



BRILLIANT GRAMMAR SCHOOL EDUCATIONAL SOCIETY'S GROUP OF INSTITUTIONS-INTEGRATED CAMPUS

(Approved by A.I.C.T.E & P.C.I, New Delhi, Affiliated to JNTUH, Hyderabad)

Abdullapur (V), Abdullapurmet (M), R.R Dist. Hyderabad – 501505

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B.Pharmacy I&I Sem Course Outcomes for the Academic Year 2021-2022

B.Pharmacy I&I Sem Course Outcomes for the Academic Year 2021-2022			
S.No.	Year/Sem	Course Name	Course Outcomes
1	I/I	Human Anatomy and Physiology- I	CO1: Explain the gross morphology, structure, and functions of various organs of the human body.
			CO2: Describe the various homeostatic mechanisms and their imbalances.
			CO3: Identify the various tissues and organs of different systems of human body
			CO4: Perform the various experiments related to special senses and nervous system:
			CO5: Appreciate coordinated working pattern of different organs of each system
2	I/I	Pharmaceutical Analysis- I	CO1: understand the principles of volumetric and electro chemical analysis
			CO2: carryout various volumetric and electrochemical titrations
			CO3: develop analytical skills
			CO4: To Explain The Concept And Types Of Redox Titrations
			CO5: To Explain The Electrochemical Methods Of Analysis
3	I/I	Pharmaceutics- I	CO1: Know the history of profession of pharmacy.
			CO2: Understand the basics of different dosage forms, pharmaceutical

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			incompatibilities and pharmaceutical calculations
			CO3: Understand the professional way of handling the prescription
			CO4: Preparation of various conventional dosage forms
			CO5: To Explain the total concept of semi solid dosages forms
4	I/I	Pharmaceutical Inorganic Chemistry-I	CO1: know the sources of impurities and methods to determine.
			CO2: impurities in inorganic drugs and pharmaceuticals
			CO3: understand the medicinal and pharmaceutical importance of inorganic compounds
			CO4: To explain the uses and preparations of pharmaceutical in organic compounds
			CO5: to explain the pharmaceutical application of radioactive substances.
5	I/I	COMMUNICATION SKILLS	CO1: Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation
			CO2: Communicate effectively (Verbal and Non Verbal)
			CO3: Effectively manage the team as a team player
			CO4: Develop interview skills.
			CO5: Develop Leadership qualities and

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			essentials
6	I/I	REMEDIAL BIOLOGY	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
			CO4: To explain the Nitrogen metabolism, and Photosynthesis
			CO5: To explain the cell division, tissues, plant growth and development.
7	I/I	Human Anatomy and Physiology-I lab	CO:1 . Study of compound microscope Microscopic study of epithelial and connective tissue , Microscopic study of muscular and nervous tissue
			CO2: 4. Identification of axial bones and appendicular bones . To study the integumentary and special senses using specimen, models, etc
			CO3: To study the nervous system using specimen, models, etc., To study the endocrine system using specimen, models, etc To demonstrate the general neurological examination
			CO:4 To demonstrate the function of olfactory nerve , To examine the different types of taste, To demonstrate the visual acuity
			CO:5 To demonstrate the reflex activity ,Recording of body temperature ,To


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			demonstrate positive and negative feedback mechanism
8	I/I	PHARMACEUTICAL ANALYSIS - I lab	CO:1 Preparation and standardization of Sodium hydroxide and Sulphuric acid
			CO2:Preparation and standardization of Sodium thiosulfate , Potassium permanganate and Ceric ammonium sulphate
			CO3: Assay of the following compounds along with Standardization of Titrant Ammonium chloride by acid base titration and Ferrous sulphate by Cerimetry
			CO:4 Sodium benzoate by non-aqueous titration and Sodium Chloride by precipitation titration
			CO:5 Determination of Normality by electro-analytical methods and Conductometric titration of strong acid against strong base
9	I/I	PHARMACEUTICS - I LAB	Co1:Preparation of Syrups and Elixirs
			CO2: Preparation of Linctus and Solutions
			CO3: Preparation of Suspensions and Emulsions
			CO:4 Preparation of Powders and Granules, Suppositories
			CO:5 Preparation of Semisolids ,Gargles and Mouthwashes
10	I/I	PHARMACEUTICAL INORGANIC CHEMISTRY - LAB	CO:1 Limit test for Chlorides and Sulphates, Modified limit test for Chlorides and Sulphates Limit test for Iron


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			<p>CO2: Limit test for Heavy metals , Lead and Arsenic</p> <p>CO3: Identification tests for Magnesium hydroxide, Ferrous sulphate ,Sodium bicarbonate, Calcium gluconateand Copper sulphate</p>
11			<p>CO:4 Test for purity Swelling power of Bentonite Neutralizing capacity of aluminum hydroxide</p> <p>CO:5 Preparation of inorganic pharmaceuticals Boric acid, Potash alum and Ferrous sulphate</p>
12	I/I	COMMUNICATION SKILLS - LAB	<p>CO:1 To explain Basic communication covering the following topics Meeting People Asking Questions</p> <p>CO2: To explain Pronunciations covering the following topics Pronunciation (Consonant Sounds)</p> <p>CO3: To explain Advanced Learning Listening Comprehension / Direct and Indirect Speech</p> <p>CO:4 To explain Figures of Speech Effective Communication Writing Skills Effective Writing</p> <p>CO:5 To explain Interview Handling Skills E-Mail etiquette Presentation Skills</p>
13	I/I	REMEDIAL BIOLOGY LAB	<p>CO:1 Introduction to experiments in biology</p> <p>CO2: Study of cell and its inclusions</p> <p>CO3: Study of Stem, Root, Leaf and its</p>


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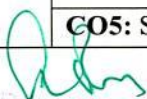


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			<p>modifications</p> <p>CO:4 Detailed study of frog by using computer models</p> <p>CO:5 Microscopic study and identification of tissues</p>
14	I/II	Human Anatomy and Physiology- II	<p>CO1: Explain the gross morphology, structure, and functions of various organs of the human body.</p> <p>CO2: Describe the various homeostatic mechanisms and their imbalances.</p> <p>CO3: Identify the various tissues and organs of different systems of human body.</p> <p>CO4: Perform the hematological tests like blood cell counts, hemoglobin estimation, bleeding/clotting time etc and also record blood pressure, heart rate, pulse and respiratory volume.</p> <p>CO5: Appreciate the interlinked mechanisms in the maintenance of normal functioning.(homeostasis) of human body.</p>
15	I/II	PHARMACEUTICAL ORGANIC CHEMISTRY – I	<p>CO1:write the structure, name and the type of isomerism of the organic compound</p> <p>CO2:write the reaction, name the reaction and orientation of reactions</p> <p>CO3:account for reactivity/stability of compounds,</p> <p>CO4:identify/confirm the identification of organic compound</p> <p>CO5: Structure and Uses of Carboxylic</p>


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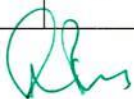
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			acids Aliphatic amines.
16	I/II	BIOCHEMISTRY	CO1: Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.
			CO2: Understand the metabolism of nutrient molecules in physiological and pathological conditions.
			CO3: Understand the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins.
			CO4: Introduction, classification, chemical nature and biological role of Bio molecules.
			CO5: Introduction, properties, nomenclature, and IUB classification of enzymes.
10	I/II	PATHOPHYSIOLOGY	CO1: Describe the etiology and pathogenesis of the selected disease states;
			CO2: Name the signs and symptoms of the diseases;
			CO3: Mention the complications of the diseases.
			CO4: Introduction, classification, chemical nature and biological role of Bio molecules
			CO5: Introduction, properties, nomenclature, and IUB classification of enzymes
11	I/II	COMPUTER APPLICATIONS IN PHARMACY	CO1: know the various types of application of computers in pharmacy


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			<p>CO2:know the various types of databases</p>
			<p>CO3:know the various applications of databases in pharmacy</p>
			<p>CO4: Introduction, Objective of Bioinformatics.</p>
			<p>CO5: Computers as data analysis in Preclinical development</p>
	I/II	HUMAN ANATOMY AND PHYSIOLOGY – II LAB	<p>CO:1. Introduction to hemocytometry, Enumeration of white blood cell (WBC) count and red blood corpuscles (RBC) count</p>
			<p>CO2: Determination of bleeding time and clotting time , Estimation of hemoglobin content</p>
			<p>CO3: . Determination of blood group and erythrocyte sedimentation rate (ESR), Determination of heart rate and pulse rate.</p>
			<p>CO:4 Recording of blood pressure, Determination of tidal volume and vital capacity, and Study of digestive, respiratory, cardiovascular systems, urinary and reproductive systems with the help of models, charts and specimens.</p>
			<p>CO:5. Study of family planning devices and pregnancy diagnosis test.. Demonstration of total blood count by cell analyser, Permanent slides of vital organs and gonads</p>
	I/II	PHARMACEUTICAL ORGANIC CHEMISTRY - I LAB	<p>CO:1Systematic qualitative analysis of unknown organic compounds like 1. Preliminary test: Color, odour, aliphatic/aromatic compounds, saturation and unsaturation, etc. 2. Detection of elements like Nitrogen, Sulphur and Halogen</p>

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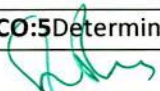
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			<p>by Lassaigne's test 3. Solubility test</p> <p>CO2: Functional group test like Phenols, Amides/ Urea, Carbohydrates, Amines, Carboxylic acids, Aldehydes and Ketones, Alcohols, Esters, Aromatic and Halogenated Hydrocarbons, Nitro compounds and Anilides.</p> <p>CO3: Identification of the unknown compound from the literature using melting point/ boiling point, Preparation of the derivatives and confirmation of the unknown compound by melting point/ boiling point.</p> <p>CO:4Preparation of suitable solid derivatives from organic compounds</p> <p>CO:5Construction of molecular models</p>
I/II	BIOCHEMISTRY LAB		<p>CO:1Qualitative analysis of carbohydrates (Glucose, Fructose, Lactose, Maltose, Sucrose and starch)</p> <p>CO2: Identification tests for Proteins (albumin and Casein) , Quantitative analysis of reducing sugars (DNSA method) and Proteins (Biuret method)</p> <p>CO3: Qualitative analysis of urine for abnormal constituents,. Determination of blood creatinine and blood sugar</p> <p>CO:4Determination of serum total cholesterol, Preparation of buffer solution and measurement of pH , Study of enzymatic hydrolysis of starch</p> <p>CO:5Determination of Salivary amylase</p>


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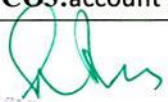
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			activity , Study the effect of Temperature on Salivary amylase activity and Study the effect of substrate concentration on salivary amylase activity
	I/II	COMPUTER APPLICATIONS IN PHARMACY LAB	<p>CO:1Design a questionnaire using a word processing package to gather information about a particular disease. 2. Create a HTML web page to show personal information. 3 Retrieve the information of a drug and its adverse effects using online tools</p> <p>CO2: Creating mailing labels Using Label Wizard , generating label in MS WORD 5 Create a database in MS Access to store the patient information with the required fields Using access</p> <p>CO3: Design a form in MS Access to view, add, delete and modify the patient record in the database and Generating report and printing the report from patient database</p> <p>CO:4Creating invoice table using – MS Access , Drug information storage and retrieval using MS Access</p> <p>CO:5. Creating and working with queries in MS Access , Exporting Tables, Queries, Forms and Reports to web pages , Exporting Tables, Queries, Forms and Reports to XML page</p>
12	II/I	PHARMACEUTICAL ORGANIC CHEMISTRY –II	<p>CO1: write the structure, name and the type of isomerism of the organic compound•</p> <p>CO2: write the reaction, name the reaction and orientation of reactions•</p> <p>CO3:account for reactivity/stability of</p>


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			compounds
			CO4 prepare organic compounds
			CO5 :structural activity and stabilitys of Cyclo alkanes
13	II/I	PHYSICAL PHARMACEUTICS - I	CO1 : Understand various physicochemical properties of drug molecules in the designing the dosage form
			CO2 : Know the principles of chemical kinetics & to use them in assigning expiry date for formulation
			CO3 :Demonstrate use of physicochemical properties in evaluation of dosage forms
			CO4 Appreciate physicochemical properties of drug molecules in formulation research and development
			CO5 : applications of pH, buffers and Isotonic solutions
14	II/I	PHARMACEUTICAL MICROBIOLOGY	CO1 : Understand methods of identification, cultivation and preservation of various microorganisms
			CO2 : Importance of sterilization in microbiology. and pharmaceutical industry
			CO3 :Learn sterility testing of pharmaceutical products
			CO4 :Microbiological standardization of Pharmaceuticals
			CO5 :Understand the cell culture technology and its applications in pharmaceutical industries.

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15	II/I	PHARMACEUTICAL ENGINEERING	CO1: To know various unit operations used in Pharmaceutical industries and To understand the material handling techniques
			CO2: To perform various processes involved in pharmaceutical manufacturing process
			CO3: To carry out various test to prevent environmental pollution.
			CO4: To appreciate and comprehend significance of plant lay out design for optimum use of resources.
			CO5: To appreciate the various preventive methods used for corrosion control in Pharmaceutical industries.
	II/I	PHARMACEUTICAL ORGANIC CHEMISTRY - II LAB	CO:1 Experiments involving laboratory techniques Recrystallization
			CO2: Determination of following oil values (including standardization of reagents) Acid value Saponification value Iodine value
			CO3: Preparation of compounds Benzanilide/Phenyl benzoate/Acetanilide from Aniline/ Phenol /Aniline by acylation• reaction. 2,4,6-Tribromo aniline/Para bromo acetanilide from Aniline/ Acetanilide by• halogenation (Bromination) reaction. 5-Nitro salicylic acid/Meta di nitro benzene from Salicylic acid / Nitro benzene by• nitration reaction.
			CO:4 Dibenzal acetone from Benzaldehyde by Claisen Schmidt reaction Cinnamic acid from Benzaldehyde by Perkin reaction• P-Iodo benzoic acid from P-amino benzoic



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			acid•
			CO:5 Benzoic acid from Benzyl chloride by oxidation reaction. Benzoic acid/ Salicylic acid from alkyl benzoate/ alkyl salicylate by hydrolysis• reaction. 1-Phenyl azo-2-naphthol from Aniline by diazotization and coupling reactions.●
II/I	PHYSICAL PHARMACEUTICS – I LAB		CO:1 Determination the solubility of drug at room temperature at different pH conditions 2. Determination of pKa value by Half Neutralization/ Henderson Hassel Balch equation
			CO2: Determination of Partition co- efficient of benzoic acid in benzene and water , Determination of Partition co- efficient of Iodine in CCl4 and water 5. Determination of % composition of NaCl in a solution using phenol-water system by CST method
			CO3: Determination of particle size, particle size distribution using sieving method and . Determination of particle size, particle size distribution using Microscopic method
			CO:4 Determination of bulk density, true density and porosity , Determine the angle of repose and influence of lubricant on angle of repose
			CO:5 Determination of stability constant and donor acceptor ratio of PABA-Caffeine complex by solubility method and Determination of stability constant and donor acceptor ratio of Cupric-Glycine complex by pH titration method

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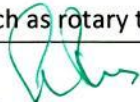
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	II/I	PHARMACEUTICAL MICROBIOLOGY LAB	<p>CO:1 Introduction and study of different equipments and processing, e.g., B.O.D. incubator, laminar flow, aseptic hood, autoclave, hot air sterilizer, deep freezer, refrigerator, microscopes used in experimental microbiology</p> <p>CO2: Sterilization of glassware, preparation and sterilization of media, Sub culturing of bacteria and fungus. Nutrient stabs and slants preparations.</p> <p>CO3: Staining methods- Simple, Grams staining and acid fast staining and Isolation of pure culture of micro-organisms by multiple streak plate technique and other techniques</p> <p>CO:4 Microbiological assay of antibiotics by cup plate method and other methods and Motility determination by Hanging drop method, Sterility testing of pharmaceuticals.</p> <p>CO:5 Bacteriological analysis of water</p>
	II/I	PHARMACEUTICAL ENGINEERING LAB	<p>CO:1 Determination of radiation constant of brass, iron, unpainted and painted glass. 2. Steam distillation – To calculate the efficiency of steam distillation. 3. To determine the overall heat transfer coefficient by heat exchanger.</p> <p>CO2: Determination of moisture content and loss on drying , Determination of humidity of air – i) from wet and dry bulb temperatures –use of Dew point method.</p> <p>CO3: Description of Construction working and application of Pharmaceutical Machinery such as rotary tablet machine,</p>


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			<p>fluidized bed coater, fluid energy mill, de humidifier, Size analysis by sieving – To evaluate size distribution of tablet granulations – Construction of various size frequency curves including arithmetic and logarithmic probability plots.</p> <p>CO:4 Size reduction: To verify the laws of size reduction using ball mill and determining Kicks, Rittinger's, Bond's coefficients, power requirement and critical speed of Ball Mill Demonstration of colloid mill, planetary mixer, fluidized bed dryer, freeze dryer and such other major equipment</p> <p>CO:5 Factors affecting Rate of Filtration and Evaporation (Surface area, Concentration and Thickness/ viscosity . To study the effect of time on the Rate of Crystallization. To calculate the uniformity Index for given sample by using Double Cone Blender</p> <p>CO5: Classification of dispersed systems & their general characteristics Colloidal dispersions</p>
	II/II	PHARMACEUTICAL ORGANIC CHEMISTRY – III	<p>CO1: understand the methods of preparation and properties of organic compounds</p> <p>CO2: explain the stereo chemical aspects of organic compounds and stereo chemical reactions</p> <p>CO3: know the medicinal uses and other applications of organic compounds</p>



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			<p>CO4: Synthesis, reactions and medicinal uses of Imidazole, Pyridine compounds.</p> <p>CO5: importance and medical uses of organic reagents.</p>
	II/II	MEDICINAL CHEMISTRY – I	<p>CO1: understand the chemistry of drugs with respect to their pharmacological activity</p> <p>CO2: understand the drug metabolic pathways, adverse effect and therapeutic value of drugs</p> <p>CO3: know the Structural Activity Relationship (SAR) of different class of Drugs</p> <p>CO4: write the chemical synthesis of some CO5: To explain the MOA and SAR of central nervous system drugs. drugs</p>
	II/II	PHYSICAL PHARMACEUTICS - II	<p>CO1: Understand various physicochemical properties of drug molecules in the designing the dosage form</p> <p>CO2: Know the principles of chemical</p>

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			<p>kinetics & to use them in assigning expiry date for Formulation</p> <p>CO3: Demonstrate use of physicochemical properties in evaluation of dosage forms.</p> <p>CO4: Appreciate physicochemical properties of drug molecules in formulation research and Development</p> <p>CO5: Classification of dispersed systems & their general characteristics Colloidal dispersions</p>
19	II/II	PHARMACOLOGY - I	<p>CO1: Understand the pharmacological actions of different categories of drugs</p> <p>CO2: Explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels.</p> <p>CO3: Apply the basic pharmacological knowledge in the prevention and treatment of various diseases.</p> <p>CO4: Observe the effect of drugs on animals by simulated experiments</p> <p>CO5: Appreciate correlation of pharmacology with other bio medical sciences</p>
20	II/II	PHARMACOGNOSY AND PHYTOCHEMISTRY - I	<p>CO1: to know the techniques in the cultivation and production of crude drugs</p>


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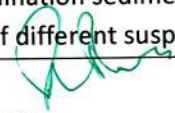


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			<p>CO2: to know the crude drugs, their uses and chemical nature</p> <p>CO3: know the evaluation techniques for the herbal drugs</p> <p>CO4: to carry out the microscopic and morphological evaluation of crude drugs</p> <p>CO5: Study of biological source, chemical nature and uses of plant products</p>
	II/II	MEDICINAL CHEMISTRY – I LAB	<p>CO:1 Preparation of drugs/ intermediates 1 1,3-pyrazole 2 1,3-oxazole 3 Benzimidazole 4 Benzotriazole</p> <p>CO2: 2,3- diphenyl quinoxaline 6 Benzocaine 7 Phenytoin 8 Phenothiazine 9 Barbiturate</p> <p>CO3: Assay of drugs 1 Chlorpromazine 2 Phenobarbitone 3 Atropine</p> <p>CO:4 Assay of drugs ibuprofen ,Aspirin , Furosemide</p> <p>CO:5 Determination of Partition coefficient for any two drugs</p>
	II/II	PHYSICAL PHARMACEUTICS – II LAB	<p>CO:1 Determination of surface tension of given liquids by drop count and drop weight method 2. Determination of HLB number of a surfactant by saponification method</p> <p>CO2: Determination of Freundlich and Langmuir constants using activated char coal .Determination of critical micellar concentration of surfactants . Determination of viscosity of liquid using Ostwald's viscometer</p> <p>CO3: Determination sedimentation volume with effect of different suspending agent .</p>


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			<p>Determination sedimentation volume with effect of different concentration of single suspending agent</p> <p>CO:4 Determination of viscosity of semisolid by using Brookfield viscometer . Determination of reaction rate constant first order.</p> <p>CO:5 Determination of reaction rate constant second order and Accelerated stability studies</p>
	II/II	PHARMACOLOGY – I LAB	<p>CO:1 Introduction to experimental pharmacology. 2. Commonly used instruments in experimental pharmacology. 3. Study of common laboratory animals</p> <p>CO2: Maintenance of laboratory animals as per CPCSEA guidelines. Common laboratory techniques. Blood withdrawal, serum and plasma separation, anesthetics and euthanasia used for animal studies. Study of different routes of drugs administration in mice/rats</p> <p>CO3: Study of effect of hepatic microsomal enzyme inducers on the phenobarbitone sleeping time in mice. Effect of drugs on ciliary motility of frog oesophagus .Effect of drugs on rabbit eye</p> <p>CO:4 Effects of skeletal muscle relaxants using rota-rod apparatus. Effect of drugs on locomotor activity using actophotometer. Anticonvulsant effect of drugs by MES and PTZ method</p> <p>CO:5 . Study of stereotype and anti-catatonic activity of drugs on rats/mice. .</p>



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			Study of anxiolytic activity of drugs using rats/mice. Study of local anesthetics by different methods
	II/II	PHARMACOGNOSY AND PHYTOCHEMISTRY – I LAB	CO:1 Analysis of crude drugs by chemical tests: (i) Tragacanth (ii) Acacia (iii) Agar (iv) Gelatin (v) starch (vi) Honey (vii) Castor oil 2. Determination of stomatal number and index
			CO2: Determination of vein islet number, vein islet termination and palisade ratio. Determination of size of starch grains, calcium oxalate crystals by eye piece micrometer
			CO3: Determination of Fiber length and width . Determination of number of starch grains by Lycopodium spore method
			CO:4 Determination of Ash value . Determination of Extractive values of crude drugs
			CO:5 Determination of moisture content of crude drugs . Determination of swelling index and foaming
21	III/I	MEDICINAL CHEMISTRY – II	CO1: Understand the chemistry of drugs with respect to their pharmacological activity
			CO2: Understand the drug metabolic pathways, adverse effect and therapeutic value of drugs
			CO3: Know the Structural Activity Relationship of different class of drugs
			CO4: Study the chemical synthesis of


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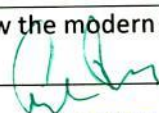


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			selected drugs
			CO5: To study the MOA and SAR of anti diabetic agents and local agents.
22	III/I	INDUSTRIAL PHARMACY - I	CO1: Know the various pharmaceutical dosage forms and their manufacturing techniques.
			CO2: Know various considerations in development of pharmaceutical dosage forms.
			CO3: Formulate solid, liquid and semisolid dosage forms and evaluate them for their quality
			CO4: To study of the Parenteral Products and Ophthalmic Preparations.
			CO5: To study about the Cosmetics and Pharmaceutical Aerosols
23	III/I	PHARMACOLOGY - II	CO1: Understand the mechanism of drug action and its relevance in the treatment of different diseases
			CO2: Demonstrate isolation of different organs/tissues from the laboratory animals by simulated experiments
			CO3: Demonstrate the various receptor actions using isolated tissue preparation•
			CO4: Appreciate correlation of pharmacology with related medical sciences
			CO5: Pharmacology of drugs acting on endocrine system.
24	III/I	PHARMACOGNOSY AND PHYTOCHEMISTRY - II	CO1: To know the modern extraction


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			<p>techniques, characterization and identification of the herbal drugs and phytoconstituents</p> <p>CO2: To understand the preparation and development of herbal formulation</p> <p>CO3: To understand the herbal drug interactions</p> <p>CO4: To carryout isolation and identification of phytoconstituents</p> <p>CO5: Industrial production, estimation and utilization of the phytoconstituents.</p>
25	III/I	COSMETIC SCIENCE	<p>CO1: Upon completion of the course the student shall be able to know the regulations pertaining to cosmetics and cosmetic excipients.</p> <p>CO2: They will be knowing the preparations of various skin care products like creams, antiperspirants, deodorants, hair care products etc</p> <p>CO3: They also know about the role of herbs in sunscreens</p> <p>CO4: explain the Definition of cosmetics as per Indian and EU regulations.</p> <p>CO5: study of Basic understanding of the terms of Comedogenic, dermatitis</p>
26	III/I	ENVIRONMENTAL SCIENCES	<p>CO1: Create the awareness about environmental problems among learners</p> <p>CO2: Impart basic knowledge about the environment and its allied problems.</p>


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			<p>CO3: Develop an attitude of concern for the environment.</p> <p>CO4: Motivate learner to participate in environment protection and environment improvement</p> <p>CO5: Acquire skills to help the concerned individuals in identifying and solving environmental problems.</p>
	III/I	INDUSTRIAL PHARMACY LAB	<p>CO:1 Preformulation study for prepared granules 2. Preparation and evaluation of Paracetamol tablets</p> <p>CO2: Preparation and evaluation of Aspirin tablets , Coating of tablets . Preparation and evaluation of Tetracycline capsules</p> <p>CO3: Preparation of Calcium Gluconate injection and Ascorbic Acid injection</p> <p>CO:4 Preparation of Paracetamol Syrup and Eye drops . Preparation of Pellets by extrusion spheronization technique</p> <p>CO:5 Preparation of Creams (cold / vanishing cream) . Evaluation of Glass containers (As per IP)</p>
	III/I	PHARMACOLOGY - II LAB	<p>CO:1 Introduction to in-vitro pharmacology and physiological salt solutions. Effect of drugs on isolated frog heart. Effect of drugs on blood pressure and heart rate of dog</p> <p>CO2: Study of diuretic activity of drugs using rats/mice. DRC of acetylcholine using frog rectus abdominis muscle. Effect of physostigmine and atropine on DRC of acetylcholine using frog rectus abdominis</p>

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			<p>muscle and rat ileum respectively.</p> <p>CO3: Bioassay of histamine using guinea pig ileum by matching method. Bioassay of oxytocin using rat uterine horn by interpolation method. Bioassay of serotonin using rat fundus strip by three point bioassay.</p> <p>CO:4 Bioassay of acetylcholine using rat ileum/colon by four point bioassay. Determination of PA2 value of prazosin using rat anococcygeus muscle (by Schilds plot method). Determination of PD2 value using guinea pig ileum</p> <p>CO:5 Effect of spasmogens and spasmolytics using rabbit jejunum. Anti-inflammatory activity of drugs using carrageenan induced paw-edema model. Analgesic activity of drug using central and peripheral methods</p>
III/I	PHARMACOGNOSY AND PHYTOCHEMISTRY II LAB		<p>CO:1 (1) Morphology, histology and powder characteristics & extraction & detection of: Cinchona, Cinnamon, Senna, Clove, Ephedra, Fennel and Coriander</p> <p>CO2: Exercise involving isolation & detection of active principles a. Caffeine - from tea dust. b. Diosgenin from Dioscorea c. Atropine from Belladonna d. Sennosides from Senna</p> <p>CO3: Separation of sugars by Paper chromatography (4) TLC of herbal extract</p> <p>CO:4 Distillation of volatile oils and detection of phytoconstituents by TLC</p> <p>CO:5 Analysis of crude drugs by chemical</p>



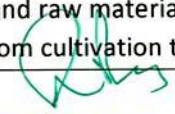
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			tests: (i) Asafoetida (ii) Benzoin (iii) Colophony (iv) Aloes (v) Myrrh
27	III/II	MEDICINAL CHEMISTRY – III	CO1: Understand the importance of drug design and different techniques of drug design.
			CO2: Understand the chemistry of drugs with respect to their biological activity.
			CO3: Know the metabolism, adverse effects and therapeutic value of drugs•
			CO4: Know the importance of SAR of drugs.
			CO5: study of drug design and Physicochemical parameters used in quantitative structure activity relationship (QSAR)
28	III/II	PHARMACOLOGY - III	CO1: Understand the mechanism of drug action and its relevance in the treatment of different infectious diseases
			CO2: Comprehend the principles of toxicology and treatment of various poisonings and appreciate correlation of pharmacology with related medical sciences.
			CO3: to study the Chemotherapy of anti viral and anti fungal agents.
			CO4: The study of Chemotherapy and Urinary tract infections and sexually transmitted diseases.
			CO5: Principles of toxicology.
29	III/II	HERBAL DRUG TECHNOLOGY	CO1: understand raw material as source of herbal drugs from cultivation to herbal drug


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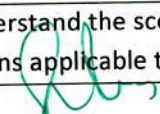
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			product
			CO2: know the WHO and ICH guidelines for evaluation of herbal drugs
			CO3: know the herbal cosmetics, natural sweeteners, nutraceuticals
			CO4: appreciate patenting of herbal drugs, GMP .
			CO5: Good Manufacturing Practice of Indian systems of medicine.
30	III/II	BIOPHARMACEUTICS AND PHARMACOKINETICS	CO1: Understand the basic concepts in biopharmaceutics and pharmacokinetics.
			CO2: Use plasma data and derive the pharmacokinetic parameters to describe the process of drug absorption, distribution, metabolism and elimination.
			CO3: Critically evaluate biopharmaceutic studies involving drug product equivalency
			CO4: Design and evaluate dosage regimens of the drugs using pharmacokinetic and biopharmaceutic parameters.
			CO5: Detect potential clinical pharmacokinetic problems and apply basic pharmacokinetic principles to solve them
31	III/II	PHARMACEUTICAL QUALITY ASSURANCE	CO1: Understand the cGMP aspects in a pharmaceutical industry
			CO2: Appreciate the importance of documentation
			CO3: Understand the scope of quality certifications applicable to pharmaceutical


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			industries
			CO4: Understand the responsibilities of QA & QC departments
			CO5: to study about the Calibration and Validation techniques.
			CO:1 Preparation of drugs and intermediates a. Sulphanilamide b. 7-Hydroxy, 4-methyl coumarin c. Chlorobutanol
			CO2: Assay of drugs a. Isonicotinic acid hydrazide b. Chloroquine c. Metronidazole
			CO3: Preparation of medicinally important compounds or intermediates by Microwave irradiation technique
			CO:4 Drawing structures and reactions using chem draw
			CO:5 Determination of physicochemical properties such as logP, clogP, MR, Molecular weight, Hydrogen bond donors and acceptors for class of drugs course content using drug design software Drug likeliness screening (Lipinskies RO5)
			CO:1 Dose calculation in pharmacological experiments 2. Antiallergic activity by mast cell stabilization assay 3. Study of anti-ulcer activity of a drug using pylorus ligand (SHAY) rat model and NSAIDS induced ulcer model.
			CO2: Study of effect of drugs on gastrointestinal motility . Effect of agonist and antagonists on guinea pig ileum . Estimation of serum biochemical parameters by using semi- autoanalyser
III/II	MEDICINAL CHEMISTRY- III LAB		
III/II	PHARMACOLOGY - III LAB		

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			<p>CO3: Effect of saline purgative on frog intestine . Insulin hypoglycemic effect in rabbit . Test for pyrogens (rabbit method)</p>
			<p>CO:4 Determination of acute oral toxicity (LD50) of a drug from a given data . Determination of acute skin irritation / corrosion of a test substance .Determination of acute eye irritation / corrosion of a test substance</p>
			<p>CO:5 Calculation of pharmacokinetic parameters from a given data . Biostatistics methods in experimental pharmacology (student's t test, ANOVA) .Biostatistics methods in experimental pharmacology (Chi square test, Wilcoxon Signed Rank test)</p>
III/II	HERBAL DRUG TECHNOLOGY LAB		<p>CO:1 To perform preliminary phytochemical screening of crude drugs. 2. Evaluation of excipients of natural origin</p>
			<p>CO2: Incorporation of prepared and standardized extract in cosmetics formulations like creams, lotions, Shampoos and their evaluation.</p>
			<p>CO3: Incorporation of prepared and standardized extract in cosmetics formulations like Syrups, Mixtures and tablets and their evaluations as per pharmacopoeial requirements</p>
			<p>CO:4 Monograph analysis of herbal drugs from recent Pharmacopoeias . Determination of Aldehyde content</p>
			<p>CO:5 Determination of phenolic content . Determination of total alkaloids</p>

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32	IV/I	INSTRUMENTAL METHODS OF ANALYSIS	CO1: Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis
			CO2: Understand the chromatographic separation and analysis of drugs.
			CO3: Perform quantitative & qualitative analysis of drugs using various analytical instruments
			CO4: to study about the Gas chromatography and High performance liquid chromatography (HPLC).
			CO5: To study about the Ion exchange chromatography Gel chromatography.
33	IV/I	INDUSTRIAL PHARMACY - II	CO1: Know the process of pilot plant and scale up of pharmaceutical dosage forms
			CO2: Understand the process of technology transfer from lab scale to commercial batch
			CO3: Know different laws and acts that regulate pharmaceutical industry in India and US
			CO4: Understand the approval process and regulatory requirements for drug products
			CO5: To study about the Indian Regulatory Requirements.
34	IV/I	PHARMACY PRACTICE	CO1: Know various drug distribution methods in a hospital
			CO2: Appreciate the pharmacy stores management and inventory control
			CO3: Monitor drug therapy of patient


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			through medication chart review and clinical review
			CO4: Know pharmaceutical care services
			CO5: do patient counseling in community pharmacy
35	IV/I	NOVEL DRUG DELIVERY SYSTEMS	CO1: To understand various approaches for development of novel drug delivery systems.
			CO2: To understand the criteria for selection of drugs and polymers for the development of Novel drug delivery systems, their formulation and evaluation
			CO3: To study about the Transdermal Drug Delivery Systems and Gastroretentive drug delivery systems.
			CO4: study about the Nanotechnology and its Concepts.
			CO5: To study about the Ocular Drug Delivery Systems Intrauterine Drug Delivery Systems
36	IV/I	PHARMACOVIGILANCE	CO1: History and development of pharmacovigilance
			CO2: National and international scenario of pharmacovigilance
			CO3: International standards for classification of diseases and drugs
			CO4: Data during pre-clinical, clinical and post approval.

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			CO5: Adverse drug reaction reporting systems and communication in pharmacovigilance
37	IV/II	BIOSTATISTICS AND RESEARCH METHODOLOGY	CO1: Know the operation of M.S. Excel, SPSS, R and MINITAB®, DoE (Design of Experiment)
			CO2: Know the various statistical techniques to solve statistical problems
			CO3: Appreciate statistical techniques in solving the problems.
			CO4: To about the Online Statistical Software's to Industrial and Clinical trial approach.
			CO5: To about the Factorial Design and Response Surface methodology
38	IV/II	SOCIAL AND PREVENTIVE PHARMACY	CO1: Acquire high consciousness/realization of current issues related to health and pharmaceutical problems within the country and worldwide.
			CO2: Have a critical way of thinking based on current healthcare development.
			CO3: Evaluate alternative ways of solving problems related to health and pharmaceutical issues
			CO4: To study about the National health intervention programme.
			CO5: To study about the Community services in rural, urban and school health.
39	IV/II	PHARMACEUTICAL JURISPRUDENCE	CO1: The Pharmaceutical legislations and their implications in the development and

[Signature]
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			marketing
			CO2: Various Indian pharmaceutical Acts and Laws
			CO3: The regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals
			CO4: The code of ethics during the pharmaceutical practice
			CO5: To study about the Pharmaceutical Legislations.
40	IV/II	NANO TECHNOLOGY	<p>CO1: The students should be able to select the right kind of materials, able to develop nano formulations with appropriate technologies, evaluate the product related test and for identified diseases</p> <p>CO2: To study about the Synthesis of Nanomaterials.</p> <p>CO3: To study about the Biomedical applications of Nanotechnology.</p> <p>CO4: To study about the Design of nanomaterials for drug delivery.</p> <p>CO5: To study about the Characterization, drug release and stability studies of nanomaterials.</p>
41	IV/II	INSTRUMENTAL METHODS OF ANALYSIS LAB	<p>CO1: determination of absorption maxima and effect of solvents on absorption maxima of organic compounds</p> <p>CO2: Estimation of dextrose and sulfanilamide by colorimetry</p> <p>CO3: TO explain the assay of paracetamol</p>


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			by UV spectrophotometry
			CO4:To determine the sodium and potassium by flame photometry
42	IV/II	PRACTICE SCHOOL	CO5:To explain the demonstration of HPLC and Gas chromatography
			CO1; To explain about the practice school is an educational innovation seeking to link industry experience with university insruction
			CO2:To explain the departments of pharmaceutical industry
			CO3:To study about the definition,classification and functions of the hospital
			CO4:To explain the definition and functions of hospital pharmacy
			CO5;TO explain the pharmacognsticstudy of medicinal plants
43	IV/II		CO1:
			CO1:
			CO1:
			CO1:
			CO1:
44	IV/I		CO1:
			CO1:
			CO1:
			CO1:


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