B.PHARMACY SYLLABUS (PCI / NEP 2020)

SEMESTER V

Subject Name: Biomedicinal Chemistry (Theory)

Subject Code: BP501T

UNIT I: Drugs Acting on the Central Nervous System (10 Hours)

- Note: Study of the development of the following classes of drugs includes chemical classification, structure, uses, SAR of selective drug classes, and synthesis of selected drugs as superscripted (*).
- General Anesthetics: Halothane, Methoxyflurane, Enflurane, Sevoflurane, Isoflurane, Desflurane, Methohexital, Thiamylal, Thiopental, Ketamine*, Ramelteon, Remimazolam, Fospropofol, Dexmedetomidine.
- Sedatives and Hypnotics: Barbital, Phenobarbital*, Mephobarbital, Amobarbital, Butabarbital, Pentobarbital, Secobarbital; Chlordiazepoxide, Diazepam*, Oxazepam, Chlorazepate, Lorazepam, Alprazolam, Zolpidem; Glutethimide, Meprobamate, Ethchlorvynol, Triclofos, Paraldehyde. SAR of Barbiturates and Benzodiazepines.
- Antipsychotics: Promazine, Chlorpromazine*, Triflupromazine, Thioridazine, Piperacetazine, Prochlorperazine, Trifluoperazine, Chlorprothixene, Thiothixene, Loxapine, Clozapine, Haloperidol, Droperidol, Risperidone, Molindone, Sulpiride, Brexpiprazole, Lumateperone, Pimavanserin, Samidorphan. SAR of Phenothiazines.
- Anticonvulsants: Phenobarbitone, Methabarbital, Phenytoin*, Mephenytoin, Ethotoin; Oxazolidinediones: Trimethadione, Paramethadione; Succinimides: Phensuximide, Methsuximide, Ethosuximide; Phenacemide, Carbamazepine*, Clonazepam, Primidone, Valproic acid, Gabapentin, Felbamate, Perampanel, Lacosamide, Retigabine. SAR of Anticonvulsants.

UNIT II: Anti-Infective Chemotherapeutic Agents (12 Hours)

- Antitubercular Agents: Isoniazid*, Ethionamide, Ethambutol, Pyrazinamide, Para-amino salicylic acid*, Rifampicin, Rifabutin, Cycloserine, Streptomycin, Capreomycin, Pretomanid, Clofazimine, Levofloxacin, Bedaquiline, Linezolid, Delamanid.
- Antimalarials: Quinine, Chloroquine*, Amodiaquine, Primaquine, Pamaquine, Quinacrine, Mefloquine, Cycloguanil pamoate, Proguanil, Pyrimethamine, Artesunate, Artemether, Atovaquone. SAR of Quinoline derivatives.
- Antiprotozoals: Metronidazole*, Tinidazole, Ornidazole, Diloxanide, Iodoquinol, Pentamidine isethionate, Atovaquone, Eflornithine, Paromomycin, Nitazoxanide.
- Antivirals: Amantadine, Rimantadine, Idoxuridine, Acyclovir*, Ganciclovir, Zidovudine, Didanosine, Zalcitabine, Lamivudine, Loviride, Delavirdine, Ribavirin, Saquinavir, Indinavir, Ritonavir, Valganciclovir, Peramivir, Lenacapavir.
- Antifungals: Amphotericin-B, Nystatin, Natamycin, Griseofulvin, Clotrimazole, Econazole, Butoconazole, Oxiconazole, Tioconazole, Miconazole, Ketoconazole*, Terconazole, Itraconazole, Fluconazole, Naftifine, Tolnaftate, Posaconazole, Isavuconazole.
- Anthelmintics: Diethylcarbamazine, Thiabendazole, Mebendazole, Albendazole*, Niclosamide, Oxamniquine, Praziquantel, Ivermectin.
- Urinary Tract Anti-infective Agents: Nalidixic acid, Norfloxacin, Enoxacin, Ciprofloxacin*, Ofloxacin, Lomefloxacin, Sparfloxacin, Gatifloxacin, Furazolidone, Nitrofurantoin, Methenamine, Moxifloxacin. SAR of Quinolones.

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UNIT III: Antibiotics and Sulfa Drugs (8 Hours)

- Antibiotics: Penicillins, Cephalosporins, β-Lactamase inhibitors, Monobactams; Aminoglycosides: Streptomycin, Neomycin, Kanamycin; Tetracyclines: Tetracycline, Oxytetracycline, Minocycline, Doxycycline; Macrolides: Erythromycin, Clarithromycin, Azithromycin; Chloramphenicol*, Clindamycin, Clavulanic acid. SAR of Penicillins, Tetracyclines, and Cephalosporins.
- Sulfa Drugs: Sulphamethizole, Sulfisoxazole, Sulphapyridine, Sulphathiazole, Sulfacetamide, Sulphamethoxazole, Sulphadiazine, Mefenide, Sulfasalazine, Trimethoprim, Cotrimoxazole, Dapsone*. SAR of Sulfonamides.

UNIT IV: Antineoplastic Agents (6 Hours)

- Mechlorethamine, Cyclophosphamide, Melphalan, Chlorambucil, Busulfan, Thiotepa; Mercaptopurine*, Thioguanine, Fluorouracil, Floxuridine, Cytarabine; Methotrexate*, Azathioprine; Dactinomycin, Daunorubicin, Doxorubicin, Bleomycin; Etoposide, Vinblastine, Vincristine, Paclitaxel, Camptothecin, Cisplatin, Mitotane, Carboplatin.

UNIT V: Endocrine Drugs, Antidiabetic Agents and Narcotic Analgesics (9 Hours)

- Endocrine Drugs – Sex hormones: Testosterone, Nandrolone, Progesterone, Oestriol, Oestradiol, Oestrone, Diethylstilbestrol; Drugs for erectile dysfunction: Sildenafil, Tadalafil; Oral contraceptives: Mifepristone, Norgestrel, Levonorgestrel; Corticosteroids: Cortisone, Hydrocortisone, Prednisolone, Betamethasone, Dexamethasone; Thyroid and antithyroid drugs: L-Thyroxine, L-Thyronine, Propylthiouracil, Methimazole.
- Antidiabetic Agents: Insulin and preparations, Tolbutamide*, Chlorpropamide, Glipizide, Glimepiride; Biguanides: Metformin; Thiazolidinediones: Pioglitazone, Rosiglitazone; Repaglinide, Nateglinide, Acarbose, Voglibose.
- Narcotic Analgesics: Morphine, Codeine, Meperidine, Anilerdine, Diphenoxylate, Loperamide, Fentanyl*, Methadone, Propoxyphene, Pentazocine, Levorphanol; Nalorphine, Levallorphan, Naloxone. SAR of Morphine analogues.

SUMIT PHARMACY

Subject Name: Industrial Pharmacognosy (Theory)

Subject Code: BP502T

UNIT I: General Introduction to Herbal Industries, Institutions and Trade Status (8 Hours)

- Role of medicinal and aromatic plants trade in national economy and introduction of current trade status and potential of some commercially important medicinal plants/natural products like Ashwagandha, Turmeric, Ginseng, Amla and essential oils.
- A brief account of bioeconomy, biodiversity hot spots and plant-based industries and institutions involved in research work on medicinal and aromatic plants in India.
- Emerging therapeutic categories of Herbal Medicinal Products available in market, their composition with rationale for: Aphrodisiac, Antistress, Anti-diabetics, Antihyperlipidemic, Immunomodulator, Hepatoprotective and Kidney disorders.
- Emerging Herbal cosmeceuticals: Anti-Aging, Depigmenting, Anti-acne, Sunscreen, Detoxifying, Anti-irritant, Nutricosmetics.

UNIT II: Commercial Production and Standardization of Botanicals (10 Hours)

- Significance of AYUSH/WHO-GMP, GLP and USFDA compliant facility in production of quality herbal products.
- Commercial production of standardized herbal extracts with clinical relevance: Coleus, Amla, Turmeric, Ashwagandha and Senna.
- Commercial production and standardization of volatile oils: Eucalyptus oil, Lavender oil and Peppermint oil, Rosemary oil.
- Preparation and standardization of Ayush formulations viz. Aristas and Asawas, Ghutika/Habb, Churna/Shafoof, Arq, Sharbat, Tincture and Bhasma.

UNIT III: Modern Methods of Analysis of Plants and Plant-Based Products (12 Hours)

- Basic principles and applications in analysis of botanicals:
- Spectroscopic methods: UV-Visible spectroscopy, IR Spectroscopy, NMR spectroscopy and Mass spectroscopy, Atomic Absorption Spectroscopy.
- Chromatographic methods: HPTLC, HPLC, UPLC, GC.

UNIT IV: Isolation, Characterization, Commercial Production and Analysis of Bioactive Phytoconstituents (8 Hours)

- Isolation, characterization with commercial production, identification and analysis of bioactive phytoconstituents: Artemisinin, Sennosides, Withanolides, Boswellic acid, Atropine, and Lycopene.

UNIT V: International Regulatory Perspectives (7 Hours)

- Overview of global regulations for herbal products: World Health Organization (WHO); United States Food and Drug Administration – Dietary Supplement Health and Education Act (DSHEA); European Medicines Agency (EMA); TGA-ARG (Therapeutic Goods Administration – Australian Regulatory Guidelines for Complementary Medicines); Natural Health Products (Canada).
- Harmonization challenges and mutual recognition of traditional medicine.
- Importance of safety, efficacy and pharmacovigilance in herbal product regulation.
- Study of Monographs on herbal drugs and botanicals related to Indian Pharmacopoeia, United States Pharmacopoeia Herbal Medicine and Dietary Supplement, Ayurvedic Pharmacopoeia of India and Unani Pharmacopoeia of India.

SUMIT PHARMACY

Subject Name: Innovation and Startup Ecosystem (Theory)

Subject Code: BP503T

UNIT I: Introduction to Innovation and Entrepreneurship (6 Hours)

- Defining Innovation and Entrepreneurship: What is Innovation? Types of Innovation: Product, Process, Business Model, Social; What is Entrepreneurship? Characteristics of an Entrepreneur.
- Invention vs Innovation: Distinction between Invention and Innovation; Importance of Innovation in the 21st Century – Economic growth and job creation; Solving societal problems; Disruptive technologies and their impact; Case Studies: Innovative companies (e.g., Apple, Google, Tesla).
- Introduction to the Startup Ecosystem: Key components – Entrepreneurs, Incubators/Accelerators, Mentors, Investors, Government, Academia, Support Services; Role of each component in fostering innovation.
- Practical Aspect: Participation in National Innovation Day and National Startup Day.

UNIT II: Ideation and Opportunity Identification (6 Hours)

- Identifying Problems and Market Gaps: Problem-solving approach to entrepreneurship; Techniques for problem identification: Observation, Empathy mapping, User interviews; Market research basics: Understanding customer needs and pain points.
- Generating Innovative Ideas: Brainstorming techniques: SCAMPER, Mind Mapping, Design Thinking principles for ideation; Lateral thinking and divergent thinking; From problem to solution: developing initial concepts.
- Opportunity Analysis and Feasibility: Market sizing and potential; Competitive analysis; SWOT analysis for new ventures.
- Practical Aspect: Participation in Ideation Challenges or Hackathons (e.g., Smart India Hackathon or IIC internal ideation competitions).

UNIT III: Building a Minimum Viable Product (MVP) and Validation (6 Hours)

- Lean Startup Methodology: Introduction to Lean Startup principles; Build–Measure–Learn feedback loop; Concept of MVP: Importance, Scope and objectives.
- Designing and Developing an MVP: Different types of MVPs; Tools and resources for rapid prototyping; User experience basics for MVPs.
- Validation: Customer interviews and feedback collection; A/B testing and split testing; Pivoting vs Persevering.
- Practical Aspect: Participation in sessions/workshops on Prototype, MVP, and Product Development.

UNIT IV: Business Models and Startup Operations (6 Hours)

- Business Model Canvas (BMC): Introduction to the 9 building blocks of BMC; Developing a BMC for a new venture; Value Proposition Design.
- Legal and Financial Aspects for Startups: Legal structures – Sole Proprietorship, Partnership, Private Limited Company; Intellectual Property Rights (IPR): Patents, Trademarks, Copyrights; Startup funding: Bootstrapping, Angel investors, Venture capital.
- Team Building and Mentorship: Importance of a strong founding team; Roles and responsibilities in a startup; Value of mentors and advisors.
- Practical Aspect: Participation in IPR awareness programs or startup funding sessions.

UNIT V: Scaling, Ecosystem Engagement, and Future Trends (6 Hours)

- Growth Strategies and Scaling Up: Marketing and sales for startups; User acquisition and retention; Challenges of scaling and solutions; Exit strategies: Acquisition, IPO.

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- Engaging with the Startup Ecosystem: Networking with investors, mentors, and entrepreneurs; Participation in startup competitions and pitch events; Leveraging incubators and accelerators.
- Future Trends in Innovation and Entrepreneurship: Emerging technologies: Artificial Intelligence, Blockchain, Internet of Things (IoT), Sustainable Technologies; Social entrepreneurship and impact investing; Global startup trends.
- Practical Aspect: Participation in National Innovation Day and student engagement activities to prepare and deliver a concise pitch for their developed idea, simulating a startup pitch event.

SUMIT PHARMACY

Subject Name: Pharmaceutical Dosage Forms II (Theory)

Subject Code: BP504T

UNIT I: Monophasic Liquids (6 Hours)

- Foundations: Need, advantages/limitations; monophasic vs biphasic; solubility-enhancement techniques.
- Vehicles and solvents: Pharmaceutical waters (types; manufacturing and Quality Control of Purified/Distilled); classes of solvents as per toxicity.
- Formulation and manufacturing: Raw-material considerations and additives; processing; Quality Control of solutions/syrups/elixirs; powders for reconstitution as solutions.
- Measuring, filling and packaging: Techniques; container–closure integrity; automation in liquid manufacturing.

UNIT II: Biphasic Liquids – Suspensions (6 Hours)

- Formulation and manufacturing: Additives; classification of suspending agents; IPQC and Quality Control; instabilities and packaging.
- Advances: Nanosuspensions; dry powder for reconstitution as suspensions; raft-forming systems.

UNIT III: Biphasic Liquids – Emulsions (6 Hours)

- Formulation and manufacturing: Additives; classification of emulsifying agents; IPQC and Quality Control; instabilities and packaging.
- Advances: Nano-emulsions, micro-emulsions, SMEDDS/SNEDDS (overview, applications).

UNIT IV: Pressurized Dosage Forms (Aerosols/MDIs/DPIs) (6 Hours)

- Aerosols and MDIs: Concepts; propellant classification/selection; valves and containers; formulation, manufacturing, and Quality Control (leak, spray pattern, delivered dose, particle-size/aerodynamic performance).
- Dry Powder Inhalers (DPIs): Valves and containers; formulation, manufacturing, and Quality Control.

UNIT V: Semisolid Dosage Forms (6 Hours)

- Theory of Semisolid Dosage Forms: Definition and purpose; drug permeation pathways through skin; factors affecting permeation; permeation enhancers: physical and chemical.
- Types of semisolid dosage forms: Ointments – Base selection, formulation, manufacturing and evaluation; Creams – Formulation, manufacturing and evaluation; Gels/Jellies – Formulation, manufacturing and evaluation; Pastes – Formulation, manufacturing and evaluation; Suppositories and Pessaries – Formulation, manufacturing and evaluation.
- Advances: Xerogels, emulgels (overview, applications).

SUMIT PHARMACY

Subject Name: Pharmaceutical Quality Assurance (Theory)

Subject Code: BP505T

UNIT I: Quality Assurance and Quality Management Systems (10 hours)

- Quality Assurance and Quality Management concepts: Definition and concepts of Quality Control, Quality Assurance, and GMP.
- Total Quality Management (TQM): Definition, elements, and philosophies.
- ICH Guidelines: Purpose, process of harmonization, overview of QSEM with special emphasis on Q-series guidelines.
- Quality by Design (QbD): Definition, overview, elements of QbD program, and tools.
- ISO 9000 and ISO 14000: Overview, benefits, elements, and steps for registration.
- NABL Accreditation: Principles and procedures.

UNIT II: Organization, Personnel, Premises, and Materials Management (10 hours)

- Organization and Personnel: Responsibilities, training, hygiene, and personal records.
- Premises: Design, construction, plant layout, maintenance, sanitation, environmental control, utilities, and control of contamination.
- Equipment and Raw Materials: Equipment selection, User Requirement Specifications (URS), handling and maintenance of raw materials.
- Warehousing: Good warehousing practices and materials management.

UNIT III: Quality Control and Good Laboratory Practices (10 hours)

- Quality Control Tests for Formulations: In-process and finished product quality control tests for tablets, capsules, ointments, creams, ophthalmic and parenteral preparations.
- Quality Control of Raw Materials and Packaging Materials: Tests for raw materials, containers, rubber closures, and secondary packing materials.
- Good Laboratory Practices (GLP): General provisions, organization and personnel, facilities and equipment, ALCOA principles, reference standards, testing facility operations, records and reports, and disqualification of testing facilities.

UNIT IV: Documentation, Complaints, and Product Recall (8 hours)

- Documentation in the Pharmaceutical Industry: Batch Formula Record, Master Formula Record, Drug Master File, SOPs, quality audits, preparation, handling, archival, and distribution of records.
- Complaints and Product Recall: Handling of complaints, evaluation of complaints, returned goods, recalls, and waste disposal.

UNIT V: Calibration and Validation (7 hours)

- Calibration and Validation: Introduction, definitions, importance, and general principles; Calibration of weights and measures, pH meter; Qualification of UV-Visible spectrophotometer, electronic balance, IR spectrophotometer, and HPLC.
- Analytical Method Validation: General principles of analytical method validation as per ICH Q2 guidelines.

SUMIT PHARMACY

Subject Name: Systemic Pharmacology II (Theory)

Subject Code: BP506T

UNIT I: Pharmacology of Drugs Acting on Central Nervous System (10 hours)

- Neurohumoral transmission in the CNS; physiological roles of GABA, glutamate, glycine, serotonin, and dopamine.
- a) General anesthetics, pre-anaesthetic medications, and local anaesthetic agents.
- b) Sedative–hypnotics.
- c) Alcohol and disulfiram.
- d) Opioids, opiate analgesics, and antagonists.
- e) Drugs used in epilepsy.
- f) Drugs used in Parkinson's and Alzheimer's diseases.

UNIT II: Pharmacology of Drugs Used in Psychiatry (7 hours)

- a) Antipsychotics, antidepressants, anti-anxiety drugs, mood stabilizers, CNS stimulants, and hallucinogens.
- b) Substance abuse, drug addiction, and general principles of de-addiction.

UNIT III: Chemotherapy (14 hours)

- Introduction: Definitions of chemotherapy, chemotherapeutic index, antibiotics, and antimicrobial agents; Concept of selective targeting in chemotherapy; Classification of antimicrobial agents based on mechanism of action; Concept of superinfection, chemoprophylaxis, and combined use of antibiotics; Antimicrobial resistance: causes, mechanisms, and preventive measures.
- Antimicrobial Agents – Classification, mechanism of action, adverse drug reactions, and therapeutic uses of: Sulphonamides and cotrimoxazole; Fluoroquinolones; Penicillins and cephalosporins; Macrolides and tetracyclines; Linezolid; Carbapenems and monobactams; Chloramphenicol and aminoglycosides.
- Chemotherapy of Diseases – Drugs used in the treatment of: Fungal infections; Viral infections; Helminthiasis; Urinary tract infections; Tuberculosis; Leprosy; Malaria; Amoebiasis; Neoplastic diseases.

UNIT IV: Pharmacology of Drugs Acting on Endocrine System (10 hours)

- a) Introduction to basic concepts of endocrinology.
- b) Thyroid and antithyroid agents.
- c) Parathormone, calcitonin, and vitamin D.
- d) Insulin and oral hypoglycaemic agents.
- e) ACTH and corticosteroids.
- f) Oral contraceptives.
- g) Drugs acting on the uterus.
- h) PCOD.

UNIT V: Drugs Acting on Gastrointestinal Tract (4 hours)

- a) Drugs used in peptic ulcer.
- b) Drugs used for constipation and diarrhoea.
- c) Emetics and anti-emetics.
- d) Digestants, carminatives, appetizers, and anorectics – definitions and examples.

SUMIT PHARMACY

Subject Name: Biomedicinal Chemistry (Practical)

Subject Code: BP507P

PRACTICAL

- 1. Preparation of Drugs / Intermediates (Any 4)
  - • 7-Hydroxy-4-methyl coumarin
  - • Thiobarbituric acid
  - • 2,3-Diphenylquinoxaline
  - • Sulphanilamide
  - • Triphenyl imidazole
  - • Perform synthesis of intermediate/drug using microwave irradiation or green chemistry techniques.
- 2. Assay of Drugs (Any 4)
  - • Sulpha drugs
  - • Metronidazole
  - • Isoniazid
  - • Phenobarbitone
  - • Benzyl penicillin
  - • Chloroquine
- 3. Drug Design and Computational Tools (Any 4)
  - • Calculate physicochemical and ADME properties using Swiss ADME (e.g., logP, molecular weight, H-bond donors/acceptors).
  - • Perform basic molecular docking studies using any of open-source academic tools.

Subject Name: Industrial Pharmacognosy (Practical)

Subject Code: BP508P

PRACTICAL

(Minimum 12 experiments must be performed)

- 1. To perform column chromatography for isolation of phytochemicals.
- 2. Preparative TLC of curcuminoids.
- 3. Isolation and identification of Piperine.
- 4. Isolation and identification of Sennoside.
- 5. Isolation and identification of Withanolide.
- 6. Isolation and identification of Lycopene.
- 7. Acid–base purification process for the separation of alkaloids.
- 8. Chemoprofiling of purified alkaloidal fraction.
- 9. Separation of amino acid by paper chromatography.
- 10. TLC/HPTLC/HPLC of herbal extracts/botanicals.
- 11. Isolation and determination of total aldehyde content in volatile oil.
- 12. Preparation of monographs on herbal drugs with respect to IP, API, IHP.
- 13. Determination of the alcohol content of Asava and Arista.
- 14. Standardization of any two Ayurvedic formulations using UV-spectroscopy.
- 15. Preparation and evaluation of Ayurvedic churna.

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- 16. Experiential learning-based experiments focused on the preparation and practical applications of folkloric or region-specific traditional formulations within the community.
- 17. Case studies analyzing community awareness and usage patterns of various traditional formulations.

Subject Name: Pharmaceutical Dosage Forms II (Practical)

Subject Code: BP509P

PRACTICAL

(Minimum 12 experiments must be performed)

- 1. To enhance the solubility of a BCS Class II drug by solid dispersion technique.
- 2. To enhance the solubility of a BCS Class II drug by cyclodextrin complexation.
- 3. Preparation and evaluation of medicated syrups using simple and artificial syrup bases.
- 4. Preparation and evaluation of different types of pharmaceutical emulsions.
- 5. Preparation and evaluation of an emulsion with a small-dose oily active (e.g., calciferol).
- 6. Preparation and evaluation of an oral suspension.
- 7. To study the effect of different suspending agents/concentrations on sedimentation volume.
- 8. Preparation and evaluation of a dry powder for reconstitution as a suspension.
- 9. Preparation and evaluation of pharmaceutical creams.
- 10. Preparation and evaluation of pharmaceutical gels.
- 11. To study the effect of different gelling agents/concentrations on viscosity of gels.
- 12. Preparation and evaluation of medicated suppositories.
- 13. Preparation and evaluation of medicated pessaries.
- 14. Preparation and evaluation of in-situ gels.
- 15. Preparation and evaluation of emulgels.

Subject Name: Systemic Pharmacology II (Practical)

Subject Code: BP510P

PRACTICAL

(Minimum 12 experiments must be performed)

- 1. Evaluation of analgesic activity of centrally and peripherally acting analgesics using Eddie's hot plate, tail-flick, tail immersion, and acetic acid-induced writhing methods through interactive computer simulation.
- 2. Evaluation of antiepileptic activity using maximal electroconvulsive shock (MES)-induced seizures through interactive computer simulation.
- 3. Demonstration of the antiepileptic activity using pentylenetetrazol-induced seizures through interactive computer simulation.
- 4. Evaluation of antidepressant activity of drugs using the tail suspension test through interactive computer simulation.
- 5. Demonstration and study of locomotor activity using actophotometer through interactive computer simulation.
- 6. Evaluation of antianxiety activity using the elevated plus maze or zero maze model through interactive computer simulation.
- 7. Evaluation of antipsychotic activity of drugs using inhibition of conditioned response on Cook's pole climbing apparatus through interactive computer simulation.

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- 8. Study of the effect of drugs on learning and memory using the Morris water maze test through interactive computer simulation.
- 9. Study of antiulcer activity using indomethacin-induced or pylorus ligation-induced ulcer models.
- 10. Estimation of the concentration of oxytocin on isolated rat uterus preparation using a suitable method through interactive computer-based simulation.
- 11. Estimation of drug concentration by 3-point or 4-point bioassay through interactive computer simulation.
- 12. Bioassay of histamine using matching, bracketing, or interpolation methods on suitable isolated tissue preparation with the help of interactive computer simulation.
- 13. Study of cell culture techniques, including types of cell culture, laboratory instruments/equipment, culture media, and growth of cell cultures in laboratory facilities.
- 14. Study of antibacterial sensitivity testing of urine culture using techniques such as the disc diffusion method (theoretical details/case studies).
- 15. Demonstration using databases and software packages for predicting drug activity, ADME properties, and toxicity.
- 16. Study of electrophoresis of protein and DNA samples and gel visualization techniques.
- 17. Construction of pharmacological networks using predicted drug targets and disease genes with activity prediction databases, disease gene databases, and suitable software.

Note:

PCI recommended softwares shall be used for performing experiments.

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