

B.Pharm-IV (Semester- VII)
DOSAGES FORM & TECHNOLOGY (DFT-I) (BP-701)

SN	Topics	Hrs
01	Preformulation Considerations Concept, Study of physical properties: description, microscopic examination, particle size, partition coefficient, dissolution, solubility, membrane permeability, drug stability, crystal structure and polymorphism.	07
02	Suppository Introduction, Types of suppository, suppository bases, Preparation, new trends of suppository, Factors affecting drug absorption from various suppositories, Displacement value, Evaluation, packaging & storage.	06
03	Ointment Ointment bases, Preparation and preservation of ointment base, Drug absorption, ophthalmic ointment, Evaluation.	05
04	Capsule Introduction, advantage & disadvantages, Additives used in capsule, Types of capsule: Hard gelatin capsule- advantages & disadvantages, Material for production & manufacturing of capsule shell Methods of filling hard gelatin capsule, Capsule size Soft gelatin capsule (soft gel) - formulation & manufacture, Evaluation of capsule.	08
05	Tablet Rational, Types of tablet, Tablet excipients, Methods of tablet manufacture (wet, dry & direct compression) and granulation, Problems & defects during tablet manufacturing, Tablet standardization. Tablet coating: Types of coating, film forming material, Coating formulation, Coating process & equipment, Coating defects.	14
06	Cosmetics Fundamental concept, Classification, Formulation & Preparation of Cold cream, Vanishing cream, Moisturizing, Cleansing cream, Face powder, dentifrices, Tooth paste, Tooth powder, Shampoo, Lipstick.	05

DOSAGES FORM & TECHNOLOGY (DFT-I) (BP-707)

PRACTICALS:

- 1) Introduction of instruments/machines used in Instrument/Machine room.
- 2) Introduction of different additives used in formulation.
- 3) To evaluate marketed uncoated and coated tablet formulations.
- 4) To prepare capsule formulations of any one drug.
- 5) Preparation and evaluation of following dosage forms.
- 6) Tablets
- 7) Capsules
- 8) Ointments
- 9) Suppositories
- 10) Ophthalmic ointment
- 11) Cold cream, vanishing cream, toothpaste, face powder, toothpowder, Cleansing cream, Shampoo, Lipstick etc.

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2. E. A. Rawlins, Ed., Bentley's, "Textbook of Pharmaceutics", 8th Edn., Ballierwe Tindall, 1995.
3. Carter S. J. Ed., "Tutorial Pharmacy", Cooper & Gunn, 6th Edn., CBS Publishers & distribution, India, 1986.
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5. Ridgways K., "Hard capsules Development & Technology", Pharmaceutical Press London, 1987.
6. Aulton M. E. "Pharmaceutics The Science of Dosage form Design" Churchill Livingston Publishers, London, 2002.
7. Remington, "The Science and Practice of Pharmacy", Vol. I and II, 21st Edn. Lippincotts Williams and Wilkin, Indian Edn. Distributed by B. I. Publications Pvt. Ltd., 2005.
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9. Wells James J. "Pharmaceutical Preformulation : The physicochemical properties of drug substances" Ellis Horwood, Chichester, UK, 1988
10. Knowlton J. and S. Rearce "Handbook of cosmetic science and technology" 1st edition; Elsevier science publisher; oxford, UK, 1993
11. Wilkinson J.B. and Moore R.J. "Harry's Cosmetology" 7th edition; Longman science and technical, London 1982.
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13. Wilkinson J. B., Moore R. J., "Harry's Cosmetology", 7th edition, Longman Scientific and Technical, 1994
14. "Indian Pharmacopoeia" 2010, Vol. I, II, III. Indian Pharmacopoeia Commission, Government of India, Ministry of Health and Family Welfare.
15. "USP 30 NF 25," The United States Pharmacopoeia" 2007, Vol. I, II, III. National formulary publication of US Pharmacopoeia.
16. "British Pharmacopoeia" 2005, Vol. I, II, III, IV. Stationary office on behalf of Medicine and Healthcare Product Regulatory Agency (MHRA).

B.Pharm-IV (Semester- VII)
MEDICINAL CHEMISTRY-II (BP-702)

SN	Topics	Hrs
01	Drug Design: general introduction common approaches used in drug design, physicochemical properties affecting in drug design. Computer aided drug design. QSAR: Methods of QSAR and molecular modeling. Introduction of Combinatorial chemistry and high thorough-put screening:	10
02	Nomenclature, classification, mode of action, SAR, Uses and synthesis of some official drugs from following categories: Cardiovascular drugs: Antihypertensive, Antiarrhythmic, Anti-anginal, cardiotonics. Skeletal Muscle Relaxants, Diuretics, Anti-coagulant, Antithrombotic, Coronary vasodilator, Hypolipoproteinemic drugs. Hypoglycemic agents. Chemotherapeutic Agents: Antiviral, Antineoplastics, Antiprotozoal (Antimalarials, Antiamoebics, Anthelmintics), Antibiotics. Antibacterial (Sulfonamides and Quinolones), Antimycobacterial Drugs (Antituberculars and Antileprotics), Antifungal agents.	35

Medicinal Chemistry II(BP-708)

PRACTICAL:

Introduction to Computer aided drug design.

Synthesis and physico-chemical characterization of following compounds

- Orange II from sulfanilic acid and β -naphthol
- Phenothiazine from diphenyl amine
- Benzocain from p- aminobenzoic acid
- 7 hydroxy 4-methyl coumarin from resorcinol
- Benzhydrol from benzophenone
- 1-phenylazo 2-naphthol from aniline and 2-naphthol

Pharmacopoeial assay of following solid dosage form

Mebendazole, Glipizide, Nifedipine, Cimetidine, Diclofenac, Atenolol

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1. Wilson and Gisvold's Text Book of Medicinal Chemistry, Lippincott Williams and Wilkins.
2. Indian Pharmacopoeia, Government of India, Ministry of Health and Family Welfare, Published by the Controller of Publications and Information Directorate (CSIR), New Delhi
3. Ashutosh Kar, Advanced Practical Medicinal Chemistry, New Age International Publication.
4. J. N. Delagado and W. A. R. Remers, Eds, Wilson and Gisvold's Textbook of Organic, Medicinal and Pharmaceutical Chemistry, J. Lipponcott Co. Philadephia.
5. W. C. Foye, Principles of Medicinal Chemistry, Lea & Febiger, Philadelphia.
6. H. E. Wolff, Ed. Burger's Medicinal Chemistry, John Wiley & Sons, New York Oxford University Press, Oxford.
7. Daniel Lednicer, Strategies for Organic Drug Synthesis & Design, John Wiley & sons, USA.
8. B. N. Ladu, H. G. Mandel & E. L. Way, Fundamental of Drug Metabolism & Disposition, William & Wilkins co., Baltimore.
9. I. L. Finar, Organic Chemistry, Vol. I & II, ELBS/ Longman, London.
10. Vogel's Text book of Practical Organic Chemistry, ELBS/ Longman, London
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12. Shriner, Hermann, Morrill, Curtin & Fuson, The Syntematic Identification of Organic Compounds, John Wiley & Sons. USA.
13. R. M. Silverstein, G. Claytron Bassel's, T. C. Movvill, Spectormetric identification of Organic compounds, John Wiley & Sons, USA
14. Kadam, Mahadik and Bothra "Advanced Practical Medicinal Chemistry"

B.Pharm-IV (Semester- VII)
PHARMACEUTICAL ANALYSIS-IV (BP-703)

SN	Topics	Hrs
01	X-ray diffraction: Theory, Instrumentation, methods, Applications.	03
02	Mass Spectrometry: Introduction, Basic Principle, Instrumentation, Single focusing, Double focusing, Quadrupole Mass Filter, Applications.	08
03	Nuclear Magnetic Resonance Spectroscopy: Introduction, Theory, Chemical Shift and its measurement, Factor influencing Chemical Shift, Solvent used in NMR, Instrumentation, Applications.	08
04	Radio-immunoassay: Principle and applications.	05
05	Separation Techniques: Partition Coefficient, Liquid-Liquid extraction, solid-liquid extraction, Applications.	06
06	Photocolorimetry: Theory, Instrumentation, Applications.	02
07	Electrophoresis: Theory, Instrumentation, Applications.	02
08	Miscellaneous methods of analysis: Nitrite Titrations, Kjeldahls Method of Nitrogen Estimation, Oxygen Combustion Flask, Karl Fischer Titration, Determination of Alcohol In Galenicals.	05
09	Introduction to concept of quality assurance:- Validation of analytical instruments and methods, GLP, ICH guidelines in pharmacopoeial and biochemical analysis, ISO guidelines, Documentation and record keeping..	06

PHARMACEUTICAL ANALYSIS-IV (BP-709)

PRACTICAL:

1. Determine accuracy and precision of standardization method of NaOH.
2. Estimation of Paracetamol in given sample by single point analysis by UV.
3. Estimation of diazepam in a given sample by using standard absorptivity by UV.
4. Assay of Sulfamethoxazole and trimethoprim as per IP.
5. Estimation of atenolol by using hydrotropic solubilizing agent.
6. Estimation of tinidazole by hydrotropic solubilization technique.
7. Estimation of nimesulide by multipoint calibration method.
8. Simultaneous spectrophotometric estimation of paracetamol and nimesulide by simultaneous equation method.
9. Identification of functional group by IR. (Minimum 4 sample).

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1. William Kemp. Organic Spectroscopy, Palgrave, New York.
2. United States Pharmacopoeia & National Formulary, The United States Pharmacopoeial Convention, Washington DC.
3. Skoogh, Principles of Instrumental Analysis, Saunders College Publishing, USA.
4. K.A. Connors, Text Book of Pharmaceutical Analysis- Wiley Intersciences, New York.
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6. H.H., Willard, L.L. Merrit & John A. Dean, Instrumental Method of Analysis, CBS Publishers & Distributors, New Delhi.
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9. British Pharmacopoeia, MHRA, London
10. Bentley and Driver, Textbook of Pharmaceutical Chemistry, Oxford University Press, Walton Street, Oxford
11. A.H. Beckett, J.B. Stenlake, Practical Pharmaceutical Chemistry, Part I and Part II, CBS Publishers and Distributors, New Delhi.
12. B.K. Sharma. Instrumental Methods of Chemical Analysis, Goel Publishing House, Meerut.
13. G. R. Chatwal And Shyam K. Anand "instrumental methods of chemical analysis"
14. A. V. Kasture, K. R. Mahadik, S. G. Wadodkar, H. N. More, A Textbook of Pharmaceutical Analysis, Vol. I, 6th edition, 2002, Nirali Prakashan, New Delhi.

B.Pharm-IV (Semester- VII)
Clinical Pharmacotherapeutics-I (BP-704)

SN	Topics	Hrs
01	Introduction to rational drug use: Definition, role of pharmacist, essential drug concept and rational drug formulations.	04
02	<p>Etiopathogenesis and Pharmacotherapy of diseases/disorders associated with following systems.</p> <p>Cardiovascular and Hemopoietic system: Hypertension, Angina Pectoris, Atherosclerosis, Congestive Heart Failure, Arrhythmias, Myocardial infarction, Hyperlipidaemias, Thromboembolic disorders and Anaemia.</p> <p>Respiratory system: Bronchial asthma, Chronic Obstructive Pulmonary Disease, Allergic rhinitis, Common cold & Cough, Cystic fibrosis.</p> <p>Gastro-intestinal system: Peptic ulcer, Inflammatory Bowel Disease, Liver diseases.</p> <p>Central Nervous system: Parkinsons disease, Alzheimer"s disease, Behavioral disorders.</p> <p>Urogenital system: Renal failure, Benign Prostatic Hypertrophy, Infertility, Dysmenorrhea, Menopause.</p> <p>Musculoskeletal system: Rheumatoid arthritis, Osteoarthritis, Gout, Spondylitis, Systemic Lupus Erythematosus.</p>	<p>12</p> <p>6</p> <p>6</p> <p>6</p> <p>6</p> <p>5</p>

Clinical Pharmacotherapeutics-I(BP-7010)

PRACTICAL:

1. Bioassay (Bracketing & Interpolation) on isolated tissue of rat.
2. Demonstration of Anesthesia (general and local).
3. Study of drugs on some models related to central nervous system. (Sedative & Hypnotics, Locomotor, Stereotypy, Muscle Relaxant, Analgesic & Anti-inflammatory).
4. Prescription related patient oriented problems on
 - Some common problems of gastro-intestinal tract (Dyspepsia, nausea, vomiting, colic, dehydration and constipation).
 - Some common problems of respiratory system (Cough, bronchial asthma).
 - Anaemia
 - Management of some painful conditions.
 - Use of some drugs in emergency (Myocardial infarction, hypertensive emergency, acute cardiac failure, anaphylaxis, cardiovascular collapse, pulmonary embolism).
 - Diabetes mellitus
 - Some bacterial infections (Respiratory infections, urinary tract infections, infective diarrhea etc.)
 - Malaria and Amoebiasis
5. Medication errors in prescribing, drawing up and administration of medication for diseases prescribed in theory.
6. Dose calculation of commonly used drugs including drugs for I.V. infusions.
7. Presentations of analysis related to Pharmacoeconomics. Data related to prescriptions from patients with similar disease to be collected & analyse in terms of cost & effectiveness.
8. Study of drugs on some models related to central nervous system (anticonvulsant, anxiolytic, antianxiety, catatonia & amnesia).

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3. C. W. Blissit. Clinical Pharmacy Practice. Philadelphia, Lea & Febiger
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10. Joseph T. Dipiro, Pharmacotherapy- A Pathophysiological Approach. McGraw-Hill Medical.
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29. Braunwald E., Harrisons Principles of Internal Medicine. McGraw-Hill Medical.
30. Brunton L. L. and Others Goodman and Gilman"s The Pharmacological Basis of Therapeutics. McGraw Hill Medical Pub. Div . New York.
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35. Rang, H.R. Dale, M. Pharmacology E.L.B.S., London
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**B.Pharm-IV (Semester- VII)
Pharmacognosy-V(BP-705)**

SN	Topics	Hrs
01	<p>Alkaloids Introduction, definition, occurrence, properties, classification, chemistry. General Biosynthetic pathways for Indole, Tropane, Quinoline and Isoquinoline alkaloids. Systematic pharmacognostic study of following crude drugs containing Alkaloids.</p> <p>a. Indole-Ergot, Rauwolfia, Nux-vomica, Vinca. b. Tropane - Datura, Coca, Belladonna. c. Purines -Tea, Theobroma. d. Quinoline - Cinchona. e. Isoquinoline - Opium, Ipecac. f. Pyridine/ piperidine - Lobelia. g. Imidazole - Pilocarpus. h. Quinazoline – Vasaka i. Amino alkaloids - Colchicum, Ephedra. j. Steroidal - Ahwagandha, Kurchi</p>	15
02	<p>Extraction, Isolation and Estimation of following Phytoconstituents Quinine, Ephedrin and Atropine</p>	03
03	<p>Flavonoids Introduction, properties, classification, chemistry and general method of extraction</p> <p>1. Flavones: Roman chamomile, <i>Passiflora incarnate</i>, Grape fruit. 2. Flavonol: Buck Wheat, Green Tea 3. Flavonones: Liquorice, Citrus Peels 4. Bioflavones- Ginkgo</p>	05
04	<p>Study of traditional drugs: Common/Vernacular names, B.S., morphology, chemical nature, pharmacology, traditional uses, marketed formulations of the following: Kantkari, Tylophora, Kalijiri, Rasna, Punarnava, Chitrak, Aparnarg, Gokhru, Sankhapushpi, Tulsi, Methi, Palash, Gymnema, Shilajit, Nagarmotha, Tinospora, Neem, and Bhringraj. Lehsun, Guggul, Artemisia, Asoka, Saffron.</p>	10
05	<p>Herbal Drug Interactions General introduction to interaction and classification. Study of fallowing drugs and their possible side effects and interactions. Hypercium, kava-kava, Ginkobiloba, Ginseng, garlic, Ginger & Ephedra.</p>	06
06	<p>Standardization of Herbal Drugs Importance of standardization and problems involved in the stanardisation. Standardization of single Drug and compound Formulations, W.H.O. guidelines for quality standards of Herbal formulations, Validation of Herbal products. Estimation of parameters, limit Used for standardization and herbal extracts</p>	06

Pharmacognosy-V (BP-7011)

PRACTICAL:

1. Extraction, Isolation and Identification of curcumin by TLC.
2. Extraction, Isolation and Identification of caffeine by TLC.
3. Study of morphological, microscopical characters & chemical / microchemical tests for following drugs:
 - a. Leaf: Datura, Vinca, Vasaka
 - b. Root: Rauwolfia
 - c. Barks: Cinchona, Kurchi,
 - d. Stem: Ephedra
 - e. Seed: Nux-Vomica
4. Determination of Ash value & Extractive values of crude drugs
5. Estimation of the crude fibre contents in given sample
6. Extraction, Isolation of following phytopharmaceuticals.
 - Eugenol from clove oil
 - Hesperidine from orange peel
 - Quinine from cinchona bark

Reference Books

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B.Pharm-IV (Semester- VII)
INDUSTRIAL PHARMACY (BP-706)

SN	Topics	Hrs
01	Pilot Plant Scale up Techniques: Significance of pilot plant study, requirements, raw materials, preparation of master procedures, Product considerations: solid dosage forms, injections, semisolids and ophthalmic products.	09
02	Pelletization Techniques: A general overview of pellets, preparation of pellets by extrusion/spheronization centrifugal method, fluid bed processes. Properties of pellets: size and size distribution, shape, density/porosity, mechanical properties. Formulation aspect of pellets.	10
03	Aerosols: Principle, component of aerosol package- propellants (types), container, valves and actuators, aerosol formulation and different types of systems, manufacture, stability testing and quality of aerosols.	04
04	Optimization Techniques in Pharmaceutical Formulation and processing: Concept of optimization, optimization parameters, optimization methods.	05
05	Packaging of Pharmaceuticals: Desirable characteristics, Detail study of different types of container and closure (glass, plastic and rubbers) including their merits and demerits, Temper-resistant packaging, blister and strip packaging, Selection and evaluation of pharmaceutical packaging materials.	08
06	cGMP: Introduction, Regulatory objectives of cGMP, Organization and Personnel, Buildings and Facilities, Production and Process control, packaging and Labeling control, Record and Reports.	06
07	Safety management: Industrial hazards due to fire, accident, mechanical and electrical equipment, chemicals and pharmaceutical safety measures.	03

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3. Chaudhari S. The WTO and Indias Pharmaceutical Industry: Patent Protection, TRIPs and Developing Countries. Oxford University Press.
4. Bean HS, Beckett AH, Carless JE . Advances in Pharmaceutical sciences, Academic Press
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8. Sharma PP. How to practice GMPs, 2nd ed, Vandana Publications, 1995.
9. Lockheart . Packaging of Pharmaceuticals of Healthcare products, Marcel Decker, 1998.
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