



Rajarshi Shahu
College of Pharmacy

Journey Towards Academic Excellence

**Course Outcomes (COs) of the Programme offered
by the institution**

B. Pharmacy Course Outcomes

(New PCI Pattern)



Dwarka Bahuuddeshiya Gramin Vikas Foundation's

Reg. No. Mah/5275/99, Mumbai Public Trust, Regd. No. F-5333

Estd: 2000

Rajarshi Shahu College of Pharmacy

(Approved by AICTE & PCI, Affiliated to Sant Gadge Baba, Amravati University, Amravati)

Shri. Dhruatraojl Sawale
President

Prof. Dr. Shirish P. Jain
Principal

Index

Sr. No.	Particular	Data
1.	Semester I	View Document
2.	Semester II	View Document
3.	Semester III	View Document
4.	Semester IV	View Document
5.	Semester V	View Document
6.	Semester VI	View Document
7.	Semester VII	View Document
8.	Semester VIII	View Document

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Semester-I

Subject: Human Anatomy and Physiology I – Theory

Subject Code: BP101T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO 1	Explain the gross morphology, structure and functions of various organs of the human body
CO 2	To learn and acquire the knowledge of homeostatic mechanisms and their imbalances
CO 3	To study and identify the various tissues and organs of different systems along with their co-relation with human body.
CO 4	To gain, explore and update the knowledge of special senses and nervous system

Subject: Human Anatomy and Physiology I - Practical

Subject Code: BP107P

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO 1	Identify various types of epithelial, muscular, connective and nervous tissue.
CO 2	Identify and understand concept of axial, appendicular skeleton and separate bone
CO 3	Expertise in collection of blood in subject to determination of values like bleeding and clotting time along with their significance in pathological conditions
CO 4	Estimation of hemoglobin content, determination of blood group, erythrocyte sedimentation rate (ESR) and their relevance in diseases
CO 5	Enumeration of hematological values like white blood cell (WBC) count and total red blood corpuscles (RBC) count through various methods.
CO 6	Create awareness of various physiological parameters like determination of heart rate and pulse rate and gain expertise in recording of blood pressure





Subject: Pharmaceutical Analysis – Theory

Subject Code: BP102T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO1	Understand the principles of volumetric titration, Calculation of Volumetric analysis, Chemical reaction and pH change during the titration.
CO2	Understand the principles of electro chemical analysis
CO3	Develop analytical skills
CO4	Understanding of the basic concepts of drug analysis

Subject: Pharmaceutical Analysis – Practical

Subject Code: BP108P

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO1	Student shall able to state principles of volumetric and electrochemical analysis
CO2	Student shall able to prepare various concentrations of solutions (Molar/Normal)
CO3	Student shall able to carry out various volumetric and electrochemical titrations
CO4	Student shall able to have analytical skills as mentioned in syllabus





Subject: Pharmaceutics I – Theory

Subject Code: BP103T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO 1	Students shall be able to understand the basic concept, history of Pharmacy in India. Also will be able to understand the Pharmacopoeia, various dosage forms, information about prescription and posology means calculation of doses.
CO 2	In this course, students will be able to understand the concept of various systems of calculation of dose, solvents/solution, isotonic solution, freezing point etc. Also students should be well aware about the powder and liquids dosage form
CO 3	Students shall understand about various Monophasic and Biphasic liquids. Students will know abouts the methods of preparation of Gargles, Mouthwashes, Throat Paint, Eardrops, Nasal drops, Enemas, Syrups, Elixirs, Liniments, Lotions, Suspensions and Emulsion.
CO 4	Students shall be able to understand the about the suppositories, displacement value & its calculations. Also students will be able to understand types Pharmaceutical incompatibilities.
CO 5	After completion of this chapter, students will understand about various ointment bases, excipients and methods of preparation and evaluation tests of semisolids

Subject: Pharmaceutics I Practical

Subject Code: BP109P

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO 1	Students should know about the formulation aspects of various dosage forms like syrups, elixirs and linctus.
CO 2	Should be able to understand the procedure and various excipients used in liquid dosage forms.
CO 3	Students should able to calculate the quantities of ingredients and packaging of powder like ORS powder (WHO), Effervescent granules, Dusting powder and Divided powders.
CO 4	Students will be able to understand various semisolid bases and the methods of manufacturing of ointments and suppositories. Also should know about the gargles in throat infection.





Subject: Pharmaceutical Inorganic Chemistry (PIC) Theory
Subject Code: BP104T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO 1	Explain the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals
CO 2	Understand method of preparation, physical and chemical properties, medicinal and pharmaceutical importance of inorganic compounds.
CO 3	Acquire the knowledge of acids, bases and buffers
CO 4	Describe the medicinal and pharmaceutical importance of Radiopharmaceuticals

Subject: Pharmaceutical Inorganic Chemistry (PIC) Practical
Subject Code: BP110P

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO 1	Perform the procedure/method for identifying impurities in pharmaceuticals.
CO 2	Explain the procedure for identification of inorganic compounds and their purities.
CO 3	Understand the method of preparation of inorganic pharmaceuticals

Subject: Remedial Mathematics – Theory
Subject Code: BP106RMT

Course Outcome	Description/Statement
CO1	Students able to describe the different types of problems by applying theory
CO2	Students able to Know the theory and their application in Pharmacy
CO3	Students able to Understand the important application of mathematics in Pharmacy





Subject: Communication skills – Theory

Subject Code: BP105T

Course Outcome	Description/Statement
CO1	Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation
CO2	Able to Communicate effectively
CO3	Understand Effectively manage the team as a team player
CO4	Able to Develop interview skills
CO5	Able to Develop Leadership qualities and essentials

Subject: Communication skills – Practical

Subject Code: BP111P

Course Outcome	Description/Statement
CO1	To know the basic communication covering parameters
CO2	To understand the Pronunciations covering parameters
CO3	To explain the Advanced Learning tools

Subject: Remedial Biology Theory

Subject Code: BP106RBT

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

Subject: Remedial Biology – Practical

Subject Code: BP112RBP

Course Outcome	Description/Statement
CO1	To know the experimental parameters in biology
CO2	To know the morphological parameters of plants.
CO3	To understand experimental Knowledge of blood group and blood pressure
CO4	Able to explain the Microscopic study and identification of tissues pertinent to Stem, Root Leaf, seed, fruit and flower



SEM-II

Subject: Human Anatomy and Physiology II– Theory

Subject Code: BP 201T

Course Outcome	Description/Statement
CO1	To understand the gross morphology, structure and functions of various organs of the human body.
CO2	To learn the basis of various homeostatic mechanisms and their imbalances
CO3	To identify the various tissues and organs of different systems of human body.
CO4	To acquire knowledge about hematological tests like blood cell counts, haemoglobin estimation, bleeding/clotting time etc and also record blood pressure, heart rate, pulse and respiratory volume along with its rationale
CO5	To understand and analyze the co-ordinated working pattern of different organs system.
CO6	To gained the knowledge about interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body.

Subject: Human Anatomy and Physiology II– Practical

Subject code: BP 207P

Course Outcome	Description/Statement
CO1	Able to learn the anatomy and physiology of organs of digestive system like salivary glands, stomach, intestine, pancreas and liver and process of Carbohydrate, Protein and Fat digestion and absorption.
CO2	Understand the Organization and functions of brain, Spinal cord, afferent and efferent nerves.
CO3	Perform the anatomy and physiology of urinary system, structure of Nephron, formation of urine, mechanism of micturition and regulation of body fluid volume
CO4	Identify the Physiology of hormones of hypothalamus-pituitary gland, adrenal gland, thyroid gland, pancreas and gonads (testis and ovary).
CO5	Able to learn the anatomy and functions of organs of respiratory system, exchange of respiratory gases, transport of respiratory gases, regulation of respiration, respiratory volumes and vital capacity.
CO6	Explain the Anatomy and physiology of reproductive organs, pregnancy.





Subject: Pharmaceutical Organic Chemistry-I (POC-I) Theory
Subject Code: BP202T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO 1	Describe the classification of organic compounds and write the structure, name and the type of isomerism of the organic compounds
CO 2	Explain hybridization in alkanes, alkenes and alkynes, and stabilities in alkene and conjugated dienes
CO 3	Acquire knowledge about preparation, reactivity, properties and uses of compounds with functional groups, such as alkyl halides, alcohols, aldehydes, ketones, carboxylic acids, and amines
CO 4	Explain the mechanism involved in the substitution, addition, nucleophilic and elimination reactions

Subject: Pharmaceutical Organic Chemistry-I (POC-I) Practical
Subject Code: BP208P

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO 1	Acquire knowledge of, and training in systematic qualitative analysis of unknown organic compounds.
CO 2	Acquire knowledge of, and training in Identification of the unknown compound from the literature using melting point/ boiling point.
CO 3	Learn and understand the method of preparation of suitable solid derivatives from organic compounds





Subject: Biochemistry- Theory

Subject Code: BP203T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO1	Student will be able to Classify & explain the chemical nature & biological role of bio-molecules & also Identify the concepts of bioenergetics included in the syllabus
CO2	Student will be able to Describe the metabolic pathways for nutrient molecules in physiological and pathological condition given in the syllabus
CO3	Student will be able to Explain the Biological Oxidation process & Describe the metabolic pathways for lipid metabolism, their biological significance & disorders included in the syllabus
CO4	Student will be able to Describe the amino acid metabolism & Outline the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins
CO5	Student will be able to State the Biosynthesis of purine ,pyrimidine nucleotides & Catabolism of purine nucleotides
CO6	Student will be able to Explain the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes

Subject: Biochemistry Practical

Subject Code: BP209P

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO1	Student will be able to Recognize the class of biomolecules & reducing sugars given in the syllabus by qualitative analysis of the unknown sample
CO2	Student will be able to Identify the types of Protein present in the unknown sample
CO3	Student will be able to Predict the amount of essential components present in the given sample of blood mentioned in the syllabus
CO4	Student will be able to Describe the methods of preparation of buffers of different pH & their measurement
CO5	Student will be able to Study the Enzymatic Hydrolysis of starch
CO6	Student will be able to Estimate the effect of Temperature, substrate concentration on salivary amylase activity





Subject: Pathophysiology – Theory
Subject Code: BP 204T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO 1	Describe the etiology and pathogenesis of the selected disease states
CO 2	Understand the signs and symptoms of the diseases
CO 3	To learn and acquire the knowledge about basic mechanism of cell injury, adaptation and inflammation process
CO 4	To understand the complications of diseases /disorders

Subject Code: Environmental Sciences– Theory
Subject Code: BP206T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO 1	Student should able to explain basics of environment like ecology, ecosystem, food chain, food web and ecological pyramids
CO 2	Student should able to describe list natural resources and explain their conservation
CO 3	Student should able to describe the current problems of environment and how to solve them, role of individual in conservation of environment.
CO 4	student should able to understand and identify the different types of environmental pollution and measures to minimize it
CO 5	Student should able to understand and explain the concept of ecosystem, structure, function of forest ecosystem, grass ecosystem, desert ecosystem & aquatic ecosystem.
CO 6	Student should able to understand the components of Ecosystem and Energy flow within it.





Subject: Computer Applications in Pharmacy – Theory

Subject Code:

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO1	Student able to know the various types of application of computers in pharmacy
CO2	Student able to describe the various types of databases
CO3	Student able to understand the various applications of databases in pharmacy

Subject: Computer Applications in Pharmacy – Practical

Subject Code: BP210P

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO1	Design and develop solutions to analyze pharmaceutical problems using computers
CO2	Integrate and apply efficiently the contemporary IT tools to all Pharmaceutical related activities
CO3	Know various types process over data storage, retrieval, updation in database of using MS office Access tools
CO4	Know about programming languages like HTML, XML Desired Attainment





SEM-III

Subject: Pharmaceutical Organic Chemistry II– Theory
Subject Code: BP301T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO 1	Draw the structures and name the various organic compounds like benzene, phenols, aromatic amines aromatic acids etc.
CO 2	Explain the concepts of aromaticity of aromatic hydrocarbons.
CO 3	Understand and write the aromatic electrophilic reaction name and explain effect of substitution on orientation of aromatic electrophilic reactions.
CO 4	Explain the use of analytical constants in analysis of fats and oils
CO 5	Relate the reactivity and stability of cyclo alkanes.
CO 6	Understand and write the reaction, mechanism and outline the synthesis of benzene and its derivatives, phenols, aromatic amines and acids, polynuclear hydrocarbons and cycloalkanes like cyclopropane and cyclobutane

Subject: Pharmaceutical Organic Chemistry II– Practical
Subject Code: BP305P

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO 1	Describe about the different mechanistic steps involved in synthesis of organic compounds like benzanilide, benzoic acid etc.
CO 2	Explain different purification methods like re-crystallization and steam distillation
CO 3	Understand to determine acid value, saponification value and iodine value.
CO 4	Explain the different reaction and mechanism involved in synthesis of organic compounds like acylation, bromination, nitration, oxidation, diazotization, hydrolysis, Claisen-Schmidt reaction and Perkin reaction.





Subject: Physical Pharmacy – I - Theory

Subject Code: BP302T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO 1	Students shall be able to understand and describe the concept of solubility, mechanism behind solute-solvent interactions and predict the factors influencing solubility of the drugs.
CO 2	Students shall be able to identify different states of matter at different condition and understand certain physicochemical properties of the drug substances.
CO 3	Students shall be able to differentiate between surface and interface and identify surface and interfacial tension, classify and list different surface active agents and recall HLB scale.
CO 4	Students shall be able to classify and evaluate complexation, its application, and interpret methods of analysis.
CO 5	After completion of this topic, students will understand about Sorensens pH scale, pH determination applications of buffers in pharmaceutical and biological systems.

Subject: Physical Pharmacy – I Practical

Subject Code:BP306P

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO 1	Students shall be able to understand the concept of solubility, pKa value by Half Neutralization/ Henderson Hasselbalch equation and partition co-efficient of substances.
CO 2	Students shall be able to understand critical solution temperature and can determined unknown concentration in CST. Also able to understand and evaluate surface tension by drop count and drop weight method.
CO 3	Students will understand about HLB, its scale and number of a surfactant and its applications. Also students will be well stood by Freundlich and Langmuir constants theory using activated charcoal
CO 4	Students shall understand about the concept of surfactants, its applications and critical micellar concentration of surfactants.
CO 5	Students shall understand stability constant and donor acceptor ratio of drug complex by solubility and pH titration method.





Subject: Pharmaceutical Microbiology – Theory

Subject Code: BP303T

Course outcome	Description
CO1	Student will be able to recognize the different equipment useful for microbiology practical
CO2	Students will be able to explain the various sterilization technique useful for sterilization of glassware, loop, media etc.
CO3	Students will be able to prepare the nutritional requirement of microorganism.
CO4	Students will be able to perform cultivation and isolation of bacteria by different technique along with study zone of Inhibition

Subject: Pharmaceutical Microbiology – Practical

Subject Code: BP307P

Course outcome	Description
CO1	Student understand methods of identification, cultivation and preservation of various microorganisms
CO2	Student know the importance and implementation of sterilization in pharmaceutical processing and industry
CO3	Able to perform sterility testing of pharmaceutical products.
CO4	Able to carry out microbiological standardization of Pharmaceuticals.
CO5	Able to understand the cell culture technology and its applications in pharmaceutical industries.





Subject: Pharmaceutical Engineering– Theory
Subject Code: BP304T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO 1	My students should be able to explain various Unit Operation mentioned as per in syllabus
CO 2	My students should be able to demonstrate and operate various machines used in mentioned in syllabus
CO 3	My students should be able to explain the material handling techniques as mentioned in syllabus which will also help them in research and development.
CO 4	My students should be able to practice various steps to prevent environmental pollution
CO 5	My students should be able to recall and describe various process involved in manufacturing of pharmaceuticals .
CO 6	My students should be able to summarize about significance of plant-layout, corrosion and industrial hazards.

Subject: Pharmaceutical Engineering– Practical
Subject Code: BP308P

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO 1	My students should be able to describe various unit operations used in pharmaceutical industries mentioned in syllabus
CO 2	My students should be able to explain and practice various process involved in process.
CO 3	My students should be able understand the application of various machines used in labs and industries mentioned in syllabus.
CO 4	My students should be able to identify and summarize the material handling techniques





Semester-IV

Subject: Pharmaceutical Organic Chemistry III– Theory
Subject Code: BP401T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO 1	Explain the concepts of stereo chemistry, their structural representation.
CO 2	Draw and compare the three dimensional structure of Lactic acid and tartaric acid
CO 3	Describe and classify stereo isomerism in optical isomers with R/S nomenclature, geometrical isomers with cis-trans and E/Z nomenclature, atropisomers and conformational isomers and discuss the stability of conformation of ethane, n-butane and cyclohexane
CO 4	Describe and classify, draw and name the structures of heterocyclic compounds under study
CO 5	Understand and draw the reactions of and outline the synthesis of heterocyclic compounds under study.
CO 6	Understand and draw the reactions and mechanism of various reactions of synthetic importance under study.

Subject: Medicinal Chemistry-I: – Theory
Subject Code: BP402T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO1	Student shall able to memorize the different Physicochemical properties which affects biological action of drugs
CO2	Student will able to Understand drug metabolism and able to explain the factors affecting drug metabolism
CO3	Student will able to explain development , Classification, mechanism of action, uses of drugs acting on Autonomic Nervous system Also able to outline the Structure activity relationship, synthesis and biosynthesis of important drugs and neurotransmitters involve in ANS
CO4	Student will able to describe the Development, Classification mechanism of action, SAR, uses and synthesis of Sedatives and Hypnotics, Anti psychotics given in syllabus
CO5	Student will able to recognize the Development, Classification mechanism of action, SAR, uses and synthesis of, Anti-consultants and General anesthetics given in syllabus





CO6	student will able to Explain the Development, Classification mechanism of action, SAR, uses and synthesis of Narcotic, non-narcotic analgesics including Non-steroidal anti-inflammatory drugs mention in syllabus
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Subject: Medicinal Chemistry-IPractical

Subject Code: BP406P

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO1	Student will able to outline the procedure, principle, mechanism and documentation of synthesis of drugs and their intermediate given in syllabus
CO2	Student will able to describe the method for isolation, purification and characterization of drugs and intermediate given in syllabus
CO3	Student will able to perform the assay of drugs and their preparation by pharmacopoeial method for drugs given in syllabus
CO4	Student will capable to determine the partition coefficient of drugs given in syllabus

Subject: Physical Pharmaceutics II – Theory

Subject Code: BP403T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO 1	My student should be able to explain complete information about the Colloidal Dispersion as per the syllabus
CO 2	My student should be able to explain Newtonian system, Non Newtonian system and Deformation of Solids at the completion of the syllabus
CO 3	My student should be able to summarize Coarse Dispersion and can demonstrate the preparation techniques and problem in the preparation of emulsion
CO 4	My student should be able to recall micromeritics and can employ powder characteristics and its evaluation techniques in designing of dosage form like tablets.
CO 5	My student should be able to describe Drug Stability and its factor, Accelerated stability study and relate them in development of the formulation like tablets, colloidal solutions etc.
CO 6	My student should be able to apply their knowledge of physical and chemical properties of drug molecule in development of the formulation like tablets, colloidal solutions etc.





Subject: Physical Pharmaceutics II – Practical
Subject Code: BP407P

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO 1	Students should be able to understand various physio chemical properties of powder, liquids in designing the dosage forms.
CO 2	Students should be able to explain physio chemical properties in the formulation development and evaluation of dosage forms
CO 3	Students should be able to identify and describe various instruments handling techniques .
CO 4	Students should be able to explain principle of chemical kinetics and to use them for stability testing.

Subject: Pharmacology-I Theory
Subject Code: BP 404T

Course Outcome	Description/Statement
CO1	To understand the basic concept in pharmacology & pharmacological actions of different categories of drugs
CO2	To learn and acquire the knowledge about mechanism of drug action at receptor /organ system/sub cellular/ macromolecular levels.
CO3	To improve the applicability of the basic pharmacological knowledge in the prevention and treatment of various diseases
CO4	To learn and understand the co-relation of pharmacology with other bio medical sciences





Subject: Pharmacology-I Practical

Subject Code: BP 408P

Course Outcome	Description/Statement
CO1	To know the knowledge about instruments and animals used in experimental pharmacology
CO2	To explain the knowledge about CPSCEA guidelines for maintenance of laboratory animals
CO3	To perform skills about blood withdrawal , collection , separation of plasma and serum along with anesthesia and euthanasia
CO4	To understand the effect of drugs on animals by simulated experiments

Subject: Pharmacognosy and Phytochemistry -I – Theory

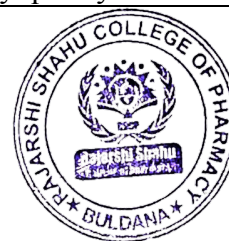
Subject: BP405T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO 1	To aware and explain the students about Scope of Pharmacognosy, Classification of Drugs and parameters required to determine the quality control of Drugs
CO 2	To Identify and perform the techniques in the cultivation and production of crude drugs
CO 3	To study and identify the crude drugs, their uses and chemical nature
CO 4	To explain the various the plant tissue culture and its application
CO 5	To explain about the various system of medicines and secondary metabolite
CO 6	To explain and understand about the biological source, chemical nature and uses of drugs of natural origin containing following drugs

Subject: Pharmacognosy and Phytochemistry -I - Practical

Subject Code: BP409P

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO 1	To identify and explain the equipment used in the pharmacognosy laboratory.
CO 2	To perform and understand the morphological and microscopical evaluation of crude drug.
CO 3	To carryout the analysis of the crude drug by chemical test.
CO 4	To identify the purity and quality crude drug by quality control test.





Semester-V

Subject: Medicinal Chemistry-II Theory

Subject Code: BP501T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO1	Student shall be able to understand the chemistry of the drug included in syllabus with respect to their pharmacological Action
CO2	Student will Recognized the different classes of drugs included in syllabus based on chemical structure
CO3	Students will able to explain structure activity relationship of different classes of drugs included in syllabus.
CO4	Students will able to Describe the Pathophysiology of different diseases related to Autacoid system, Cancer, Cardiovascular system, Endocrine System, diabetes mellitus Along with pharmacology of Local Anesthesia
CO5	Student will explain the physicochemical properties, Metabolic pathway, Mechanism of action, adverse effect of the drugs included in syllabus
CO6	Student will capable to sketch synthesis reaction of different drugs given in syllabus

Subject: Industrial Pharmacy I – Theory

Subject Code: BP502T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO1	Students will be able to explain various physicochemical properties of drug and their influence on product
CO2	Students will be able to classify and explain tablet, capsule and liquid dosage form.
CO3	Students will be able to explain formulation, processing and evaluation aspect of parenteral and ophthalmic products.
CO4	Students will be able to describe formulation and preparation of cosmetic products.
CO5	Students will be able to explain aerosol and its examination parameters.
CO6	Students will be able to identify various packaging material with their merits and demerits.





Subject: Industrial Pharmacy I – Practical

Subject Code: BP506T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO1	Students will be able to demonstrate and operate tablet punching machine.
CO2	Students will be able to reproduce the formulation of unit solid dosage form and able to identify their defects.
CO3	Students will be able to reproduce the formulation of cosmetic such as vanishing cream, cold cream and shampoo
CO4	Students will be able to reproduce the formulation of sterile products such as injection and eye drops.

Subject: Pharmacology-II Theory

Subject Code: BP 503T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO1	Students should be able to explain the role of autocooids, endocrine hormones, steroids and their receptors.
CO2	Students should be able to remember definition & classification of autocoid antagonists, cardiovascular drugs, diuretics, antidiuretics, hormone agonists and antagonists, NSAIDs, antigout drugs, antirheumatic drugs, corticosteroids, androgens, anabolic steroids, oral contraceptives and drugs acting on uterus.
CO3	Students should be able to describe the pharmacological actions of autocoid antagonists, cardiovascular drugs, diuretics, antidiuretics, hormone agonists and antagonists, NSAIDs, antigout drugs, antirheumatic drugs, corticosteroids, androgens, anabolic steroids, oral contraceptives and drugs acting on uterus.
CO4	Students should be able to understand the mechanism of action along with receptors for autocoid antagonists, cardiovascular drugs, diuretics, antidiuretics, hormone agonists and antagonists, NSAIDs, antigout drugs, antirheumatic drugs, corticosteroids, androgens, anabolic steroids, oral contraceptives and drugs acting on uterus.





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CO5	Students should be able to describe the uses, adverse effects & dose of autocoid antagonists, cardiovascular drugs, diuretics, antidiuretics, hormone agonists and antagonists, NSAIDs, antigout drugs, antirheumatic drugs, corticosteroids, androgens, anabolic steroids, oral contraceptives and drugs acting on uterus.
CO6	Students should be able to understand principles, applications & types of bioassay and also to remember the bioassay of insulin, oxytocin, vasopressin, ACTH, d- tubocurarine, histamine and 5-HT. The students should be able to discuss the introduction to hemodynamics and electrophysiology of heart, introduction to autocooids and basic concepts in endocrine pharmacology.

Subject: Pharmacology-II Practical

Subject Code: BP 507P

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO1	Students should be able to understand the in-vitro pharmacology, composition, types, role of physiological salt solutions, effect of drugs (adrenaline, acetylcholine, calcium chloride, potassium chloride) on isolated frog heart and blood pressure and heart rate of dog.
CO2	Students should be able to analyze the diuretic activity of furosemide in rats and DRC of Acetylcholine using frog rectus abdominus muscle.
CO3	Students should be able to explain the effect of Physostigmine and Atropine on DRC of Acetylcholine using frog rectus abdominus muscle and rat ileum respectively and bioassay of Histamine using guinea pig ileum by matching method.
CO4	Students should be able to perform the bioassay of Oxytocin using rat uterine horn by interpolation method, bioassay of Serotonin using rat fundus strip by three point bioassay and bioassay of Acetylcholine using rat ileum/colon by four point bioassay.
CO5	Students should be able to determine PA ₂ value of Prazosin using rat anococcygeus muscle (by Schilds plot method) and PD ₂ value using guinea pig ileum.
CO6	Students should be able to describe the effect of vasopressin and





	spasmolytics (acetylcholine, atropine, physostigmine, propranolol) using rabbit jejunum, anti-inflammatory activity of Indomethacin using carrageenan induced paw-edema model and analgesic activity of Morphine sulphate using central and peripheral methods.
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Subject Code: Pharmacognosy and Phytochemistry – II– Theory

Subject Code: BP504T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO 1	Explain basic metabolic pathways and formation of different secondary metabolites through various pathways included in the syllabus
CO 2	Explain General introduction, composition, chemistry & chemical classes, biosources, therapeutic uses and commercial applications of secondary metabolites included in the syllabus.
CO 3	Explain about General Isolation, Identification and Analysis of Phytoconstituent included in the syllabus.
CO 4	Understand Industrial production, estimation and utilization of the phytoconstituents included in the syllabus
CO 5	Compare and contrast about the traditional as well as modern extraction techniques included in the syllabus.
CO 6	Explain about various separations techniques and spectroscopic included in the syllabus.

Subject :Pharmacognosy and Phytochemistry – I – Practical

Subject Code: BP508P

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO 1	My student will be able to identify the various crude drug included in the Syllabus
CO 2	My student will be able to perform the isolation of Various phytoconstituents included in the syllabus
CO 3	My student will be able to carryout the isolation volatile oil from crude drug included in the syllabus
CO 4	My student will be able to understand and carryout the separation of Phytoconstituents from mixture by Means of Chromatography





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Subject :Pharmaceutical Jurisprudence-Theory

Subject Code: BP505T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO1	Understanding of the Pharmaceutical legislations and their implications in the development and marketing of pharmaceuticals.
CO2	Students will gain the basic Knowledge and understanding of Various Indian pharmaceutical Acts and Laws
CO3	Knowledge and application of the legislation regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals
CO4	Application of code of ethics during the pharmaceutical practice





SEMESTER-VI

Subject: Medicinal Chemistry- III Theory

Subject Code: BP601T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO1	My students shall able to Explain Historical Development, Nomenclature and stereochemistry of Antibiotics given in syllabus
CO2	My students shall able to discuss the classification of antibiotics along with their SAR, mechanism of action, chemical degradation and uses
CO3	Students shall able to classify the antimalarial drugs given in syllabus and able to recall concept of prodrug, its design and application
CO4	Students shall able to summarize historical development, nomenclature chemistry, classification and stereochemistry of Anti-infective agents
CO5	Students shall able to recognize mechanism of action, SAR, uses and synthesis of Anti-infective agents
CO6	Student shall able to discuss the various approach in drug design and importance of drug design

Subject: Medicinal Chemistry- III Practical

Subject Code: BP607P

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO1	Able to write the chemical synthesis of some drugs
CO2	Describe the structural activity relationship of different class of drug
CO3	Know the identification and characterization of different class of medicinal compounds
CO4	Able to understand the chemistry of drugs with respect to their pharmacological action

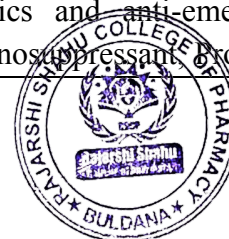




Subject: Pharmacology-III Theory

Subject Code: BP 602T

Course Outcome	Description/Statement
CO1	Students should be able to understand the general principles of chemotherapy, general principles of treatment of poisoning, basic knowledge of acute, subacute and chronic toxicity, genotoxicity, carcinogenicity, teratogenicity and mutagenicity, clinical symptoms and management of barbiturates, morphine, organophosphorus compound and lead, mercury and arsenic poisoning.
CO2	Students should be able to remember the definition & classification of Anti-asthmatic drugs, drugs used in the management of COPD, Expectorants and antitussives, Nasal decongestants, Respiratory stimulants, Antiulcer agents, Drugs for constipation and diarrhoea, Appetite stimulants and suppressants, Digestants and carminatives, Emetics and anti-emetics, Chemtherapeutic agents, Immunostimulants, Immunosuppressant, Protein drugs, monoclonal antibodies, target drugs to antigen, biosimilars.
CO3	Students should be able to describe the pharmacological actions of Anti-asthmatic drugs, drugs used in the management of COPD, Expectorants and antitussives, Nasal decongestants, Respiratory stimulants, Antiulcer agents, Drugs for constipation and diarrhoea, Appetite stimulants and suppressants, Digestants and carminatives, Emetics and anti-emetics, Chemtherapeutic agents, Immunostimulants, Immunosuppressant, Protein drugs, monoclonal antibodies, target drugs to antigen, biosimilars.
CO4	Students should be able to explain the mechanism of action & receptors for Anti-asthmatic drugs, drugs used in the management of COPD, Expectorants and antitussives, Nasal decongestants, Respiratory stimulants, Antiulcer agents, Drugs for constipation and diarrhoea, Appetite stimulants and suppressants, Digestants and carminatives, Emetics and anti-emetics, Chemtherapeutic agents, Immunostimulants, Immunosuppressant, Protein drugs, monoclonal antibodies, target drugs to antigen, biosimilars.
CO5	Students should be able to discuss the uses, adverse effects & dose of Anti-asthmatic drugs, drugs used in the management of COPD, Expectorants and antitussives, Nasal decongestants, Respiratory stimulants, Antiulcer agents, Drugs for constipation and diarrhoea, Appetite stimulants and suppressants, Digestants and carminatives, Emetics and anti-emetics, Chemtherapeutic agents, Immunostimulants, Immunosuppressant, Protein





	drugs, monoclonal antibodies, target drugs to antigen, biosimilars.
CO6	Students should be able to explain Chronopharmacology, definition of rhythm and cycles, biological clock and their significance leading to chronotherapy.

Subject: Pharmacology-III Practical

Subject Code: BP 608P

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO1	Students should be able to understand dose calculation in pharmacological experiments, Antiallergic activity by mast cell stabilization assay, Study of anti-ulcer activity of a drug using pylorus ligand (SHAY) rat model and NSAIDS induced ulcer model.
CO2	Students should be able to analyze - Effect of drugs on gastrointestinal motility, Effect of agonist and antagonists on guinea pig ileum, Estimation of serum biochemical parameters by using semi- autoanalyser.
CO3	Students should be able to perform & study - Effect of saline purgative on frog intestine, Insulin hypoglycemic effect in rabbit, Test for pyrogens by rabbit method.
CO4	Students should be able to determine - Acute oral toxicity (LD50) of a drug from a given data and acute skin irritation / corrosion of a test substance.
CO5	Students should be able to describe - Determination of acute eye irritation / corrosion of a test substance and calculation of pharmacokinetic parameters from a given data.
CO6	Students should be able to understand - Biostatistics methods in experimental pharmacology (students t test, ANOVA, Chi square test, Wilcoxon Signed Rank test).





Subject: Herbal Drug Technology Theory

Subject Code: BP603T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO 1	Explain about raw material as source of herbal drugs, good agricultural practices of medicinal plants including organic farming, and use of pesticide and insecticide included in the syllabus.
CO 2	Compare and Contrast in Basic principles involved in Ayurveda, Siddha, Unani and Homeopathy system and explain about Preparation and standardization of Ayurvedic formulations viz Aristas and Asawas, Ghutika, Churna, Lehya and Bhasma included in the syllabus.
CO 3	Explain about General aspects, Market, growth, scope and types of products available in the market. Health benefits and role of Nutraceuticals in ailments like Diabetes, CVS diseases, Cancer, Irritable bowel syndrome and various Gastro intestinal diseases included in the syllabus.
CO 4	Classify interaction of drugs and their possible side effects included in the syllabus.
CO 5	Explain about herbal cosmetics and Significance of substances of natural origin as excipients included in the syllabus.
CO 6	Summaries WHO and ICH guidelines for evaluation of herbal drugs and patenting of herbal drugs included in the syllabus.
CO 7	Explain about plant based industries and institutions involved in work on medicinal and aromatic plants in India and their GMP included in the syllabus.

Subject: Herbal Drug Technology Practical

Subject Code: BP 609P

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO 1	Perform Phytochemical screening of crude drugs and to determine Alcohol content in ayurvedic Formulation
CO 2	Perform various Evaluation Parameters of Crude drugs
CO 3	Prepare the various herbal formulation as well as Monograph of crude drugs
CO 4	Perform titrimetric analysis of Crude drugs





Subject: Biopharmaceutics and Pharmacokinetics – Theory
Subject Code: BP604T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO1	My students will be able to explain the absorption and distribution process of drug
CO2	My students will be able to explain the process of drug elimination and discuss about bioavailability of drug
CO3	My students will be able to write and explain one compartment models of pharmacokinetic
CO4	My students will be able to write and explain multi compartment models of pharmacokinetic.
CO5	My students will be able to justify the concept of linear and non-linear pharmacokinetic
CO6	My students will be able to define various terms of biopharmaceutics.

Subject: Pharmaceutical Biotechnology – Theory
Subject Code: BP605T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO1	My Student will be able to explain application of biotechnology in pharmaceutical sciences, Application of genetic engineering in medicine, Biosensors, DNA technology.
CO2	My Student will be able to describe about Protein engineering, PCR, Immuno blotting techniques, General method of the preparation of bacterial vaccines and different preparations.
CO3	My Student will be able to summarize Mutation, Genetic organization of Eukaryotes and Prokaryotes and Microbial genetics.
CO4	My Student will be able to memorize & explain about Structure of Immunoglobulins and MHC, Hypersensitivity reactions, Immune stimulation and suppressions, Geneticengineering.
CO5	My Student will be able to discuss use of microbes in industry, Production of enzymes, blood products and plasma substituents.





CO6	My Student will be able to describe large scale production fermenter design, production of different components (penicillins, citric acid, Vitamin B12, Glutamic acid, Griseofulvin,).
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Subject: Quality Assurance – Theory

Subject Code: BP606T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO1	Students should explain the concepts of Quality control, Quality assurance and GMP
CO2	Students should understands , regulatory aspects of pharmaceuticals
CO3	Students should able explain the responsibilities of key personnel in a Pharmaceutical manufacturing unit, and important utilities in pharmaceutical industries
CO4	Students should explain the quality control in pharmaceutical industry and importance of GLP and its scope
CO5	Students should understands importance of documentations in pharmaceutical industry
CO6	Students should understands calibration, qualification , validation, and good warehouse practice





Semester-VII

Subject: Instrumental Method Of Analysis (Theory)

Subject Code: BP701 T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO1	Understands the fundamental concepts of Instrumental techniques interaction of matter with electromagnetic radiations
CO2	Understands the instrumentation of spectroscopic techniques
CO3	Explain applications of spectroscopic techniques in qualitative and quantitative analysis of drugs
CO4	Understands the principle of chromatographic techniques
CO5	Understands the instrumentation of Chromatographic techniques.
CO6	Understands the applications of Chromatographic techniques.

Subject: Instrumental Method Of Analysis practical

Subject Code: BP705 P

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO1	Understand the principal and working of UV spectrophotometry
CO2	Understand the principal and working of Calorimetry
CO3	Understand the techniques for flame photometry
CO4	Understand the different techniques for development of chromatography.

Subject: Industrial Pharmacy II (Theory)

Subject Code: BP702 T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO1	Students should be able to know the process of pilot plant and scale up of dosage forms
CO2	Students should be able to understand the process of technology transfer from lab scale to commercial batch
CO3	Students should be able to study different laws and acts that regulate pharmaceutical industry
CO4	Students should be able to understand Quality Management System
CO5	Students should be able to aware about concept of QbD





Subject Code: Pharmacy Practice

Subject Code: BP703T

Course Outcome	Description/Statement
CO1	Students should be able to explain principles of therapeutics, quality improvement, communication, economics, health behavior, social and administrative aspects, health policy.
CO2	Students should be able to perform drug distribution methods in hospital and apply it in the practice of pharmacy.
CO3	Students should be able to apply principles of drug store management and inventory control to medication use.
CO4	Students should be able to monitor drug therapy of patient through medication chart review, obtain medication history interview and counsel the patients, identify drug related problems.
CO5	Students should describe professional ethics by producing safe and appropriate medication use throughout society

Subject: Novel Drug Delivery System – Theory

Subject Code: BP 704T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO 1	Students should understand concept of controlled and sustained release drug delivery system and role of various polymers in the design and development of various novel drug delivery systems
CO 2	Students should understand and remember the various processes of microencapsulation and evaluation of the microcapsules
CO 3	Students should understand the concept of mucosal drug delivery system and its design considerations with respect to various theories of muco-adhesion
CO 4	Students should understand the concept of transdermal drug delivery Systems, gastroretentive drug delivery systems, nasopulmonary drug delivery system and its design considerations
CO 5	Students should understand the concept of various targeted drug delivery system and its design considerations
CO 6	Students should understand the concept of ocular drug delivery systems and intrauterine drug delivery systems its design considerations





Semester-VIII

Subject: Biostatistics and research methodology – Theory

Subject Code: BP801T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO 1	Students should understand and learn applications of biostatistics in pharmacy with the help measures of central tendency, measures of dispersion and correlation
CO 2	Students should understand and learn regression analysis, probability, parametric tests and non-parametric tests
CO 3	Students should understand the concept of research methodology and its applications while design of experiments using experimental design techniques. Also understand the significance of plagiarism while drafting the research articles and thesis
CO 4	Students should learn and practices designing the methodology while report writing and presentation of data
CO 5	Students should understand and learn design of experiments using statistical analysis in Excel, SPSS, MINITAB and DOE online software trials
CO 6	Students should understand and the design and analysis of experiments using factorial designs and CCD for optimization of experiments

Subject: Social and Preventive Pharmacy

Subject Code: BP802T

Course Outcome	Description/Statement
CO1	Students shall be able to understand the concept of health and disease and thereby understand concept of prevention and control of disease, balanced diet, nutritional deficiencies and malnutrition, impact of urbanization on health and disease.
CO2	Student shall be able to understand the concept of preventive medicine: on various diseases, and concept of addiction -abuse for the drugs or substances.
CO3	Students shall be able to understand the importance of various National health programs on different diseases, its objectives, functioning and outcome.
CO4	Students shall be able to know the significance of various National health intervention programme for mother and child, tobacco control programme, Malaria Prevention Program.
CO5	Students will be able to understand the community health services in rural area





	urban and school health. Also will know the functions of PHC, and Improvement in rural sanitation.
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Subject: Pharmaceutical Regulatory Science (Theory)

Subject Code: BP804ET

Course Outcome	Description/Statement
CO1	Students should be able to understand the process of drug discovery and development
CO2	Students should be able to illustrate regulatory approval process
CO3	Students should be able to describe the regulatory authorities and agencies governing the pharmaceuticals
CO4	Students should be able to explain the regulatory approval process and their registration in Indian and international markets
CO5	Students should be able to understand the various aspects of Clinical Trials
CO6	Students should be able to clarify the basic regulatory concepts

Subject: Pharma Marketing Management

Subject Code: BP803ET

Course Outcome	Description/Statement
CO1	Student should, understand of marketing concepts and techniques
CO2	Describe the product specifications
CO3	Know the promotional ideas for marketing
CO4	Understand the different Pharmaceutical marketing channels
CO5	Explain the Emerging concepts in marketing

