

B.PHARMACY SYLLABUS (PCI / NEP 2020)

SEMESTER IV

Subject Name: Herbal Drug Technology (Theory)

Subject Code: BP401T

UNIT I: Plant Tissue Culture and Standardized Extracts (10 Hours)

- Plant tissue culture as an alternative source of medicine: Historical development; Types of cultures; Nutritional requirements; Growth and maintenance of callus and suspension culture; Role of elicitation, genetic transformation, biotransformation, precursor feeding, and somaclonal variation in biomass and secondary metabolite production.
- Introduction to biomanufacturing: Medicinal plant-based biomanufacturing; Utilising plant factories in obtaining valuable ingredients for food, pharmaceutical, and cosmetic industries; Examples: Shikonin and Paclitaxel; Oral vaccines in healthcare.
- Optimization and production of standardized extracts of medicinal plants: Strategies for preparation of desired quality extracts by optimizing and adjusting bioactives ensuring quality using analysis of metabolites and TLC fingerprints of the following: Aqueous and hydro-alcoholic extracts of Ashwagandha, Shatavari, Licorice, Neem, and Haritaki; Flavonoid-rich fraction of Sweet lime peel; Terpenoid-rich fraction of Bacopa; Phenol-rich fraction of Green Tea; Steroid-rich fraction of Tribulus; Alkaloid-rich fraction of Vasaka.

UNIT II: Herbal Formulations, Excipients and Cosmetics (10 Hours)

- Herbal formulations – Conventional herbal formulations: syrups, mixtures, powders, capsules, tablets, creams, ointments; Novel dosage forms: phytosomes (phytoconjugates), liposomes, nanoformulations; Composition, preparation, and characterization using standardized extracts and bioactives.
- Herbal cosmetics – Sources and description of raw materials of herbal origin as active agents in skincare, hair care, and oral hygiene products; Applications in skincare, hair care, and oral hygiene products such as: Sunscreen-lotion/gel; Hair oil, shampoo, herbal dye; Herbal mouthwash, chewing gums, candies, gargles; Face serums and herbal face packs.
- Excipients of Natural origin – Colorants, sweeteners, binders, diluents; Viscosity builders, disintegrants; Flavors and perfumes; Protective agents, waxes, bleaching agents and antioxidants.

UNIT III: Quality Control and Standardisation of Herbal Medicines (7 Hours)

- WHO, AYUSH, and EU guidelines on quality control, stability, and shelf life studies of herbal medicines.
- Approaches for standardisation and quality control of botanicals and formulations.
- Testing methods and regulatory considerations.
- Role of DNA fingerprint and molecular markers such as rbcL, matK, and SCAR in quality control.
- Forensic pharmacognosy: Role in identification of illicit herbal drugs (e.g., Cannabis, Opium).

UNIT IV: Herb–Drug / Food / Herb Interactions (10 Hours)

- General introduction to interactions and role of ADME, Cytochrome P450, and P-gp.
- Herb–drug interactions: St. John's Wort with warfarin; Ginkgo biloba with aspirin.
- Herb–food interactions: Licorice with salty foods; Turmeric with fats; Green tea with iron-rich foods.
- Herb–herb interactions: Ephedra with Ginseng; Chamomile with Valerian.
- Adverse reactions related to plants and foods such as allergy, intolerance, and toxicity.

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UNIT V: Regulatory Requirements of Herbal Drugs and Botanicals (8 Hours)

- Regulatory framework in India for Herbal and ASU medicines:
 - a) Role of regulatory bodies.
 - b) ASU DTAB (Ayurveda, Siddha, and Unani Drugs Technical Advisory Board).
 - c) ASU DCC (Drugs Consultative Committee for ASU drugs).
 - d) Schedule T – GMP requirements for ASU drugs.
 - e) Schedule E1 – Poisonous drugs listed under AYUSH.
 - f) Drugs and Cosmetics Act – Regulatory provisions relevant to herbal/ASU medicines, procedures for registration, trade, and export.
 - g) Concept of Phytopharmaceuticals and Ayush Aahara in bridging Indian traditional knowledge with modern science.
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SUMIT PHARMACY

Subject Name: Medicinal Chemistry (Theory)**Subject Code: BP402T****UNIT I: Fundamentals of Medicinal Chemistry (7 hours)**

- Introduction: History and scope of medicinal chemistry.
- Physicochemical properties in relation to biological action: Ionization, solubility, partition coefficient, hydrogen bonding, Chelation, Bioisosterism and protein binding.
- Drug metabolism: Phase I & II reactions.
- Note: Study of the development of the following drug classes includes Chemical Classification, Structure, Uses, Structure Activity Relationship (SAR) of selective drug classes, and Synthesis of selected drugs as superscripted (*).

UNIT II: Drugs Acting on the Autonomic Nervous System (15 hours)

- Adrenergic/Sympathomimetic agents: Nor-epinephrine, Epinephrine, Phenylephrine*, Dopamine, Methyldopa, Clonidine, Dobutamine, Isoproterenol, Terbutaline, Salbutamol*, Bitolterol, Naphazoline, Oxymetazoline and Xylometazoline, Hydroxyamphetamine, Pseudoephedrine, Propylhexedrine, Metaraminol.
- Anti-adrenergic/Sympatholytic agents: Tolazoline*, Phentolamine, Phenoxybenzamine, Prazosin, Dihydroergotamine, Propranolol*, Metibranolol, Atenolol, Betazolol, Bisoprolol, Esmolol, Metoprolol, Labetalol, Carvedilol. SAR of beta adrenergic blockers.
- Cholinergic/Parasympathomimetic agents: Acetylcholine, Carbachol*, Bethanechol, Methacholine, Pilocarpine, Physostigmine, Neostigmine, Pyridostigmine, Edrophonium chloride, Tacrine hydrochloride, Ambenonium chloride, Isoflurophate, Echothiophate iodide, Parathione, Malathion, Pralidoxime chloride.
- Anti-Cholinergic/Parasympatholytic agents: Atropine, Hyoscyamine, Scopolamine, Homatropine, Ipratropium*, Tropicamide, Cyclopentolate, Clidinium, Glycopyrrolate, Dicyclomine*, Methantheline, Propantheline, Benztropine mesylate, Orphenadrine, Biperidine, Procyclidine, Tridihexethyl, Isopropamide, Ethopropazine. SAR of cholinergic blockers.
- Local anesthetic agents: Cocaine, Hexylcaine, Meprylcaine, Cyclomethycaine, Piperocaine, Benzocaine, Butamben, Procaine*, Butacaine, Propoxycaine, Tetracaine, Benoxinate, Lignocaine, Mepivacaine, Prilocaine, Etidocaine, Phenacaine, Dipreron, Dibucaine*. SAR of Local anesthetics.

UNIT III: Drugs Acting on the Cardiovascular System (09 hours)

- Anti-anginals: Amyl nitrite, Nitroglycerin, Pentaerythritol, Isosorbide dinitrate*, Dipyridamole, Verapamil, Bepridil hydrochloride, Diltiazem, Nifedipine, Amlodipine, Felodipine, Nicardipine, Nimodipine.
- Anti-hypertensives: Timolol, Captopril, Lisinopril, Enalapril, Benazepril, Quinapril, Methyldopate*, Clonidine, Guanethidine, Guanabenz, Sodium nitroprusside, Diazoxide, Minoxidil, Reserpine, Hydralazine.
- Drugs to treat Congestive Heart Failure (CHF): Digoxin, Digitoxin, Nesiritide, Bosentan, Tezosentan.
- Anti-arrhythmics (Class I–IV): Quinidine sulphate, Procainamide, Disopyramide*, Phenytoin, Lidocaine, Tocainide, Mexiletine, Lorcainide, Amiodarone, Sotalol.

UNIT IV: Drugs Acting on Blood and Renal System (06 hours)

- Antihyperlipidemic Agents: Fenofibrate*, Lovastatin, Cholestyramine and Cholestipol.
- Coagulants and Anti-Coagulants: Menadione, Acetomenadione, Warfarin, Anisindione, Clopidogrel.
- Diuretics: Acetazolamide*, Methazolamide, Dichlorphenamide, Chlorthiazide, Hydrochlorothiazide, Hydroflumethiazide, Cyclothiazide, Furosemide*, Bumetanide, Ethacrynic acid, Spironolactone, Triamterene, Amiloride, Mannitol. SAR of Thiazides.

UNIT V: Autacoids and Related Drugs (08 hours)

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- Antihistamines – H1-antagonists: Diphenhydramine hydrochloride*, Dimenhydrinate, Doxylamines, Clemastine, Diphenylpyraline, Tripelenamine, Chlorcyclizine, Meclizine, Buclizine, Chlorpheniramine, Triprolidine, Phenindamine, Promethazine*, Trimeprazine, Cyproheptadine, Azatidine, Astemizole, Loratadine, Cetirizine, Levocetirizine, Cromolyn. H2-antagonists: Cimetidine*, Famotidine, Ranitidine.
 - Gastric Proton pump inhibitors: Omeprazole, Lansoprazole, Rabeprazole, Pantoprazole.
 - Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) and Antipyretics: Sodium salicylate, Aspirin, Diflunisal, Mefenamic acid*, Niflumic acid, Meclofenamate, Indomethacin, Sulindac, Tolmetin, Zomepirac, Diclofenac, Ketorolac, Ibuprofen*, Naproxen, Piroxicam, Phenacetin, Acetaminophen, Antipyrine, Phenylbutazone, Celecoxib, Etoricoxib. SAR of representative agents by class.
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Subject Name: Pharmaceutical Biotechnology (Theory)

Subject Code: BP403T

UNIT I: Introduction to Pharmaceutical Biotechnology (9 Hours)

- Introduction to biotechnology in pharmaceutical sciences; protein therapeutics; analytical characterization of proteins; monoclonal antibodies; antigens; enzyme immobilization; cell culture and immobilization techniques; pharmaceutical applications.

UNIT II: Genetic Engineering and Recombinant DNA Technology (9 Hours)

- Principles of genetic engineering; recombinant DNA technology; production of interferons, hepatitis-B vaccine, and insulin; polymerase chain reaction (PCR) and its applications; mutations and types of mutants.

UNIT III: Microbial Biotransformation and Fermentation Technology (9 Hours)

- Microbial biotransformation; fermentation principles and process control; industrial production of alcohol, penicillins, citric acid, and vitamin B12; blood products—collection, processing, and storage.

UNIT IV: Gene Therapy, Genomics and Personalized Medicine (9 Hours)

- Gene therapy—types and methodologies; delivery systems; ethical concerns and challenges; Human Genome Project; role of bioinformatics and artificial intelligence in personalized medicine.

UNIT V: Immunology, Vaccines and Sera (9 Hours)

- Basics of immunology; types and generations of vaccines; immunization strategies; vaccine preparation, evaluation, and standardization; regulatory aspects; sera therapy; marketed products; challenges and newer approaches.
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Subject Name: Social Pharmacy and Public Health (Theory)**Subject Code: BP404T****UNIT I: Introduction to Social Pharmacy and Public Health (6 Hours)**

- Social Pharmacy: Definition, scope, historical development, and importance. Social pharmacy as a multidisciplinary field.
- Public Health: Definition, concepts, history, core functions, and ethical considerations.
- Interplay between Social Pharmacy and Public Health: The evolving role of the pharmacist in the public health arena.
- Concept of Health and Disease: WHO definition of health; dimensions of health – physical, mental, social, spiritual, and environmental.
- Determinants of Health: Social, economic, environmental, lifestyle, and healthcare service determinants and their impact on population health.
- Health Indicators: Indicators used to measure health status and health outcomes in a population.

UNIT II: Health Systems, Policy, and Pharmacoepidemiology (6 Hours)

- Healthcare Delivery Systems: Overview of global healthcare systems.
- Indian Healthcare System: Structure, public and private sectors, primary, secondary, and tertiary levels of care.
- Health Policy: Introduction to health policy formulation and analysis; objectives of India's National Health Policy.
- National Health Mission (NHM): NRHM and NUHM – goals, strategies, and impact on public health indicators.
- Pharmacoepidemiology: Definition, aims, scope, and applications.
- Measures of Disease Frequency and Distribution: Incidence, prevalence, endemic, epidemic, pandemic; morbidity and mortality rates, Odds ratio and relative risk.
- Introduction to Biostatistics: Role in public health; types of data; basic data presentation methods.

UNIT III: Preventive Healthcare, Health Promotion, and Communicable Diseases (6 Hours)

- Levels of Prevention: Primordial, primary, secondary, and tertiary prevention with examples.
- Role of Pharmacists in Disease Prevention and Health Promotion: Immunization services, screening programs, lifestyle counselling.
- Health Education: Definition, principles, methods, and importance; development of effective health education materials.
- Mother and Child Health (MCH): Antenatal care, postnatal care, breastfeeding, immunization schedules.
- Communicable Diseases: Modes of transmission, prevention, and control of tuberculosis, HIV/AIDS, malaria, dengue, typhoid, influenza; pharmacist's role.

UNIT IV: Non-Communicable Diseases, Nutrition, Mental Health, and National Programs (6 Hours)

- Non-Communicable Diseases (NCDs): Diabetes, hypertension, cardiovascular diseases, chronic respiratory diseases, cancer; prevention and management.
- Nutrition and Health: Balanced diet, macro- and micronutrients, malnutrition, nutritional deficiency disorders, food safety, and adulteration.
- Mental Health: Common mental disorders, stigma, promotion of mental well-being; pharmacist's role.
- National Health Programs in India: Programs related to MCH, NCDs, communicable diseases, tobacco control, and deafness prevention.

UNIT V: Pharmacoeconomics, Rational Use of Medicines, Professional Roles, and Future Trends (6 Hours)

- Pharmacoeconomics: Introduction, significance; Cost-Benefit Analysis (CBA), Cost-Effectiveness Analysis (CEA), Cost-Utility Analysis (CUA).
 - Rational Use of Medicines (RUM): Definition, importance, problems of irrational drug use; pharmacist's role.
 - Medication Adherence: Factors affecting adherence, consequences of non-adherence, improvement strategies.
 - Drug Misuse and Abuse: Alcohol, tobacco, opioids, prescription drug abuse; pharmacist's role.
 - Professionalism and Ethics in Social Pharmacy: Ethical dilemmas in public health pharmacy.
 - Disaster Management: Role of pharmacists.
 - Emerging Trends: Telepharmacy, digital health, personalized medicine, expanding public health responsibilities of pharmacists.
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Subject Name: Systemic Pharmacology I (Theory)

Subject Code: BP405T

UNIT I: Pharmacology of Drugs Acting on the Peripheral Nervous System (10 Hours)

- Organization and functions of PNS.
- Neurohumoral transmission, co-transmission. Neurotransmitters and their receptors, including non-adrenergic and non-cholinergic (NANC) neurotransmitters.
- Parasympathomimetic and Parasympatholytic drugs.
- Sympathomimetic and sympatholytic drugs.
- Skeletal muscle relaxants (peripheral and central).
- Drugs used in the treatment of myasthenia gravis and glaucoma.

UNIT II: Pharmacology of Drugs Acting on the Cardiovascular System (10 Hours)

- Introduction to cardiovascular hemodynamics and cardiac electrophysiology.
- Drugs used in congestive cardiac failure.
- Anti-arrhythmic drugs.
- Anti-anginal and newer anti-ischemic drugs.
- Anti-hypertensive drugs.
- Shock, types of shocks and drugs used in their management.
- Stroke, types of strokes and drugs used in their management.

UNIT III: Pharmacology of Drugs Acting on Blood and Kidney (10 Hours)

- Pharmacology of drugs acting on blood: Anti-platelet agents; Coagulants and anticoagulants; Fibrinolytics and Plasma expanders; Haematinics; Anti-hyperlipidaemic drugs.
- Pharmacology of drugs acting on kidney: Diuretics; Anti-diuretics.

UNIT IV: Pharmacology of Autacoids and Related Drugs (9 Hours)

- Introduction to autacoids and their classification. Therapeutic significance of important agonists and antagonists of prostaglandins, thromboxane, leukotrienes, angiotensin, bradykinin and substance P.
- Histamine and antihistamines.
- 5-HT, its agonists and antagonists, drugs used in migraine.
- Non-steroidal anti-inflammatory drugs, antipyretics and analgesics.
- Anti-gout and Antirheumatic drugs including Disease Modifying Antirheumatic Drugs (DMARDs).

UNIT V: Pharmacology of Drugs Acting on Respiratory System and Immune System (6 Hours)

- Drugs used in the treatment of bronchial asthma and COPD.
 - Definitions, classification and therapeutic uses of nasal decongestants, mucolytics, expectorants and antitussives.
 - Respiratory stimulants.
 - Pharmacology of Drugs acting on immune system: Mechanism of action, adverse effects and therapeutic uses of important classes of immune stimulants and immunosuppressants.
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Subject Name: Herbal Drug Technology (Practical)

Subject Code: BP406P

PRACTICAL

(Minimum 12 experiments must be performed)

- 1. To establish seed germination and plant tissue culture of a medicinal plant.
- 2. Preparation and standardization of extracts of Phenol-rich fraction of Green Tea.
- 3. Preparation and standardization of Aqueous and hydro-alcoholic extracts of Ashwagandha or Haritaki (as per IP procedure).
- 4. Preparation and standardization of Flavonoid-enriched fraction of Sweet lime peel.
- 5. Preparation and standardization of Terpenoid-rich fraction of Bacopa.
- 6. Preparation and standardization of Steroid-rich fraction of Tribulus.
- 7. Preparation and standardization of Alkaloid-rich fraction of Vasaka.
- 8. Evaluation of excipients of natural origin.
- 9. To develop and evaluate herbal cosmetics in form of gel, cream, lotion using standardized herbal extract.
- 10. To develop and evaluate herbal shampoo using standardized herbal extract.
- 11. To develop herbal formulations in form of syrups and mixtures using standardized herbal extract and their evaluation as per Pharmacopoeial guidelines.
- 12. To develop herbal tablets using standardized herbal extract and their evaluation as per Pharmacopoeial guidelines.
- 13. Preparation of botanicals-based new herbal medicinal product delivery systems (phytosomes).
- 14. Experiential learning-based experiments involving collection of herbal formulations/extracts from the market and their quality evaluation as per Pharmacopoeial guidelines.
- 15. Survey on different commercialized marketed herbal cosmetics.
- 16. Survey on different commercialized marketed herbal medicine.

Subject Name: Medicinal Chemistry (Practical)

Subject Code: BP407P

PRACTICAL

(Minimum 12 experiments must be performed)

- 1. Preparation of Drugs / Intermediates
 - a. Aspirin
 - b. Benzotriazole
 - c. Benzocaine
 - d. Phenytoin
 - e. Dibenzalacetone
 - f. Paracetamol
- 2. Assay of Drugs (Any 3)
 - a. Aspirin
 - b. Ibuprofen
 - c. Furosemide
 - d. Paracetamol
- 3. Monograph Analysis (Any 3)

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- a. Paracetamol
- b. Aspirin
- c. Phenobarbital
- d. Diclofenac
- e. Phenytoin

Subject Name: Pharmaceutical Biotechnology (Practical)

Subject Code: BP408P

PRACTICAL

(Minimum 12 experiments must be performed)

- 1. Understanding Good microbiological laboratory practices while working in microbiology laboratory: aseptic handling; growth and isolation of microbes using streaking, spreading and subculturing techniques; microbial staining; study of various equipment such as loop, straight wire, spreader, forceps, pipette, test tube, petri dish, burner etc. and apparatus used in microbiology lab – BOD incubator, laminar flow, aseptic hood, autoclave, hot air sterilizer, deep freezer and microscopes.
- 2. Handling of biological spill, decontamination procedures and hygiene while handling microorganisms and disposal.
- 3. Sterilization and evaluation of glassware and apparatus using hot air oven.
- 4. Preparation and sterilization of solid and liquid culture medium using different techniques.
- 5. Determination of microbiological efficacy of disinfectant / preservative efficacy test.
- 6. Tests for sterility of ophthalmic or parenteral marketed formulation according to IP.
- 7. Analysis of Biotechnological product (Protein, nucleic acid materials) by UV Vis and FTIR spectrophotometer.
- 8. Production of alcohol using Fermentation process.
- 9. Practice Whole cell immobilization technique (any one).
- 10. Practice Enzyme immobilization technique and its kinetics.
- 11. Isolation and estimation of DNA and RNA.
- 12. Isolation of plasmids and expression of protein.
- 13. Agarose gel electrophoresis of DNA/RNA.
- 14. SDS – polyacrylamide gel electrophoresis for proteins.
- 15. Microbiological assay of antibiotics.

Subject Name: Social Pharmacy and Public Health (Practical)

Subject Code: BP409P

PRACTICAL

*(Minimum 12 Experiments must be performed; * Mandatory experiments)*

- 1. Training on health screening services (Blood pressure, body mass index (BMI), blood glucose levels, heart rate (pulse rate), respiratory rate, body temperature, oxygen saturation (SpO2), hemoglobin levels (basic anemia screening)).
- 2. Develop health promotion material for the prevention of communicable diseases.
- 3. Role play – usage of different mental scales in patient screening.
- 4. Case study on calculation of prevalence; incidence, odds ratio and relative risk.
- 5. Design and demonstrate preventive strategies for major communicable diseases (group activity).

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- 6. Present a case study highlighting cost-benefit analysis in healthcare.
- 7. Perform cost-effectiveness analysis for selected health interventions.
- 8. Conduct cost-utility analysis to assess health program efficiency.
- 9. Perform basic first aid techniques.
- 10. Design informational leaflet on lifestyle modifications for disease prevention.
- 11. Identify and illustrate irrational drug use with a real-world example.
- 12. Prepare an immunization chart, interpret the vaccination schedule and perform patient counselling for vaccination*.
- 13. Hand wash and hand sanitizing techniques*.
- 14. Demonstration and practice of wound dressing in first aid and basic suturing techniques*.
- 15. Practical training on routes of drug administration – oral, and other non-parenteral routes*.
- 16. Practical training on routes of drug administration – parenteral routes*.
- 17. Training on basic life support (BLS)*.

Subject Name: Systemic Pharmacology I (Practical)**Subject Code: BP410P****PRACTICAL**

(Minimum 12 Experiments must be performed)

- 1. To demonstrate Langendorff's heart assembly and its applications in pharmacology (only video demonstration/or charts and illustrations).
- 2. Recording of the effects of different electrolytes, agonists and antagonists on the isolated and perfused frog heart preparation using interactive computer simulation experiment.
- 3. To study the effect of various drugs on blood pressure and heart rate in anaesthetized dog using interactive computer simulation experiment.
- 4. Demonstration of the estimation of intraocular pressure on rabbit eye and human eye by using conventional Schiötz tonometer and non-contact tonometer.
- 5. To evaluate the muscle relaxant activity of drugs on Rota-rod apparatus using interactive computer simulation experiment.
- 6. Demonstration of the effect of spasmogens and spasmolytic using rabbit jejunum using interactive computer simulation experiment.
- 7. Determination of PA₂ value of Atropine using a suitable isolated tissue preparation by Schild plot method with the help of hypothetical data using interactive computer simulation experiment.
- 8. Determination of PA₂ value of Prazosin using a suitable isolated tissue preparation by Schild plot method with the help of hypothetical data using interactive computer simulation experiment.
- 9. To study the antiallergic effects of drugs using mast cell degranulation assay using interactive computer simulated experiment.
- 10. Evaluation of diuretic activity of drugs in rats using metabolic cages (simulation) and estimation of electrolytes in the urine samples/serum using flame photometer/commercially available kits.
- 11. Evaluation of effects of antihistaminic drugs on the histamine-induced bronchospasm in guinea pigs using interactive simulated experiment.
- 12. To study and analyse drug-drug interaction/rational drug management of asthma with the help of Case Study/hypothetical data/any clinical report.
- 13. To study clinical pharmacology of the plasma volume expanders and their importance (using charts/open sources videos).

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- 14. Demonstration of evaluation of anti-inflammatory activity in paw oedema model using plethysmometer using simulations.
- 15. Concept of Biobanking and its significance in drug screening.
- 16. Isolation of Polymorphonuclear cells from blood and evaluation of endotoxin-induced oxidative stress in them using Nitrobluetetrazolium dye method by colorimetry.
- 17. Determination of viability of cells (using isolated polymorphonuclear cells) by Trypan blue dye exclusion assay to determine cell viability using microscopy method.
- 18. Determination of anti-inflammatory activity of drugs in vitro using RBC membrane stabilization assay.
- 19. Determination of protein concentrations using Bradford reagent and plotting of standard curve of bovine serum albumin.
- 20. Estimation of anticholinesterase inhibitory activity of drugs using Ellman's reagent (DTNB).
- 21. Determination and plotting of standard curve for LPO, Nitric oxide and GSH.

Note:

PCI recommended softwares shall be used for performing experiments.

Subject Name: Internship (Mandatory)

Subject Code: BP411I

PRACTICAL

Every candidate shall be required to complete a minimum of 240 hours of practical training (spread over two semesters – Semester IV and Semester VI) in a Pharmaceutical/Cosmetics/Medical Devices/Food Industry, or in a Hospital/Community Pharmacy, or any other relevant field as per the prescribed course content. Two separate internship reports are to be submitted and evaluated.

- Internship placement options include:
 - Pharmaceutical / Cosmetics / Medical Devices / Food Industry
 - Hospital Pharmacy
 - Community Pharmacy
 - Any other relevant field as per prescribed course content
- Evaluation Pattern:
 - Certificate and Report submission: 75 Marks
 - Presentation and Discussion: 25 Marks
 - Total: 100 Marks

Note:

A regular record of attendance in the Internship shall be maintained. The first internship report corresponds to Semester IV; the second to Semester VI.