

B. PHARM SEMESTER – VIII

**SEMESTER-VIII
SCHEME OF TEACHING**

SUB CODE	NAME OF SUBJECT	CONTACT HOURS PER WEEK		CREDITS	
		T	P	T	P
B801T	Hospital Pharmacy Theory	2	--	2	--
B802T	Pharmaceutical Industrial Management Theory	3	--	2	--
B803T	Pharmaceutical Production Management Theory	4	--	2	--
B804T	Clinical Pharmacy-II Theory	4	--	3	--
B804P	Clinical Pharmacy-II Practical	--	2	--	3
B805T	Pharmacognosy-VI Theory	4	--	3	--
B805P	Pharmacognosy-VI Practical	--	3	--	3
B806T	Medicinal Chemistry - III Theory	4	--	3	--
B806P	Medicinal Chemistry-III Practical	--	3	--	3
B807T	Pharmaceutical Analysis-III Theory	4	--	3	--
B807P	Pharmaceutical Analysis-III Practical	--	3	--	3
Total		36		30	

SCHEME OF EXAMINATION

SUB CODE	NAME OF SUBJECT	DURATION OF EXAM (HRS)		MARKS			
		T	P	THEORY		PRACTICAL	
				University level evaluation	Institute level evaluation	University level evaluation	Institute level evaluation
B801T	Hospital Pharmacy Theory	3	--	80	20	--	--
B802T	Pharmaceutical Industrial Management Theory	3	--	80	20	--	--
B803T	Pharmaceutical Production Management Theory	3	--	80	20	--	--
B804T	Clinical Pharmacy-II Theory	3	--	80	20	--	--
B804P	Clinical Pharmacy-II Practical	--	3	--	--	80	20
B805T	Pharmacognosy-VI Theory	3	--	80	20	--	--
B805P	Pharmacognosy-VI Practical	--	3	--	--	80	20
B806T	Medicinal Chemistry-III Theory	3	--	80	20	--	--
B806P	Medicinal Chemistry-III Practical	--	3	--	--	80	20
B807T	Pharmaceutical Analysis-III Theory	3	--	80	20	--	--
B807P	Pharmaceutical Analysis-III Practical	--	3	--	--	80	20
TOTAL		33		560	140	320	80

SUBJECT : Hospital Pharmacy
SUBJECT CODE : B801T
RATIONALE : Importance of Hospital pharmacy has not been much recognized in India but has immense value in improving rational drug use and efficient drug management in hospitals. Basic concepts and best practices followed at international level will be introduced to the student.

COURSE OBJECTIVES : To provide basic understanding of how the drugs can be managed in hospital right from purchase to administration to patient level so as to implement rational drug usage and minimize medication errors and adverse drug reactions.

LEARNING OUTCOMES:

1. Able to create a lay out of ideal hospital
2. Create Drug Formulary for hospital considering various factors
3. Able to set up drug distribution channel in hospital
4. Set up Adverse Drug Reaction monitoring in the hospital.

PREREQUISITES: NONE

TEACHING AND EVALUATION SCHEME:

SUB CODE	TITLE OF SUBJECT	TEACHING SCHEME			CREDITS	EVALUATION SCHEME				TOTAL MARKS
		T	P	TOTAL HRS		INTERNAL		EXTERNAL		
						T	P	T	P	
B801T	Hospital Pharmacy	2	-	2	2	20	--	80	--	100

CONTENTS:

1	Introduction: primary, secondary and tertiary care, pharmacy practice, institutional, hospital, ward, clinical, community pharmacy, patient confidentiality, patient compliance, counseling, informed consent, pharmaceutical care and planning	10
2	Hospital pharmacy and management: Organization and structure, basic hospital pharmacy services, specialized services like DIC, patient participation in decision-making regarding therapy, factors affecting patients, decision	20
3	Professional responsibilities: Pharmacists as practitioners, responsibilities of pharmacy practitioners-comparison between developed countries and India, relationship with other health care professionals, ethics of practice	20
4	Medication- errors, ADR and prescription event monitoring: Medication errors, types and sources, methods to study medication errors, ADR- definition, role of pharmacist in ADR, WHO ADR reporting programme in India	20
5	Community Pharmacy: Organization, administration, supply and control, stock control, suppliers, price and purchase control, receipt and return of goods, legislations.	20
6	Skills: Communication, counseling, reading, writing, thinking, factors affecting development of these skills	10

BOOKS RECOMMENDED:

1. "A Textbook Of Hospital Pharmacy", Goyal R. K., Vallabh Prakashan
2. "A Textbook Of Hospital Pharmacy", Goyal R.K., B S Shah Prakashan
3. "Hospital Pharmacy", Hassan William E., Lea And Febiger Publication
4. "Textbook Of Hospital Pharmacy", Allwood M.C., Blackwell Scientific Publication

B. PHARM SEMESTER – VIII**SUBJECT : Pharmaceutical Industrial Management****SUBJECT CODE : B802T****RATIONALE : In a technical course the student is little aware of management principles. The subject will provide brief concepts on Industrial management which she/he has to practice in day to day life in Industry.****COURSE OBJECTIVES : To provide brief introduction to various management skills.****LEARNING OUTCOMES: The student should be able to understand the management terminologies. He should be able to narrate briefly the concepts of various management Principles.****PREREQUISITES: NONE****TEACHING AND EVALUATION SCHEME:**

SUB CODE	TITLE OF SUBJECT	TEACHING SCHEME			CREDITS	EVALUATION SCHEME				TOTAL MARKS
		T	P	TOTAL HRS		INTERNAL		EXTERNAL		
						T	P	T	P	
B802T	Pharmaceutical Industrial Management	3	-	3	2	20	--	80	--	100

CONTENTS:

1	Concept of management: Administrative management (planning, organizing, staffing, directing and controlling), entrepreneurship, development, operative management (personnel, Materials production, financial marketing, time/space margin/ morale). Principles of management (co-ordination, communication, motivation, decision-making, leadership, innovation, creativity, delegation of authority/responsibility, record keeping), identification of key points to give maximum thrust for development and perfection, total quality management (TQM).	15
2	Accountancy: Principles of accountancy, ledger posting and book entries, preparation of trial balance, columns of a cash book, bank reconciliation statement, rectification of errors, profits and loss account, balance sheet, purchase, keeping and pricing of stocks, treatment of cheques, bills of exchange, promissory notes and hundies documentary bills.	15
3	Pharmacoeconomics: Principles of economics with special reference to the laws of demand and supply, demand schedule, demand curves, labor welfare, general principles of insurance and inland and foreign trade, procedure of exporting and importing goods.	15
4	Pharmaceutical marketing: Functions of buying, selling, transportation, storage, finance, feedback, information, channels of distribution, wholesale, retail sale, departmental store, multiple shop and mail order business.	15
5	Salesmanship: Principles of sales promotion, advertising, ethics of sales, merchandising, literature, detailing.	10
6	Market research: Recruitment, training, evaluation, compensation to the pharmacist, pre-requisition, basic information services.	10
7	Materials management: A brief exposure of the basic principles of materials management, purchase, stores and inventory control (eligibility, efficiency, evaluation, recruitment methodology, service conditions, termination performance evaluation etc.)	10
8	Production management: A brief exposure of the different aspects of production management, a visible and invisible inputs, methodology of activities, performance evaluation technique, process-flow, process know-how, maintenance management.	10

BOOKS RECOMMENDED:

1. J. A. Stoner, R.E. Freeman & D.R. Gilbert “Management” Prentice Hall, New Delhi
2. P. Kotler, “Marketing Management Analysis, Planning, Implementation & Control”, Prentice Hall, Delhi
3. H.A. Smith, “Principles And Methods Of Pharmacy Management”, Lea & Febiger, Philadelphia
4. P. Gopalkrishan and M. Sundaresan, “Material Management: An Integrated Approach”. Prentice Hall, Delhi
5. C. B. Mannoria, “Personal Management”, Himalaya Publishing House, Bombay
6. L. Lachman, H. A. Lieberman And J.L. Kanic, “Theory And Practice Of Industrial Pharmacy”, Lea & Febiger, U.S.A.
7. P. Kotler, “Principles of Marketing”, Prentice Hall, New Delhi.

B. PHARM SEMESTER – VIII

SUBJECT : **Pharmaceutical Production Management**
SUBJECT CODE : **B803T**
RATIONALE : Learning technology is not sufficient. Managing the technology is equally important. The overall production lay out. Supportive facilities management, Waste management, Safety Management etc becomes equally important. This subject will expose the students in this area.

COURSE OBJECTIVES : To introduce the student to supportive facilities, scale up technologies, industrial hazards and safety management, Environment Management etc.

LEARNING OUTCOMES: The student should be able to

1. Design pharmaceutical layout for any product, product.
2. Have expertise on environmental control
3. Perform project management.

PREREQUISITES: Industrial pharmacy

TEACHING AND EVALUATION SCHEME:

SUB CODE	TITLE OF SUBJECT	TEACHING SCHEME			CREDITS	EVALUATION SCHEME				TOTAL MARKS
		T	P	TOTAL HRS		INTERNAL		EXTERNAL		
						T	P	T	P	
B803T	Pharmaceutical Production Management	4	-	4	2	20	--	80	--	100

B803T Pharmaceutical Production Management

1	Pharmaceutical plant lay out Plant lay out-Factors affecting lay out- significant features designing different departments—Regulatory requirement of plant design. Production planning, Supply chain management, Material management, and Waste management.	10
2	Environmental control in pharmaceutical industry: Air and water handling, An introduction to environmental control and monitoring High Purity Water Systems Effects of environmental conditions on product Stability Environmental Monitoring: Cleanrooms Microbiological Environmental Monitoring methods and standards. Roll of Personnel in environment monitoring.	40
3	Industrial hazards and safety aspects	05
4	Scale up techniques and its importance	10
5	GMP and process Validation	05
6	Quality by Design in pharmaceutical manufacturing : Concept	10
7	Documentation in pharmaceutical industry	10

B. PHARM SEMESTER – VIII

SUBJECT : Clinical Pharmacy-II
SUBJECT CODE : B804T & B804P
RATIONALE : The subject includes details of diagnosis and management of various diseases.

COURSE OBJECTIVES : At the end of the course the student should be able to:
 1. Discuss pathophysiology, symptoms and diagnosis of various diseases.
 2. Discuss clinical aspects, other manifestations and combination therapy of said diseases.

LEARNING OUTCOMES: At the end of the course the student will be able to:
 1. Understand and categories the symptoms of given diseases and address properly.
 2. Suggest therapeutic strategy for the same.
 3. Manage the disease properly.

PREREQUISITES: Basic pharmacology

TEACHING AND EVALUATION SCHEME:

SUB CODE	TITLE OF SUBJECT	TEACHING SCHEME			CREDITS		EVALUATION SCHEME				TOTAL MARKS
		T	P	TOTAL HRS	T	P	INTERNAL		EXTERNAL		
							T	P	T	P	
B804T & B804P	Clinical Pharmacy-II	4	2	6	3	3	20	20	80	80	200

CONTENTS:

	Diagnosis and management of following disorders/diseases	
1	Respiratory disease: Asthma	04
2	Gastrointestinal tract disorders: Peptic ulcer disease Inflammatory bowel disease Liver disorders: hepatitis, cirrhosis, alcoholic liver disease, jaundice	13
3	Haemopoietic disorders: Anemia	08
4	Endocrine disorders: Pituitary Adrenal Thyroid Parathyroid Diabetes mellitus	17
5	Infectious diseases: Tuberculosis Pneumonia Upper respiratory infections : bronchitis, pharyngitis, laryngitis, tonsillitis, epiglottis, obits media, sinusitis, common cold Urinary tract infection Enteric Infections: cholera, typhoid, diarrhea, dysentery, food poisoning	18
6	Renal diseases: Acute Renal Failure (ARF) Chronic Renal Failure (CRF) Concepts of Dialysis	18

7	Joint and Connective Tissue Disorders: Rheumatoid Arthritis Osteoarthritis Gout	13
8	Neoplastic Disorders: Acute Leukemia Chronic Leukemia Breast Cancer	09

B804P Clinical Pharmacy-II Practical

1. Case studies of disease conditions mentioned in syllabus.

BOOKS RECOMMENDED:

1. Clinical Pharmacy And Therapeutics By Herfindal
2. Clinical Pharmacy And Therapeutics By Roger Walker
3. Clinical Pharmacology By Bennet
4. Meylers Side Effects Of Drugs VOL 1 – 6 By Aronson J.K
5. Textbook Of Biopharmaceutics And Clinical Pharmacokinetics By Keane Bil
6. Applied Therapeutics: The Clinical Use Of Drugs By Koch And Kimble
7. Basic And Clinical Pharmacology By Katzung
8. Clinical Interpretation Of Laboratory Test By Widmann Frances
9. Clinical Pharmacokinetics : Concepts And Application By Rowland Macolm
10. Encyclopedia Of Clinical Pharmacy By Dipiro Joseph
11. Oxford Text Book Of Clinical Pharmacology And Drug Therapy By Grathame Smith
12. Principles Of Clinical Pharmacology By Atkinson Arthur
13. Basic Principles Of Clinical Research And Methodology By Gupta SK
14. Clinical Pharmacology By Laurence
15. Handbook Of Clinical Pharmacy By Yadav A.V
16. Basic And Clinical Pharmacology Made Memorable By Luty Jason
17. CLINICAL PHARMACY By Tipnis
18. CLINICAL TOXICOLOGY By Marsha Ford
19. Modern Pharmacology With Clinical Applications By Craig Charles
20. A Handbook Of Experiments In Pre-Clinical Pharmacology By Kasture
21. A Text Book Of Clinical Pharmacy practice: Essential Concepts And Skills By Parthasarathi
22. Aids To Clinical Pharmacology And Therapeutics By Rees John
23. Element Of Clinical Pharmacy By R K Goyal
24. MCQs IN CLINICAL PHARMACOLOGY By Mant Timothy
25. Selected Topics In Clinical Pharmacology By Kshirsagar

B. PHARM SEMESTER – VIII

SUBJECT : Pharmacognosy-VI
SUBJECT CODE : B805T & B805P
RATIONALE : This subject discusses Chemistry, Isolation, Estimation, Biogenetic pathway, Biosynthesis and pharmacological properties of the natural compounds.

COURSE OBJECTIVES : At the end of the course the student should be able to:

1. Importance of natural compounds belonging to said plants in therapeutics.
2. Know basic principles of isolation procedures and estimation techniques.
3. Discuss cGMP of herbal products and its regulatory aspects.

LEARNING OUTCOMES: At the end of the course the student will be able to:

1. Define and differentiate chemistry and pharmacological properties of natural compounds.
2. Apply estimation techniques of isolated photochemical.
3. Know the principles of holistic and traditional therapy.

PREREQUISITES: Basic Phytochemistry

TEACHING AND EVALUATION SCHEME:

SUB CODE	TITLE OF SUBJECT	TEACHING SCHEME			CREDITS		EVALUATION SCHEME				TOTAL MARKS
		T	P	TOTAL HRS	T	P	INTERNAL		EXTERNAL		
							T	P	T	P	
B805T & B805P	Pharmacognosy-VI	4	3	7	3	3	20	20	80	80	200

CONTENTS:

1	Role and Utilization of medicinal and aromatic plants in national economy	15
2	Natural allergens and photosensitizing agents and fungal toxins	15
3	Chemotaxonomy of medicinal plants	15
4	Marine Pharmacognosy, novel medicinal agents from marine sources	10
5	Standardization of crude drugs and their herbal formulations	25
6	Introduction of different chromatography methods and their application in the evaluation of herbal drugs.	20

B805P Pharmacognosy-VI Practical

1	Introduction to Ayurvedic Pharmacopoeia of India, Indian Herbal Pharmacopoeia & Ayurvedic Formulary of India.
2	Preparation of herbal cold cream.
3	Preparation of herbal face wash.
4	Preparation of herbal shampoo.
5	Preparation of herbal Pain relief cream.
6	Preparation of herbal tooth paste
7	Preparation of herbal lipstick
8	Preparation of herbal face mask
9	Determination of iodine value
10	Determination of saponification value
11	Determination of Acid value
12	Determination of Physical parameters-Ash value

B. PHARM SEMESTER – VIII

13	Determination of Physical parameters-Extractive value
14	Preparation and standardization of Triphala powder.
15	Preparation and standardization of Trikatu powder.

BOOKS RECOMMENDED:

1.	Quality Control Methods For Medicinal Plant Materials, WHO
2.	Pulok Mukherjee, Quality Control Of Herbal Drugs : An Approach To Evaluation Of Botanicals
3.	Paridhavi, Herbal Drug Technology,
4.	Wagner, Plant Drug Analysis, Springer Verlag Publication.
5.	E. Stahl, Thin layer chromatography
6.	Ayurvedic Pharmacopoeia Of India
7.	Ayurvedic Formulary of India (Formulations)
8.	Herbal Pharmacopoeia 1-2 (IDMA)
9.	Quality control of Indian Medicinal Plants by ICMR
10.	Kalia A.N., Textbook Of Industrial Pharmacognosy, CBS Publication
11.	Phytochemical Methods : A Guide To Modern Techniques Of Plant Analysis, Harborne J.B.
12.	Anasari, Pharmacognosy Textbook of Natural Products, Latest Edition.
13.	Ashutosh Kar, Pharmacognosy And Pharmacobiotechnology, New Age International Publication
14.	Bruneton Jean, Pharmacognosy : Phytochemistry Medicinal Plants, Lavoisier Publishing
15.	Wagner, Plant Drug Analysis, Springer Verlag Publication
16.	Kaeley and Haenes, Instant notes in Analytical chemistry, Bios international
17.	Willard, Merritt, Dean, Settle, Instrumental Methods of Analysis, CBS Publishers 7th Ed., 1986

SUBJECT : Medicinal Chemistry-III
SUBJECT CODE : B806T & B806P
RATIONALE : This subject discusses Synthetic procedures of selected drugs, mode of action, uses, structure activity relationship including Physico-Chemical properties of various pharmacologically active drugs belonging to CNS and ANS drugs.

COURSE OBJECTIVES: At the end of the course the student should be able to:

1. Know the basic principles of synthesis with active moiety.
2. Know functional groups to attach to achieve therapeutic activity.
3. Know the principles of structure activity relationships of compounds.
4. Apply and consider the factors affecting yield of products.

LEARNING OUTCOMES: At the end of the course the student will be able to:

1. Apply principles of organic synthesis in practice.
2. Choose correct processing conditions to get desired product.
3. Understand the importance of auxiliary processes like recrystallization, purification, solvent recovery etc., in economizing the synthesis process.
4. Establish structure activity relationship for any given compound.

PREREQUISITES: Basic organic chemistry.

TEACHING AND EVALUATION SCHEME:

SUB CODE	TITLE OF SUBJECT	TEACHING SCHEME			CREDITS		EVALUATION SCHEME				TOTAL MARKS
		T	P	TOTAL HRS	T	P	INTERNAL		EXTERNAL		
							T	P	T	P	
B806T & B806P	Medicinal Chemistry - III	4	3	7	3	3	20	20	80	80	200

CONTENTS:

1	<p>Drugs acting on Central nervous system</p> <p>Synthetic procedures of selected drugs, mode of action, uses, structure activity relationship including Physico-Chemical properties of the following classes of drugs: Drugs acting on central nervous system: general anesthetics, local anesthetics, hypnotics and sedatives, opioid analgesics, antitussives and anti convulsants, anti parkinsonism drugs, CNS stimulants, Psychopharmacological agents (neuroleptics, antidepressants, anxiolytics) Drugs acting on respiratory system- Antitussive, expectorants, Respiratory stimulants</p>	55
2	<p>Drugs acting on Autonomic Nervous System</p> <p>Synthetic procedures of selected drugs, mode of action, uses, structure activity relationship including Physico-Chemical properties of the following classes of drugs: Drugs acting on Autonomic Nervous System (Drugs acting at Synaptic and neuro-effector junction sites, Cholinergic and Anticholinesterases, Adrenergic Drugs, Antispasmodic and Neuromuscular blocking agents). Biochemical approaches in drug designing wherever applicable should be discussed.</p>	45

B806P Medicinal Chemistry-III Practical

1. Introduction to separation and Identification of organic binary mixtures and importance of solubility in separation of mixture.
- 2-9 To separate and identify given organic binary mixture.
10. To synthesize barbituric acid from ethyl acetoacetate and urea.
11. To synthesize Orange II from sulfanilic acid
12. To synthesize paracetamol from nitrobenzene. (Step 1)
13. To synthesize paracetamol from nitrobenzene. (Step 2)
14. To synthesize 2, 3-diphenyl quinoxaline from *o*-phenylenediamine. (Step 1)
15. To synthesize 2, 3-diphenyl quinoxaline from *o*-phenylenediamine. (Step 2)
16. To study IR and C13 NMR spectra of compound.

BOOKS RECOMMENDED:

1. Iock, J. and Beale, J. M. Eds., Wilson and Giswold's Textbook of Organic Medicinal and Pharmaceutical Chemistry, Lippincott Williams & Wilkins, Philadelphia, 2004
2. Lemke, L. T., Williams, D. A., Victoria F Roche, V. F. Principles of Medicinal Chemistry, Lippincott Williams & Wilkins, Philadelphia, 2007.
3. Furniss, B.S. Hannaford, A.J., Smith, P.W.G., Tatchell, A.R., Vogel's Textbook of Practical Organic Chemistry, Pearson Education (ELBS/Longman group), London, 1989.
4. Mann, F. G. & Saunderson, B. C., Introduction to Practical Organic Chemistry, 1st Edition, Longmans, Green, London, 1941.
5. Shriner, R. L., Hermann, C. K. F., Morrill, T. C., The Systematic Identification of Organic Compounds, John Wiley & Sons, USA, 2003.
6. Thomas, G., Fundamentals of Medicinal Chemistry, 1st Edition, John Wiley & Sons, 2003.
7. Abraham, D. J., Ed., Burger's Medicinal Chemistry and Drug Discovery, Vol. 1-6, 6th Edition, John Wiley & Sons, New Jersey, 2003. Lednicer, D., Strategies for Organic Drug Synthesis & Design, John Wiley & Sons, USA, 1998.
8. Kar, A., Medicinal Chemistry, New Age International Publishers, New Delhi, 2007.
9. Ladu, B. N., Mandel H.G. & E. L. Way, Fundamentals of Drug Metabolism & Disposition, William & Wilkins Co., Baltimore.
10. Finar, I.L., Organic Chemistry, Vol. I & II, 6th Edition, Pearson Education (ELBS/Longman group), London, 2004.
11. Nograidey, T., Medicinal Chemistry: A Molecular and Biochemical Approach, Oxford University Press, New York, Oxford, 2005.
12. Silverstein, R. M., Basseler, G. C., Morrill, T.C., Spectrometric Identification of Organic Compounds, John Wiley & Sons, USA, 1967.
13. Kemp, W., Organic Spectroscopy, 3rd Edition, W.H. Freeman & Company/ELBS, London, 1991.
14. Taylor, J. B and Triggler, D. J., Comprehensive Medicinal Chemistry II, Vol. 1-8, Quantitative Drug Design, Elsevier Ltd., 2007
15. Martin, Y. C. Quantitative Drug Design- A Critical Introduction (Medicinal Research Monograph, Vol. 8) Marcel Dekker Inc., New York, 1978.
16. Lednicer, D. Strategies for Organic Drug Synthesis & Design, Vol 1-6, John Wiley & Sons, USA, 2002.
17. Jurs, P. C. Computer Software Application in Chemistry, 2nd Edition, John Wiley & Sons, New York, 1996.

SUBJECT : Pharmaceutical Analysis-III
SUBJECT CODE : B807T & B807P
RATIONALE : This subject discusses methodology, instrumentation, and applications of spectrophotometric and chromatographic techniques to estimate drug substances and drug products.

COURSE OBJECTIVES : At the end of the course the student should be able to:

1. Understand basic principles of instrumental analysis of drugs and drug products.
2. Know basic principles of spectrophotometry and chromatographic analysis.
3. Know theoretical interpretation of the analytical results.

LEARNING OUTCOMES: At the end of the course the student will be able to:

1. Make choice of correct analytical method for given drug.
2. Aware of pharmacopoeial methods of analysis and standards for drugs.
3. Conduct analytical experiments of drug products by handling instruments.
4. Interpret various spectra.

PREREQUISITES: Basic Analytical Calculations.

TEACHING AND EVALUATION SCHEME:

SUB CODE	TITLE OF SUBJECT	TEACHING SCHEME			CREDITS		EVALUATION SCHEME				TOTAL MARKS
		T	P	TOTAL HRS	T	P	INTERNAL		EXTERNAL		
							T	P	T	P	
B807T & B807P	Pharmaceutical Analysis-III	4	3	7	3	3	20	20	80	80	200

CONTENTS:

1	<p>Spectrophotometric Techniques: The theoretical aspects, basic instrumentation, elements of interpretation of spectra, and applications of the following analytical techniques should be discussed:</p> <ol style="list-style-type: none"> 1. Ultraviolet and visible spectrophotometry. 2. Spectro-Fluorimetry 3. Infrared spectrophotometry. 4. Nuclear Magnetic Resonance spectroscopy including ¹³C NMR. 5. Mass spectrometry 6. Atomic Spectroscopy 	60
2	<p>Chromatography: Introduction, general principles, theory and instrumentation of following Techniques: HPLC, HPTLC, GC, UPLC, SFC. Introduction to Paper chromatography, Column chromatography, hyphenated techniques like LC-MS, LC-MS-MS, GC-MS, GC-MS-MS.</p>	40

B 807P Pharmaceutical Analysis-III Practical

<ol style="list-style-type: none"> 1. To study the standards of tablets as per IP 96 2. Introduction to sums related to Standards of Tablets. 3. To perform weight variation tests as well as content of active ingredient test of given sample of the mefenamic acid tablet. 4. Monograph of aspirin as per IP 96. 5. To perform assay of calcium gluconate in given sample of calcium gluconate injection as per IP 96. 6. To determine the hardness of water. 7. To perform test of active ingredient and test for 4-aminophenol for the given tablet of paracetamol
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as per IP 96.

8. To Perform content of active ingredient test and weight variation for tablet of Metformin HCl IP 96
9. To perform content of active ingredient test for given amiloride HCl tablets as per IP 96.
10. To perform weight variation test and content of active ingredient test for given chloramphenicol capsule as per IP 96.
11. To perform content of active ingredient test for Co-trimoxazole tablet as per IP 96.
(Sulphamethoxazole – nitrite titration.)
12. To find out concentration of Potassium and Sodium using Flame photometer.
13. To determine % of Sulphamethoxazole from given sample by Bratton marshal reagent.
14. To demonstrate HPLC as analytical tool.
15. To demonstrate HPTLC as analytical technique.
16. To determine dissociation constant (pKa) of indicator by using UV-visible spectrophotometer.

BOOKS RECOMMENDED:

1. K. Bansal, Chromatography, 1st Ed., Campus books, New Delhi, 2000.
2. K. Bansal, Analytical spectroscopy, 1st Ed., Campus books, New Delhi, 2000.
3. A. Kar, Pharmaceutical drug analysis, 1st Ed., Minerva books, New Delhi, 2001.
4. S. Usharani, Analytical chemistry, 1st Ed., McMillan, New Delhi, 2000.
5. D.H.Shah, SOP; Guidelines, 1st Ed., Business horizons, New Delhi, 1997.
6. D.H.Shah, QA manual, 1st Ed., Business horizons, New Delhi, 1997
7. A. H. Beckett, J. B. Stanlake, Practical Pharmaceutical chemistry-Vol- 1, 4th Ed., CBS, New Delhi, 2004.
8. G.R. Chatwaal, Analytical spectroscopy, 1st, Himalaya publishing house, Mumbai, 1996.
9. G.R. Chatwaal, Analytical chromatography, 1st, Himalaya publishing house, Mumbai, 1996.
10. M. Parkany, Quality assurance and TQM for analytical laboratory, Royal society of chemistry, new Delhi, 1995
11. D.A. Skoog, Principles of instrumental analysis, 5th Ed., Saunders College, USA, 2000.
12. B.K. Sharma, Instrumental methods of chemical analysis, 6th Ed., Krishna Prakashan media, UP., 1997.
13. H.H. Willard, L.L.Meritt, Instrumental methods of analysis, 6th Ed., CBS New Delhi, 1996.
14. J. R. Stoker, GMP for Pharmaceuticals, 4th Marcel Deckker, USA, 1997.
15. D. C. Garratt, Qualitative analysis of drugs, 3rd Ed., CBS, New Delhi, 2001.
16. Indian Pharmacopoeia.
17. British Pharmacopoeia.
18. United States Pharmacopoeia.
19. J.W. Munson, Pharmaceutical analysis, modern methods, 1th Marcel Deckker, USA, 1997.
20. M. Parkany, Quality assurance and TQM for analytical laboratory, Royal society of chemistry, new delhi, 1995