	BP305P CO6	<i>Synthesize</i> different derivatives of organic/aromatic compounds	L6



  
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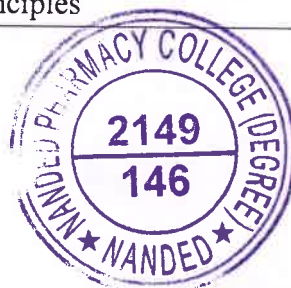
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B. PHARM SECOND YEAR-III <sup>RD</sup> SEMESTER			
SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Physical Pharmaceutics I (Theory)	BP302T CO1	<i>Knowledge</i> of various theories, laws and equations related to different states of matter	L1
	BP302T CO2	<i>Understand</i> concept of solubility.	L2
	BP302T CO3	<i>Apply</i> the concept of pH, isotonic solutions in preparation of pharmaceutical and biological buffers	L3
	BP302T CO4	<i>Distinguish</i> the principles of complexation / protein binding & to use them for calculations of drug release and stability constant.	L4
	BP302T CO5	<i>Explain</i> the surface and interfacial phenomenon and role of surfactants	L5
	BP302T CO6	<i>Elaborate</i> the physicochemical properties of drug molecules,	L6
Physical Pharmaceutics I (Practical)	BP306PCO 1	<i>Knowledge</i> about different pharmaceutical excipients, their properties, and their functions in formulation development.	L1
	BP306PCO2	<i>Understand</i> the phenomenon of partition coefficient and surface tension	L2
	BP306PCO3	<i>Apply</i> the knowledge of phase diagram to determine consolute temperatures, complexation and adsorption isotherms	L3
	BP306PCO4	<i>Illustrate</i> the knowledge of solubility in various pharmaceutical preparations	L4
	BP306PCO5	<i>Interpret</i> various physicochemical tests which involve experiments related to particle size determination, rheology, drug dissolution, pH measurement, and drug content uniformity.	L5
	BP306PCO6	<i>Explain</i> the concept of solubility and recognize basic rules and equations regarding physical principles	L6



  
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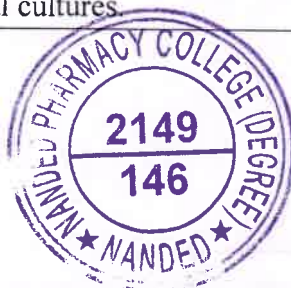
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## B. PHARM SECOND YEAR-III<sup>RD</sup> SEMESTER

SUBJECT	CO NO	CO OUTCOME	LEVEL
Pharmaceutical Microbiology (Theory)	BP303TCO1	<i>Knowledge</i> of different microbial control methods and design and working of various equipment's in the pharmaceutical industry.	L1
	BP303TCO2	<i>Understand</i> the morphological and structural aspects of various types of micro-organisms and their role in the development of Pharmaceutical Microbiology.	L2
	BP303TCO3	<i>Apply</i> the skills for preservation, cultivation and growth of micro-organisms and measurements of growth.	L3
	BP303TCO4	<i>Operate</i> various equipment's and instruments used in pharmaceutical industry.	L4
	BP303TCO5	<i>Evaluate and compare</i> various antimicrobial procedures used in the pharmaceutical industries.	L5
	BP303TCO6	<i>Manufacturing</i> of pharmaceutical products and <i>evaluation</i> of various manufacturing facilities.	L6
Pharmaceutical Microbiology (Practical)	BP307PCO1	<i>Knowledge</i> of different microbial control methods and design and working of various equipment's used in the pharmaceutical microbiology laboratory.	L1
	BP307PCO2	<i>Understand</i> the microbial morphology, principle and procedure used in various microbiological activities like staining, sterilization, inoculation, incubation etc.	L2
	BP307PCO3	<i>Apply</i> the skills for preservation, cultivation and growth of micro-organisms and measurements of growth.	L3
	BP307PCO4	<i>Operate</i> various equipment's and instruments used in microbiology laboratory.	L4
	BP307PCO5	<i>Evaluate and compare</i> various antimicrobial procedures and techniques of microbial cultivation.	L5
	BP307PCO6	<i>Preparing</i> different microbial nutrient media and microbial cultures.	L6



  
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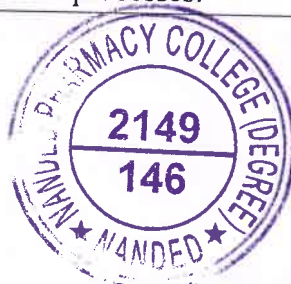
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SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Pharmaceutical Engineering (Theory)	BP304TCO1	<i>Knowledge</i> of design, working and general aspects of various pharmaceutical processes and equipment's used their in.	L1
	BP304TCO2	<i>Understand</i> the concept of unit operations, various laws, and principles applicable in pharmaceutical operations.	L2
	BP304TCO3	<i>Apply</i> the skills for material handling during pharmaceutical manufacturing process.	L3
	BP304TCO4	<i>Operate</i> various equipment's and instruments used in pharmaceutical industry.	L4
	BP304TCO5	<i>Evaluate and measure</i> various factors influencing different pharmaceutical operations.	L5
	BP304TCO6	<i>Create and discuss</i> the operational data for various pharmaceutical processes.	L6
Pharmaceutical Engineering (Practical)	BP308PCO1	<i>Knowledge</i> of design, working and general aspects of various pharmaceutical processes and equipment's used pharmaceutical industry.	L1
	BP308PCO2	<i>Understand</i> the concept of unit operations, various laws, and principles applicable in pharmaceutical operations.	L2
	BP308PCO3	<i>Apply</i> the skills for material handling during pharmaceutical manufacturing process.	L3
	BP308PCO4	<i>Operate</i> various equipment's and instruments used in pharmaceutical industry.	L4
	BP308PCO5	<i>Evaluate and measure</i> various factors influencing different pharmaceutical operations.	L5
	BP308PCO6	<i>Create and discuss</i> the operational data for various pharmaceutical processes.	L6



  
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B. PHARM SECOND YEAR-IV <sup>TH</sup> SEMESTER			
SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Pharmaceutical Organic Chemistry III (Theory)	BP401T CO1	<i>Knowledge</i> about structure, numbering, naming, different medicinal uses of organic/heterocyclic/stereochemical compounds	L1
	BP401T CO2	<i>Understand</i> the physical properties, stabilities, classification, and medicinal uses of the organic/heterocyclic/stereochemical compounds	L2
	BP401T CO3	<i>How to develop</i> different methods of preparation of organic/heterocyclic/stereochemical compounds	L3
	BP401T CO4	<i>How to test</i> , analyse, categorise, and distinguish chemically different organic/heterocyclic/stereochemical compounds	L4
	BP401T CO5	<i>Determine</i> and prove the principle/mechanism behind synthetic methods /chemical reactions/stereochemical reactions /rearrangement reactions of organic/heterocyclic compounds	L5
	BP401T CO6	<i>Synthesize</i> different derivatives of organic/heterocyclic organic compounds with different methods	L6



  
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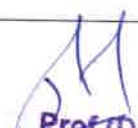
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## B. PHARM SECOND YEAR-IV<sup>TH</sup> SEMESTER

SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Medicinal Chemistry I (Theory)	BP402T CO1	<b>Knowledge</b> about category, structure, numbering, naming, and uses of different medicinal compounds	L1
	BP402T CO2	<b>Understand</b> history, development physicochemical parameters, stabilities, metabolism, classification, and uses of different medicinal compounds	L2
	BP402T CO3	<b>Discover</b> the mechanism of action, protein binding, receptor binding of different ANS and CNS acting drugs	L3
	BP402T CO4	<b>How to analyse</b> structure in relation with their pharmacological activity, categorise and classify according to chemical class of different ANS and CNS acting drugs	L4
	BP402T CO5	<b>Evaluation</b> of different side effects, toxic effects, drug-food interactions, dosage-regimen, of different ANS and CNS acting drugs	L5
	BP402T CO6	<b>How to synthesize</b> ANS and CNS acting drugs with different methods/schemes	L6
Medicinal Chemistry I (Practical)	BP406P CO1	<b>Knowledge</b> about category, structure, numbering, naming, and uses of different /Heterocyclic compounds /medicinal compounds/organic reactions	L1
	BP406P CO2	<b>Understand</b> , principle, procedure, and assay of different /Heterocyclic compounds /medicinal compounds	L2
	BP406P CO3	<b>Application</b> of basic principles of organic chemistry for the preparation of different /Heterocyclic compounds /medicinal compounds	L3
	BP406P CO4	<b>How to analyse</b> medicinal compound quantitatively/Examination of partition coefficient	L4
	BP406P CO5	<b>Determination</b> of physical constant of heterocyclic compounds /medicinal compounds /partition coefficient measurement	L5
	BP406P CO6	<b>How to synthesize</b> different /heterocyclic compounds /medicinal compounds with different methods/schemes	L6



  
Prof. (Dr.) N. B. Ghiware  
PRINCIPAL 21  
Nanded Pharmacy College,  
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Date:

## B. PHARM SECOND YEAR-IV<sup>TH</sup> SEMESTER

SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Physical Pharmaceutics II (Theory)	BP403TCO1	<i>Knowledge</i> of determination of various physicochemical properties such rheological and derived properties of drug, excipients and various formulations.	L1
	BP403TCO2	<i>Understand</i> the principles of physical pharmacy and their applications in pharmaceutical formulations.	L2
	BP403TCO3	<i>Apply</i> knowledge of physical pharmacy principles to solve processing problems in the pharmaceutical industry.	L3
	BP403TCO4	<i>Operate</i> various instruments and equipment's which are commonly used in pharmaceutical industry.	L4
	BP403TCO5	<i>Evaluate</i> the factors influencing the bioavailability of drugs and stability of various formulations.	L5
	BP403TCO6	<i>Create</i> innovative approaches in drug product development	L6
Physical Pharmaceutics II (Practical)	BP407P CO1	<i>Knowledge</i> of physicochemical properties of drug and excipient in development of various formulations.	L1
	BP407P CO2	<i>Understand</i> the physicochemical principles of drug and their applications in pharmaceutical formulations.	L2
	BP407P CO3	<i>Application</i> of practical skills acquired to solve the processing problems in pharmaceutical industry.	L3
	BP407P CO4	<i>Operate</i> various instruments and equipment's which are commonly used in pharmaceutical industry.	L4
	BP407P CO5	<i>Evaluate</i> the factors influencing the stability of various formulations.	L5
	BP407P CO6	<i>Create</i> innovative approaches in drug product development	L6



  
Prof. (Dr.) N.B. Ghiware  
PRINCIPAL  
Nanded Pharmacy College,  
Nanded.



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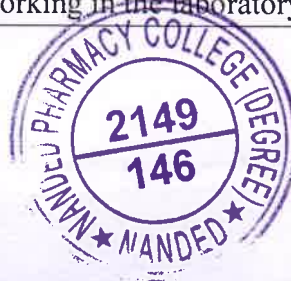
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B. PHARM SECOND YEAR-IV <sup>TH</sup> SEMESTER			
SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Pharmacology I (Theory)	BP404TCO1	<b>Knowledge</b> of pharmacokinetics and pharmacodynamics of drugs in relation to their therapeutic effects	L1
	BP404TCO2	<b>Understand</b> the fundamental principles of pharmacology, Definition, historical landmarks and scope of pharmacology	L2
	BP404TCO3	<b>Identifying</b> and describing the mechanisms of action of commonly used drugs and their therapeutic uses	L3
	BP404TCO4	<b>Analyzing</b> the role of pharmacology in the treatment and management of various diseases and conditions.	L4
	BP404TCO5	<b>Evaluate</b> Critical research studies on pharmacology and drug development, Nature and source of drugs and essential drugs concept	L5
	BP404TCO6	<b>Developing</b> an understanding of and Neurohumoral transmissions, drug interactions, drug toxicity, and drug-drug interactions and and potential adverse effects.	L6
Pharmacology I (Practical)	BP404PCO1	<b>Knowledge</b> to solve practical problems like dose calculations	L1
	BP404PCO2	<b>Understand</b> the principles of Experimental Pharmacology	L2
	BP404PCO3	<b>Demonstrate</b> proficiency in laboratory techniques commonly used in pharmacology, such as drug preparation, drug administration to experimental animals, use of instruments for drug analysis	L3
	BP404PCO4	<b>Operate</b> Various instruments and Animal models for behavioral activity in Rodents	L4
	BP404PCO5	<b>Select</b> Techniques of Terminal and Non terminal blood sampling, anesthesia and Euthanasia	L5
	BP404PCO6	<b>Elaborate</b> professional ethics and safety guidelines like CPCSEA while conducting experiments, handling drugs, and working in the laboratory.	L6



  
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PRINCIPAL  
Nanded Pharmacy College,  
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## B. PHARM SECOND YEAR-IV<sup>TH</sup> SEMESTER

SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Pharmacognosy and Phytochemistry I (Theory)	BP 405 TCO1	<i>Describe</i> classification along with their merits & demerits.	L1
	BP 405 TCO2	<i>Summarize</i> about history and scope of Pharmacognosy.	L2
	BP 405TCO3	<i>Identify</i> the crude drugs, their uses and chemical nature.	L3
	BP 405 TCO4	<i>Distinguish</i> the techniques in the cultivation and production of crude drugs.	L4
	BP 405 TCO5	<i>Evaluate</i> techniques for the herbal drugs	L5
	BP 405 TCO6	<i>Estimate/Elaborate</i> out the microscopic and morphological evaluation of crude drugs.	L6
Pharmacognosy and Phytochemistry I (Practical)	BP 409 PCO1	<i>Describe</i> the quality and purity of crude drugs	L1
	BP 409 PCO2	<i>Understand</i> the skills for the quality control of crude drugs	L2
	BP 409 PCO3	<i>Identify</i> crude drugs by its microscopical characteristics	L3
	BP 409 PCO4	<i>Analysis</i> of crude drugs by chemical tests.	L4
	BP 409 PCO5	<i>Measure</i> linear measurements for crude drug identification.	L5
	BP 409 PCO6	<i>Elaborate</i> quality control methods for standardization of herbal drugs.	L6



  
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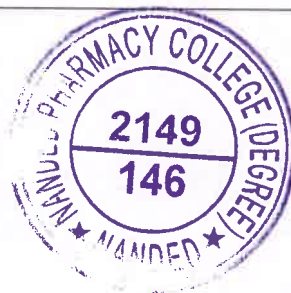
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B. PHARM THIRD YEAR-V <sup>TH</sup> SEMESTER			
SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Medicinal Chemistry II (Theory)	BP501T CO1	<i>Knowledge</i> about category, structure, numbering, naming, and uses of different medicinal compounds	L1
	BP501T CO2	<i>Understand</i> history, development physicochemical parameters, stabilities, metabolism, classification, and uses of different medicinal compounds	L2
	BP501T CO3	<i>Discover</i> the mechanism of action, protein binding, receptor binding of antihistamines, antidiabetic agents, local anaesthetics, CVS, and endocrine system acting drugs	L3
	BP501T CO4	<i>How to analyse</i> structure in relation with their pharmacological activity, categorise and classify according to chemical class of antihistamines, antidiabetic agents, local anaesthetics, CVS, and endocrine system acting drugs	L4
	BP501T CO5	<i>Evaluation</i> of different side effects, toxic effects, drug-food interactions, dosage-regimen, of antihistamines, antidiabetic agents, local anaesthetics, CVS, and endocrine system acting drugs	L5
	BP501T CO6	<i>How to synthesize</i> antihistamines, antidiabetic agents, local anaesthetics, CVS, and endocrine system acting drugs with different methods/schemes	L6



  
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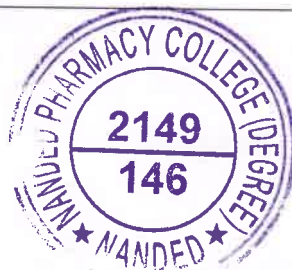
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## B. PHARM THIRD YEAR-V<sup>TH</sup> SEMESTER

SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Industrial Pharmacy I (Theory)	BP502TCO1	<i>Knowledge</i> of manufacturing technologies, various excipients commonly used in pharmaceutical industry.	L1
	BP502TCO2	<i>Understand</i> the concepts pertaining to preformulation, regulatory requirements, testing of various formulations.	L2
	BP502TCO3	<i>Apply</i> the problem-solving skills to overcome the processing problems.	L3
	BP502TCO4	<i>Operate</i> various instruments and equipment's which are commonly used in manufacturing plant.	L4
	BP502TCO5	<i>Evaluate</i> various formulations like tablets, capsules, and cosmetic preparations for their quality attributes.	L5
	BP502TCO6	<i>Designing</i> of various formulations like solid, liquid, semisolid and cosmetic preparations based on the information gained.	L6
Industrial Pharmacy I (Practical)	BP506P CO1	<i>Knowledge</i> of formulation technologies, various excipients commonly used in pharmaceutical industry.	L1
	BP506P CO2	<i>Understanding:</i> Develop a practical understanding of various pharmaceutical manufacturing processes, equipment, and techniques used in industrial settings.	L2
	BP506P CO3	<i>Develop</i> problem-solving skills by analyzing and resolving challenges encountered during the practical exercises.	L3
	BP506P CO4	<i>Operate</i> various instruments and equipment's during practical's which are commonly used in manufacturing plant.	L4
	BP506P CO5	<i>Evaluate</i> formulations for quality attributes.	L5
	BP506P CO6	<i>Designing</i> of various formulations based on the information gained.	L6



  
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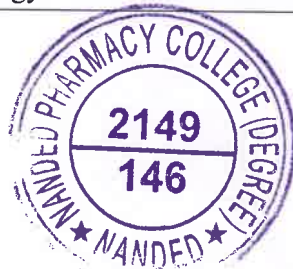
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B. PHARM THIRD YEAR-V <sup>TH</sup> SEMESTER			
SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Pharmacology II (Theory)	BP503TCO1	<i>Knowledge</i> of pharmacokinetics and pharmacodynamics of drugs in relation to their therapeutic effects and potential adverse effects	L 1
	BP503TCO2	<i>Understand</i> the mechanism of drug action and its relevance in the treatment of different infectious diseases, the cell communication mechanism	L 2
	BP503TCO3	<i>Identifying</i> and describing the mechanisms of action of commonly used drugs and their therapeutic uses.	L 3
	BP503TCO4	<i>Analysing</i> the role of pharmacology in the treatment and management of various diseases and conditions	L 4
	BP503TCO5	<i>Evaluate</i> Critical research studies on pharmacology, Bioassay and drug development, appreciate the newer targets of several disease conditions for treatment.	L 5
	BP503TCO6	<i>Developing</i> an understanding to Appreciate correlation of pharmacology with related medical sciences.	L 6
Pharmacology II (Practical)	BP507PCO1	<i>Knowledge</i> of different bioassay methods and determination of different activities, parameters using various methods.	L 1
	BP507PCO2	<i>Understand</i> the isolation of different organs/tissues from the laboratory animals by simulated experiments	L 2
	BP507PCO3	<i>Identifying</i> and describing the various receptor actions using isolated tissue preparation	L 3
	BP507PCO4	<i>Analysing</i> the role of pharmacology in the treatment and management of various diseases and conditions	L 4
	BP507PCO5	<i>Evaluate</i> Critical research studies on pharmacology, Bioassay and drug development.	L 5
	BP507PCO6	<i>Developing</i> an understanding to Appreciate correlation of pharmacology with related medical sciences.	L 6



  
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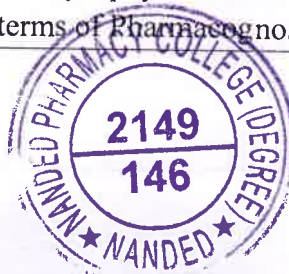
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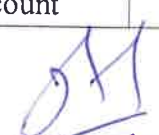
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## B. PHARM THIRD YEAR-V<sup>TH</sup> SEMESTER

SUBJECT	CO NO	CO OUTCOME	LEVEL
Pharmacognosy and Phytochemistry II (Theory)	BP504T CO1	<b>Knowledge</b> Make acquainted with chemistry of various classes of phytochemicals	L1
	BP504T CO2	<b>Comprehend</b> the concepts pertaining to general methods of extraction (traditional and modern) and isolation	L2
	BP504T CO3	<b>Apply</b> concept of chemistry and Pharmacognostic account and their correlation in terms of commercial application	L3
	BP504T CO4	<b>Analyse</b> the importance of various phytochemical class as a medicinal agent	L4
	BP504T CO5	<b>Explain</b> different types of Industrial production, its estimation and utilization of the various classes of phytoconstituents	L5
	BP504T CO6	<b>Create/ establish and summarise</b> the correlation between chemistry, phytochemical classification, modern methods of extraction and isolation. determination using suitable analytical techniques	L6
Pharmacognosy & Phytochemistry II (Practical)	BP508P CO1	<b>Knowledge-</b> Make acquainted with identification of various classes of phytochemicals	L1
	BP508P CO2	<b>Comprehend</b> the concepts pertaining to general methods of extraction (traditional and modern) and isolation	L2
	BP508P CO3	<b>Apply</b> concept of Pharmacognostic account and their correlation in terms of separation and identification	L3
	BP508P CO4	<b>Analyse</b> the importance of various detection techniques of phytochemical class	L4
	BP508P CO5	<b>Explain</b> different types of detection of various classes of phytoconstituents	L5
	BP508P CO6	<b>Create/ establish and summarise</b> the correlation between chemistry, phytochemical classification, extraction in terms of Pharmacognostic account	L6



  
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SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Pharmaceutical Jurisprudence (Theory)	BP505TCO1	<i>Knowledge</i> of legal and regulatory framework which govern the pharmaceutical trade and industry.	L1
	BP505TCO2	<i>Understand</i> the role and importance of regulatory bodies, like, PCI, NPPA, FDA & Drug Laboratories.	L2
	BP505TCO3	<i>Develop</i> the various aspects of patent law, intellectual property rights, Acts and rules that are relevant to the pharmaceutical trade and industry.	L3
	BP505TCO4	<i>Analyse &amp; identify</i> the different ethical and legal considerations that pharmacists must know.	L4
	BP505TCO5	<i>Evaluate</i> issues related to drug promotion, advertising, pricing, distributing, repacking, manufacturing.	L5
	BP505TCO6	<i>Elaborate</i> various issues related to preclinical and clinical research, Import, export manufacturing and trade of Pharmaceuticals.	L6



  
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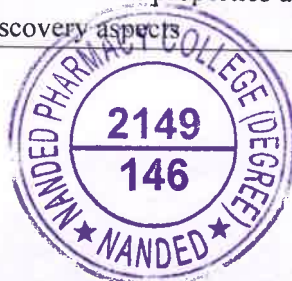
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SUBJECT	CO NO	CO OUTCOME	LEVEL
Medicinal Chemistry III (Theory)	BP601T CO1	<b>Knowledge-</b> Make acquainted with history and various class of anti-infective agents, traditional and computer aided drug discovery	L1
	BP601T CO2	<b>Comprehend</b> the concepts pertaining to chemistry, detailed chemical classification and nomenclature of various anti-infective agents	L2
	BP601T CO3	<b>Apply</b> concept of chemistry and pharmacological effect and their correlation in terms of mode of action or binding of drugs to target receptors	L3
	BP601T CO4	<b>Analyse</b> the SAR of various anti-infective medicinal agents	L4
	BP601T CO5	<b>Explain</b> different types of organic synthesis reactions of various anti-infective agents along with their reaction mechanisms; in addition to various reagents implemented in these reactions.	L5
	BP601TCO6	<b>Create/ establish and summarise</b> the correlation between chemistry, chemical classification, cellular target, SAR and apt use of anti-infective medicinal compounds in clinical use. Information about various drug discovery aspects and components.	L6
Medicinal chemistry III (Practical)	BP607PCO1	<b>Knowledge</b> Make acquainted with various techniques of synthesis and assay of drugs	L1
	BP607PCO2	<b>Comprehend</b> the concepts pertaining to chemistry, detailed chemical reactions its mechanism of various medicinal agents	L2
	BP607PCO3	<b>Apply</b> concept of chemistry and its correlation for Drawing structures and reactions of drugs	L3
	BP607PCO4	<b>Analyse</b> the various physicochemical properties of various medicinal agents	L4
	BP607PCO5	<b>Explain</b> different types of synthesis reactions along with mechanism of various synthetic agents along with their reaction mechanisms; in addition to various reagents implemented in these reactions.	L5
	BP607PCO6	<b>Create establish and summarise</b> the correlation between chemistry, physic-chemical properties and its usefulness in various drug discovery aspects	L6



  
Prof. Dr. N. B. Ghiware  
PRINCIPAL 30  
Nanded Pharmacy College,  
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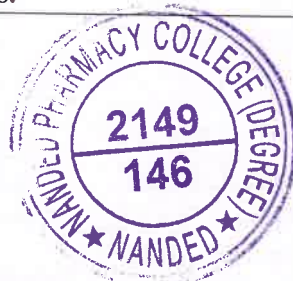
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SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Pharmacology III (Theory)	BP602TCO1	<i>Knowledge</i> of pharmacokinetics and pharmacodynamics of drugs in relation to their therapeutic effects and potential adverse effects	L 1
	BP602TCO2	<i>Understand</i> the mechanism of drug action and its relevance in the treatment of different infectious diseases.	L 2
	BP602TCO3	<i>Identifying</i> and describing the mechanisms of action of commonly used drugs and their therapeutic uses.	L 3
	BP602TCO4	<i>Analysing</i> the role of pharmacology in the treatment and management of various diseases and conditions	L 4
	BP602TCO5	<i>Evaluate</i> Critical research studies on pharmacology, chrono pharmacology and drug development.	L 5
	BP602TCO6	<i>Developing</i> an understanding of chemotherapy, drug toxicity, and Principles of toxicology.	L 6
Pharmacology III (Practical)	BP608PCO1	<i>Knowledge</i> of pharmacokinetics and pharmacodynamics of drugs in relation to their therapeutic effects using different models.	L 1
	BP608PCO2	<i>Understand</i> the the mechanism of drug action and its relevance in the treatment of different infectious diseases.	L 2
	BP608PCO3	<i>Identifying</i> and determining the mechanisms of action of commonly used drugs and their toxicities.	L 3
	BP608PCO4	<i>Analysing</i> the role of pharmacology in the treatment and management of various diseases and conditions	L 4
	BP608PCO5	<i>Evaluate</i> dose calculation and calculation of pharmacokinetic parameters from given data.	L 5
	BP608PCO6	<i>Developing</i> and understanding of Biostatistical methods and effects of therapeutic agents considering different methods by using specific tests and isolated preparations.	L 6



  
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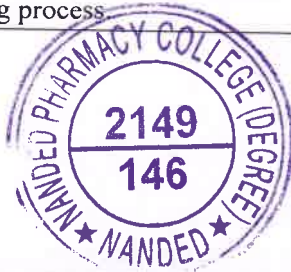
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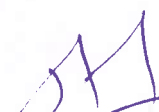
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## B. PHARM THIRD YEAR-VI<sup>TH</sup> SEMESTER

SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Herbal Drug Technology (Theory)	BP603T CO1	<i>Knowledge</i> of medicinal herbs, management of the quality of the processes, marketing of medicinal plants and derivatives for use in herbal, food and cosmetic products	L1
	BP603T CO2	<i>Understanding</i> of the principles and practices of herbal medicine: including the preparation, formulation, and administration of herbal remedies	L2
	BP603T CO3	<i>Apply</i> design and conduct research studies on herbal drugs, including the use of appropriate research methodologies and statistical analysis	L3
	BP603T CO4	<i>Evaluate</i> the safety concerns the potential safety concerns associated with herbal drugs, including interactions with other medications and the risk of contamination.	L5
	BP603T CO5	<i>Analysis of</i> regulatory requirements for herbal drugs, including the approval process, labelling requirements, and post-market surveillance	L4
	BP603T CO6	<i>Develop and Discuss</i> ICH, WHO guidelines and patenting for herbal drugs	L6
Herbal Drug Technology (Practical)	BP609PCO1	<i>Knowledge</i> of Herbal Drugs including their sources, preparation methods, therapeutic uses, and herbal drug formulations.	L1
	BP609PCO2	<i>Understanding</i> the significance of phytochemical screening in the quality assessment and standardization of herbal drugs.	L2
	BP609PCO3	<i>Practising</i> WHO and ICH guidelines for the evaluation, quality control, manufacturing, and safety assessment of herbal drugs.	L3
	BP609PCO4	<i>Analyse</i> these guidelines to ensure the quality, safety, and efficacy of herbal drugs.	L4
	BP609PCO5	<i>Evaluate</i> the suitability and compatibility of natural excipients for use in various dosage forms.	L5
	BP609PCO6	<i>Develop</i> an understanding and the importance of maintaining quality, safety, and consistency in the manufacturing process	L6



  
Prof. Dr. N. B. Ghiware  
PRINCIPAL  
Nanded Pharmacy College, 32  
Nanded.



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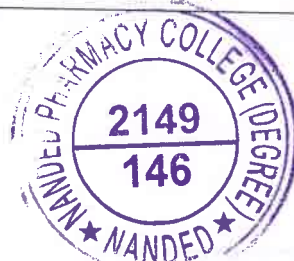
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## B. PHARM THIRD YEAR-VI<sup>TH</sup> SEMESTER

SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Biopharmaceutics and Pharmacokinetics (Theory)	BP604T CO 1	<i>State</i> the concepts of bioavailability and bioequivalence Studies	L1
	BP604T CO 2	<i>Understand</i> the concepts and mechanism of dissolution and in vitro in vivo correlation.	L2
	BP604T CO 3	<i>Use</i> plasma drug concentration -time data to calculate the pharmacokinetic parameters to describe the kinetics of drug absorption, distribution, metabolism, excretion, elimination.	L3
	BP604T CO 4	<i>Illustrate</i> various compartmental models and non-compartmental analysis methods.	L4
	BP604T CO 5	<i>Evaluate</i> pharmacokinetic processes and their relevance in efficacy of dosage form.	L5
	BP604T CO 6	<i>Discuss</i> the concept of biopharmaceutics and its applications in formulation development	L6
Pharmaceutical Biotechnology (Theory)	BP605TCO1	<i>Knowledge</i> of basic concepts, methods, applications, and general aspect of modern sophisticated bioanalytical techniques.	L1
	BP605TCO2	<i>Understand</i> the concept of pharmaceutical biotechnology, its scope, applications, and role of micro-organisms in its development.	L2
	BP605TCO3	<i>Developing</i> the skills required during advanced biotechnological operations like rDNA technology, immunoblotting techniques, protein engineering, fermentation, enzyme immobilization etc.	L3
	BP605TCO4	<i>Analyze</i> applications and uses of various laboratory biotechniques in diagnosis and treatment of diseases.	L4
	BP605TCO5	<i>Explaining</i> the immunological concepts like types of immunity, hypersensitivity, mutation, microbial genetic transfer etc.	L5
	BP605TCO6	<i>Production</i> of biotechnological products like vitamins, antibiotics, organic acids, vaccines, enzymes, hormones etc.	L6



  
Prof. Dr. J.N.B. Ghiware  
PRINCIPAL  
Nanded Pharmacy College  
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B. PHARM THIRD YEAR-VI <sup>TH</sup> SEMESTER			
SUBJECT	CO NO	CO OUTCOME	LEVEL
Quality Assurance Theory	BP606TCO1	<i>Knowledge</i> of Practice Consistently run in pharmaceutical industry.	L1
	BP606TCO2	<i>Understand</i> and summarize set of Regulatory Guidelines, Approvals & Certifications of National and International Agencies	L2
	BP606TCO3	<i>Practice</i> of rules & regulations of drug regulating authority in Pharmaceutical Industries	L3
	BP606TCO4	<i>Examine</i> accountability and practice of Pharmaceutical Industry	L4
	BP606TCO5	<i>Evaluate</i> strategy to control quality in pharmaceutical product throughout product life and restraint quality defects	L5
	BP606TCO6	<i>Create</i> and maintain crucial documents in Pharmaceutical Industry	L6



Prof.(Dr.)N.B.Ghiware  
PRINCIPAL  
Nanded Pharmacy College,  
Nanded.



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## B. PHARM FINAL YEAR-VII<sup>TH</sup> SEMESTER

SUBJECT	CO NO	CO OUTCOME	LEVEL
Instrumental Methods of Analysis (Theory)	BP701TCO1	<i>Knowledge</i> and Importance of Spectrophotometry & Chromatography in Pharmaceutical Industry	L1
	BP701TCO2	<i>Understand</i> fundamental principles of Instrumental Analytical Methods	L2
	BP701TCO3	<i>Develop</i> problem solving skill required during preparation and standardization of chemical solutions	L3
	BP701TCO4	<i>Operate</i> and maintenance of the spectrophotometer and chromatographic instruments	L4
	BP701TCO5	<i>Interpret</i> Records of Spectroscopic and Chromatographic analysis	L5
	BP701TCO6	<i>Propose</i> new analytical methods or correct implementation of official analytical method	L6
Instrumental Methods of Analysis (Practical)	BP705PCO1	<i>Knowledge</i> and Importance of Spectrophotometry & Chromatography in Pharmaceutical Industry	L1
	BP705PCO2	<i>Understand</i> principle & procedure of Photometric and Chromatography Method	L2
	BP705PCO3	<i>Apply</i> practical skill & problem-solving skills required during quantitative and qualitative analysis of substance	L3
	BP705PCO4	<i>Operate</i> and handle critically the spectrophotometer and chromatographic instruments	L4
	BP705PCO5	<i>Interpret</i> Results of Spectroscopic and Chromatographic analysis	L5
	BP705PCO6	<i>Propose</i> way to find & minimize errors come across throughout analysis	L6



  
Prof. (Dr.) N.B. Ghiware  
PRINCIPAL  
Nanded Pharmacy College,  
Nanded.



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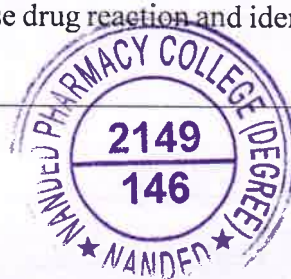
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## B. PHARM FINAL YEAR-VII<sup>TH</sup> SEMESTER

SUBJECT	CO NO	CO OUTCOME	LEVEL
Industrial Pharmacy-II (Theory)	BP702TCO1	<i>Knowledge</i> of different Laws and Acts that regulate pharmaceutical industry.	L1
	BP702TCO2	<i>Understand</i> the principles of technology transfer, regulatory affairs, quality management system and its applications in safety and efficacy of pharmaceutical product.	L2
	BP702TCO3	<i>Apply</i> principles of process validation to ensure the manufacturing processes are consistent, reliable, and compliant with regulatory requirements.	L3
	BP702TCO4	<i>Analyze</i> regulatory requirements for pharmaceutical manufacturing, including current Good Manufacturing Practices (cGMPs), quality control, and product labelling.	L4
	BP702TCO5	<i>Evaluation</i> of quality management system, drug approval process, regulatory submission and scale process.	L5
	BP702TCO6	<i>Analyze</i> regulatory requirements for pharmaceutical manufacturing, including current Good Manufacturing Practices (cGMPs), quality control, and product labelling.	L6
Pharmacy Practice (Theory)	BP703T CO 1	<i>Knowledge</i> of various pharmaceutical care services	L1
	BP703T CO 2	<i>Understand</i> various drug distribution methods in hospital.	L2
	BP703T CO 3	<i>Apply</i> the pharmacy practice for patient counselling in community pharmacy	L3
	BP703T CO 4	<i>Illustrate</i> the concept of rational drug therapy	L4
	BP703T CO 5	<i>Interpret</i> selected laboratory results of specific disease state	L5
	BP703T CO 6	<i>Explain</i> adverse drug reaction and identify drug related problems	L6



  
Prof. Dr. N.B. Ghiware  
PRINCIPAL 36  
Nanded Pharmacy College,  
Nanded.





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## B. PHARM FINAL YEAR-VII<sup>TH</sup> SEMESTER

SUBJECT	CO NO	CO OUTCOME	LEVEL
Novel Drug Delivery System (Theory)	BP704T-CO1	<i>Knowledge</i> of Different types of novel drug delivery systems.	L1
	BP704T-CO2	<i>Understanding</i> the principles and techniques involved in novel drug delivery systems.	L2
	BP704T-CO3	<i>Developing</i> formulation, selection of excipients, process optimization, and quality control of novel drug delivery system.	L3
	BP704T-CO4	<i>Analyse</i> Regulatory considerations and intellectual property issues related to novel drug delivery systems.	L4
	BP704T-CO5	<i>Evaluate</i> NDDS 's safety, efficacy & stability	L5
	BP704T-CO6	<i>Designing</i> innovative drug delivery approaches to address unmet medical needs.	L6



  
Prof. (Dr.) N.B. Ghiware  
PRINCIPAL  
Nanded Pharmacy College,  
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## B. PHARM FINAL YEAR-VIII<sup>TH</sup> SEMESTER

SUBJECT	CO NO	CO OUTCOME	LEVEL
Biostatistics and Research Methodology (Theory)	COBP801T.CO1	<i>Knowledge</i> of appropriate statistical tests based on the research question, study design, and data characteristics.	L1
	COBP801T.CO2	<i>Understand</i> the basic principles of research design and methodology, including hypothesis testing, sampling techniques, and study design.	L2
	COBP801T.CO3	<i>Apply</i> statistical methods to analyze and interpret data, including measures of central tendency, variability, correlation, and regression, parametric and nonparametric test	L3
	COBP801T.CO4	<i>Analysis</i> of statistical software to analyze data and generate appropriate graphs and tables to present findings and plagiarism	L4
	COBP801T.CO5	<i>Evaluate</i> the strengths and weaknesses of different types of research studies, including observational studies and experimental designs.	L5
	COBP801T.CO6	<i>Create</i> research findings effectively through Graphs, written reports and oral presentations.	L6
Social and Preventive Pharmacy (Theory)	BP802T-CO1	<i>Knowledge</i> related to the basic concept of public health, health issues, role of Pharmacist.	L1
	BP802T-CO2	<i>Understand</i> the basic concept of public health, health issues considering socio-cultural factors & role of community Pharmacist in this context.	L2
	BP802T-CO3	<i>Examine</i> the issues regarding social, economic, cultural, personal hygiene related on health & overall its impact.	L3
	BP802T-CO4	<i>Outline</i> the solutions related the management of ailments & disorders arising through various studied causes.	L4
	BP802T-CO5	<i>Assess</i> the surveillance program, national program on such community diseases as well as the management of other lifestyle diseases.	L5
	BP802T-CO6	<i>Integrate</i> the various factors related to the role of Pharmacist in delivering the community services.	L6



  
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## B. PHARM FINAL YEAR-VIII<sup>TH</sup> SEMESTER

SUBJECT	CO NO	CO OUTCOME	LEVEL
Pharma Marketing Management (Theory)	BP803ETCO1	<i>Knowledge</i> of various techniques of marketing and promotion	L1
	BP803ETCO2	<i>Understand</i> importance and role of pricing	L2
	BP803ETCO3	<i>Application</i> of Emerging concepts in marketing	L3
	BP803ETCO4	<i>Categorize</i> various pharmaceutical Channels	L4
	BP803ETCO5	<i>Explain</i> the concepts of marketing and pharmaceutical marketing	L5
	BP803ETCO6	<i>Elaborate</i> Duties of professional sales representative	L6
Cosmetic Science (Theory)	BP809ET-CO1	<i>Knowledge</i> of the principles of cosmetic formulation, including the selection of ingredients, their compatibility, and their role in achieving the desired cosmetic effects.	L1
	BP809ET-CO2	<i>Understand</i> the fundamental principles of cosmetic science, including the composition and structure of cosmetic products, and the mechanism of their action on the skin.	L2
	BP809ET-CO3	<i>Apply</i> problem solving skills to address the processing problems.	L3
	BP809ET-CO4	<i>Analyze</i> the impact of consumer trends on the cosmetics industry, including the use of natural ingredients, sustainability, and ethical production.	L4
	BP809ET-CO5	<i>Evaluate</i> the safety and efficacy of cosmetic products using appropriate scientific methods and testing procedures.	L5
	BP809ET-CO6	<i>Design</i> and develop a understanding of the chemistry of cosmetics, including the composition of raw materials, their properties, and their interactions.	L6



  
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## COURSE OUTCOMES

### PROGRAM: M. PHARMACY (PHARMACOLOGY)

M. PHARM FIRST YEAR-I <sup>ST</sup> SEMESTER			
SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Modern Pharmaceutical Analytical Techniques	MPL101T CO1	<b>Knowledge</b> of various modern analytical techniques (spectroscopy and chromatography)	L1
	MPL101T CO2	<b>Comprehend</b> the concepts pertaining to instrumentation, principle and working of analytical instruments	L2
	MPL101T CO3	<b>Apply</b> concept from sample preparation to result analysis of various modern analytical techniques	L3
	MPL101T CO4	<b>Analyse</b> the information obtained from different analytical techniques	L4
	MPL101T CO5	<b>Explain</b> different types of spectroscopy and chromatography techniques along with their working; in addition to its role in Pharmaceutical Industry	L5
	MPL101T CO6	<b>Create/ establish and summarise</b> the correlation between principle, working, instrumentation and applications in Pharmacy.	L6



  
Prof. (Dr.) N.B. Ghiware  
PRINCIPAL  
Nanded Pharmacy College,  
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M. PHARM FIRST YEAR-I <sup>ST</sup> SEMESTER			
SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Advanced Pharmacology-I	MPL102T CO1	<b>Knowledge</b> of the mechanisms of drug action and the relationship between drug concentration and effect, which is known as pharmacodynamics.	L1
	MPL102T CO1	<b>Understand</b> the principles of pharmacokinetics, including drug absorption, distribution, biotransformation, and elimination.	L2
	MPL102T CO1	<b>Apply</b> concepts of neurotransmission, including the general aspects and steps involved in the process.	L3
	MPL102T CO1	<b>Simplify</b> cardiovascular pharmacology, including diuretics, antihypertensives, anti-ischemics, anti-arrhythmics, drugs for heart failure and hyperlipidemia. autocoid pharmacology and understand the physiological and pathological roles of autocoids	L4
	MPL102T CO1	<b>Determine</b> pathophysiology of diseases and the pharmacology and toxicology of drugs used in various systems, including the autonomic pharmacology system. This includes parasympathomimetics and lytics, sympathomimetics and lytics.	L5
	MPL102T CO1	<b>Elaborate</b> the pharmacology of the central nervous system, including general and local anesthetics, sedatives and hypnotics, drugs used to treat anxiety, depression, psychosis, mania, epilepsy, and neurodegenerative diseases. Additionally, analgesics	L6



  
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M. PHARM FIRST YEAR-I <sup>ST</sup> SEMESTER			
SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Pharmacological & Toxicological Screening Methods-I	MPL103CO1	<b>Label</b> the regulations and ethical requirement for the usage of various species and strains of experimental animals and explain CPCSEA guidelines, GLP,	L1
	MPL103CO2	<b>Classify</b> Bioassay, Explain the principle, scope, limitations, and methods of bioassay	L2
	MPL103CO3	<b>Identify</b> and explain various preclinical <i>in-vitro</i> , <i>in-vivo</i> and other possible animal alternative models for the screening of classes and different systems.	L3
	MPL103CO4	<b>Categorize</b> and explain various preclinical <i>in-vitro</i> , <i>in-vivo</i> and other possible animal alternative models for the screening of following classes of drugs such as Immunomodulators, Immunosuppressants and immunostimulants	L4
	MPL103CO5	<b>Explain</b> general principles of Immunoassay and explain Immunoassay methods of evaluation	L5
	MPL103CO6	<b>Discuss</b> limitations of animal experimentation, alternate animal experiments and explain extrapolation of in vitro data to preclinical and preclinical to humans.	L6



  
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## M. PHARM FIRST YEAR-I<sup>ST</sup> SEMESTER

SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Cellular & Molecular Pharmacology	MPL104TCO1	<i>Knowledge</i> related to the basic components at cellular & molecular level	L1
	MPL104TCO2	<i>Understand</i> the fundamental structure and functions of cellular components.	L2
	MPL104TCO3	<i>Examine</i> the interaction of these basic structural and functional components with drugs.	L3
	MPL104TCO4	<i>Illustrate</i> the basic activities and pathways at molecular level.	L4
	MPL104TCO5	<i>Access</i> the applicability of molecular pharmacology & biomarkers in new drug discovery process.	L5
	MPL104TCO6	<i>Explain</i> the receptor signal transduction process, molecular pathways affected by drugs, molecular biology techniques applicable for Pharmacology.	L6



  
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SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Pharmacology-I (Practicals)	MPL105TCO1	<i>Knowledge</i> of the analytical instruments, its handling & basic handling of laboratory animals.	L1
	MPL105TCO2	<i>Understand</i> the basic techniques of small animal's experimentations.	L2
	MPL105TCO3	<i>Apply</i> the preclinical <i>in-vivo</i> experimental models on intact animals.	L3
	MPL105TCO4	<i>Analyse</i> the biological response of the drug using <i>in-vivo</i> & <i>in-vitro</i> animal models.	L4
	MPL105TCO5	<i>Conclude</i> the response of the drug over the basic animal model.	L5
	MPL105TCO6	<i>Explain</i> the possible mechanism of action of the drug.	L6



  
Prof. Dr. N.B. Ghiware  
PRINCIPAL  
Nanded Pharmacy College,  
Nanded.





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# NANDED PHARMACY COLLEGE

Shyam Nagar, Nanded - 431 605 Maharashtra India (19.175868,77.307992)

Phone – 91 2462 254347 Tele fax No. 91 2462 254445 (O)

Visit: [www.nandedpharmacycollege.org.in](http://www.nandedpharmacycollege.org.in); Email: [ssbesnpc146@gmail.com](mailto:ssbesnpc146@gmail.com)

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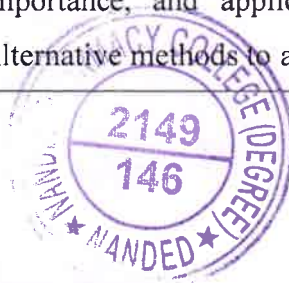
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Ref. No. NPC / B. Pharm/

Date:

## M. PHARM FIRST YEAR-II<sup>ND</sup> SEMESTER

SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Advanced Pharmacology-II	MPL104TCO1	<i>Recall</i> the fundamentals of general & systemic Pharmacology.	L1
	MPL104TCO2	<i>Understand</i> the pharmacokinetics & pharmacodynamics of the drugs used in treatment of disease.	L2
	MPL104TCO3	<i>Apply</i> the fundamental knowledge to understand the concept of drug action & mechanism.	L3
	MPL104TCO4	<i>Outline</i> the Pharmacotherapy using Pharmacological & non-Pharmacological measures.	L4
	MPL104TCO5	<i>Assess</i> the Pathophysiology & Pharmacotherapy of the certain disease.	L5
	MPL104TCO6	<i>Explain</i> the mechanism of drug action at cellular & molecular level.	L6
Pharmacological & Toxicological Screening Methods-II	MPL 202CO1	<i>Describe</i> the basics and the types of toxicology.	L1
	MPL 202CO2	<i>Express</i> the regulatory guidelines for conducting toxicological studies.	L2
	MPL 202CO3	<i>Application</i> various toxicity studies as per OECD guidelines.	L3
	MPL 202CO4	<i>Examine</i> special toxicity studies.	L4
	MPL 202CO5	<i>Explain</i> in detail about various methods employed in drug discovery and development.	L5
	MPL 202CO6	<i>Discuss</i> the concept of Safety pharmacology studies, Importance, and applications of toxicokinetic and Alternative methods to animal toxicity testing.	L6



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## M. PHARM FIRST YEAR-II<sup>ND</sup> SEMESTER

SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Principles of Drug Discovery	MPL203T CO1	<b>Knowledge</b> of various stages and techniques of drug discovery	L1
	MPL203T CO2	<b>Understand</b> the principles involved mechanisms of drug-receptor and their significance in drug discovery and development.	L2
	MPL203T CO3	<b>Apply</b> computational tools and techniques for drug discovery, including molecular modelling, molecular docking, and structure-activity relationship (SAR) analysis.	L3
	MPL203T CO4	<b>Analyze</b> and evaluate the different strategies and approaches used in drug discovery, such as high-throughput screening, rational drug design, and virtual screening.	L4
	MPL203T CO5	<b>Explain</b> Critically scientific approach of research in the field of drug discovery, and stay updated with the latest advancements and trends of software's/ websites in the field.	L5
	MPL203T CO6	<b>Create/</b> establish and summarise the correlation between target identification and validation, lead generation, lead optimization, and preclinical and clinical development in Pharmacy.	L6



  
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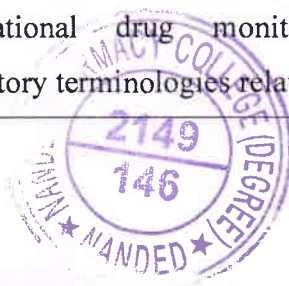
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## M. PHARM FIRST YEAR-II<sup>ND</sup> SEMESTER

SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Experimental Pharmacology (Practical)	MPL204TCO1	<b>Knowledge</b> of the role and functioning of the Ethical Committee, specifically the Institutional Review Board (IRB), ethical guidelines for biomedical research and the protection of human participants.	L1
	MPL204TCO2	<b>Understand</b> the origin and principles of International Conference on Harmonization - Good Clinical Practice (ICH-GCP) guidelines and their importance in ensuring ethical conduct in clinical trials.	L2
	MPL204TCO3	<b>Identify</b> the roles and responsibilities of different personnel involved in clinical trials, including investigators, study coordinators, sponsors, and contract research organizations (CROs), and understand the management of clinical trial documentation.	L3
	MPL204TCO4	<b>Distinguish</b> between various types of clinical trials, such as experimental studies (randomized controlled trials and non-randomized controlled trials) and observational studies (cohort studies, case-control studies, and cross-sectional studies).	L4
	MPL204TCO5	<b>Explain</b> safety monitoring in clinical trials, including the detection, reporting, severity assessment, and management of adverse drug reactions (ADRs).	L5
	MPL204TCO6	<b>Elaborate</b> the international aspects of pharmacovigilance, including the WHO international drug monitoring program and regulatory terminologies related to ADRs.	L6



Prof. J. B. Ghiware  
PRINCIPAL 47  
Nanded Pharmacy College,  
Nanded.



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M. PHARM FIRST YEAR-II <sup>ND</sup> SEMESTER			
SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Pharmacology Practical II	MPL205TCO1	<i>Knowledge</i> of the dissection, isolation, mounting of tissue preparation & assembly setup.	L1
	MPL205TCO2	<i>Understand</i> the basic techniques related to mounting the tissue to recording of responses in case of <i>in-vitro</i> models.	L2
	MPL205TCO3	<i>Examine</i> the vital signs of the animal using guided methodology.	L3
	MPL205TCO4	<i>Examine</i> the toxicity of the drug as per methodology of the guidelines.	L4
	MPL205TCO5	<i>Conclude</i> the response of the drug over the basic animal models & clinical studies.	L5
	MPL205TCO6	<i>Design</i> the protocol for clinical studies, monitoring the clinical aspects of the drugs.	L6



  
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M. PHARM SECOND YEAR-III <sup>ND</sup> SEMESTER			
SUBJECT	CO NO	COURSE OUTCOME	LEVEL
Research Methodology & Biostatistics	MRM301TCO1	<i>knowledge</i> of biostatistics, including its definition, application, the importance of sample size, factors influencing sample size and statistical tests of significance.	L1
	MRM301TCO2	<i>Understand</i> the general research methodology and its components, including research objectives, requirements, practical difficulties, review of literature.	L2
	MRM301TCO3	<i>Application</i> of medical research, including its history, values in medical ethics, principles of autonomy, beneficence, non-maleficence, double effect.	L3
	MRM301TCO4	<i>Analyze</i> study design, types of studies, strategies to eliminate errors/bias, controls, randomization, crossover design, placebo, and blinding techniques	L4
	MRM301TCO4	<i>Discuss</i> CPCSEA guidelines for laboratory animal facilities, including the goals, veterinary care, quarantine, disease surveillance, diagnosis, treatment and control, personal hygiene, facility location, anesthesia, euthanasia.	L5
	MRM301TCO5	<i>Elaborate</i> Declaration of Helsinki and its history, introduction, basic principles for all medical research, and additional principles for medical research combined with medical care.	L6



  
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