# Shri Rawatpura Sarkar University, Raipur

# Examination Scheme & Syllabus

# For

# BACHELOR IN PHARMACY

# Semester- SEMESTER VII

(Effective from the session: 2019-20)

## Board of Studies Members

**Prof. (Dr.) Vijay Kumar Singh  Dr. Veena Devi Singh  Mr. Nagendra Bhuwane  Mr. Pushpendra Kurre**

# Faculty of Pharmacy
# Shri Rawatpura Sarkar University, Raipur
## BACHELOR OF PHARMACY
## SEMESTER - VII
## Examination Scheme
## (Effective from the session: 2019-20)

| Sr. No. | Subject Code | Name of the Course with PCI code | Internal assessment | | | | Teaching hours per week | | | Credit | End semester exams | | | Total Marks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | TA | Sessional exams | | | | | | | | | | |
| | | | | CT | Duration | Total | L | T | P | | Marks | | Duration | |
| 1 | BPH701T | Instrumental Methods of Analysis – Theory | 10 | 15 | 1 Hr | 25 | 3 | 1 | | 4 | 75 | 25 | 3 Hrs | 100 |
| 2 | BPH702T | Industrial Pharmacy-II – Theory | 10 | 15 | 1 Hr | 25 | 3 | 1 | | 4 | 75 | 25 | 3 Hrs | 100 |
| 3 | BPH703T | Pharmacy Practice – Theory | 10 | 15 | 1 Hr | 25 | 3 | 1 | | 4 | 75 | 25 | 3 Hrs | 100 |
| 4 | BPH704T | Novel Drug Delivery System – Theory | 10 | 15 | 1 Hr | 25 | 3 | 1 | | 4 | 75 | 25 | 3 Hrs | 100 |
| 5 | BPH701P | Instrumental Methods of Analysis – Practical | 5 | 10 | 4 Hr | 15 | | | 4 | 2 | 35 | 15 | 4 Hrs | 50 |
| 6 | BPH709PS | Practice School* | 25 | -- | -- | 25 | | | 12 | 6 | 125 | 25 | 5 Hrs | 150 |
| | | | 70 | 70 | 8 Hrs | 140 | Total 24 | | | | 460 | 140 | 21 Hrs | 600 |

*The subject experts at college level shall conduct examination

# Board of Studies Members

**Prof. (Dr.) Vijay Kumar Singh** **Dr. Veena Devi Singh** **Mr. Nagendra Bhuwane** **Mr. Pushpendra Kurre**

<table>
<tr><td>Course Title</td><td colspan="5">Instrumental Methods of Analysis - Theory</td></tr>
<tr><td>Course Code</td><td colspan="4">BPH701T</td><td>Total theory periods : 45 Hrs</td><td>Total Tutorial periods : 15</td></tr>
<tr><td rowspan="2">Course Credits</td><td>L</td><td>T</td><td>P</td><td>TC</td><td colspan="2">Total marks in the end semester : 75</td></tr>
<tr><td>3</td><td>1</td><td></td><td>4</td><td colspan="2">Minimum of class tests to be conducted : 02</td></tr>
<tr><td>Prerequisites</td><td colspan="6">Basic fundamental studied in previous class in B.Pharm.</td></tr>
<tr><td>Course Objectives</td><td colspan="6">At the end of the course, the student shall be able to<br>• Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis<br>• Understand the chromatographic separation and analysis of drugs.<br>• Perform quantitative & qualitative analysis of drugs using various analytical instruments.</td></tr>
<tr><td>Course Contents</td><td colspan="6">UNIT-I 10 Hours<br>UV Visible spectroscopy<br>Electronic transitions, chromophores, auxochromes, spectral shifts, solvent effect on absorption spectra, Beer and Lambert’s law, Derivation and deviations.<br>Instrumentation - Sources of radiation, wavelength selectors, sample cells, detectors- Photo tube, Photomultiplier tube, Photo voltaic cell, Silicon Photodiode.<br>Applications - Spectrophotometric titrations, Single component and multi component analysis<br>Fluorimetry<br>Theory, Concepts of singlet, doublet and triplet electronic states, internal and external conversions, factors affecting fluorescence, quenching, instrumentation and applications<br>UNIT-II 10 Hours<br>IR spectroscopy<br>Introduction, fundamental modes of vibrations in poly atomic molecules, sample handling, factors affecting vibrations.<br>Instrumentation - Sources of radiation, wavelength selectors, detectors - Golay</td></tr>
</table>

cell, Bolometer, Thermocouple, Thermister, Pyroelectric detector and applications.

**Flame Photometry**-Principle, interferences, instrumentation and applications.

**Atomic absorption spectroscopy-** Principle, interferences, instrumentation and applications.

**Nepheloturbidometry-** Principle, instrumentation and applications

**UNIT-III** **10 Hours**

**Introduction to chromatography**

**Adsorption and partition column chromatography**-Methodology, advantages, disadvantages and applications.

**Thin layer chromatography**- Introduction, Principle, Methodology, Rf values, advantages, disadvantages and applications.

**Paper chromatography**-Introduction, methodology, development techniques, advantages, disadvantages and applications.

**Electrophoresis–** Introduction, factors affecting electrophoresis mobility, Techniques of paper, gel, capillary electrophoresis, applications.

**UNIT-IV** **8 Hours**

**Gas chromatography** - Introduction, theory, instrumentation, derivatization, temperature programming, advantages, disadvantages and applications.

**High performance liquid chromatography (HPLC)-**Introduction, theory, instrumentation, advantages and applications.

**UNIT-V** **07 Hours**

**Ion exchange chromatography-** Introduction, classification, ion exchange resins, properties, mechanism of ion exchange process, factors affecting ion exchange, methodology and applications.

**Gel chromatography-** Introduction, theory, instrumentation and applications.

**Affinity chromatography-** Introduction, theory, instrumentation and applications

| | |
|---|---|
| **Course Outcomes** | • Explain the theoretical principles underpinning the instrumental techniques and their applications.<br>• Independently integrate concepts and techniques in instrumental analysis and correlate to relevant applications. |
| **Text Books** | 1. Instrumental Methods of Chemical Analysis by B.K Sharma.<br>2. Organic spectroscopy by Y.R Sharma.<br>3. Text book of Pharmaceutical Analysis by Kenneth A. Connors.<br>4. Vogel's Text book of Quantitative Chemical Analysis by A.I. Vogel. |
| **Reference Books** | 1. Quantitative Analysis of Drugs in Pharmaceutical Formulations by P. D. Sethi.<br>2. Spectrophotometric identification of Organic Compounds by Silverstein |

# Bachelor Of Pharmacy
# Semester-(VII)
# 2023-24

<table>
<tr><td>Course Title</td><td colspan="5">Industrial Pharmacy – Theory</td></tr>
<tr><td>Course Code</td><td colspan="4">BPH702T</td><td>Total theory periods : 45 Hrs</td><td>Total Tutorial periods : 15</td></tr>
<tr><td rowspan="2">Course Credits</td><td>L</td><td>T</td><td>P</td><td>TC</td><td colspan="2" rowspan="2">Total marks in the end semester : 75<br>Minimum of class tests to be conducted : 02</td></tr>
<tr><td>3</td><td>1</td><td></td><td>4</td></tr>
<tr><td>Prerequisites</td><td colspan="5">Basic fundamental concept studied in brief in B.Pharm. I Sem in Physical pharmacy</td></tr>
<tr><td>Course Objectives</td><td colspan="5">Upon completion of the course the student shall be able to<ul><li>Know the process of pilot plant and scale up of pharmaceutical dosage forms.</li><li>Understand the process of technology transfer from lab scale to commercial batch.</li><li>Know different laws and acts that regulate pharmaceutical industry in India and US.</li><li>Understand the approval process and regulatory requirements for drug products.</li></ul></td></tr>
<tr><td>Course Contents</td><td colspan="5">UNIT- I 10 Hours<br><br>Pilot plant scale up techniques: General considerations - including significance of personnel requirements, space requirements, raw materials, Pilot plant scale up considerations for solids, liquid orals, semi solids and relevant documentation, SUPAC guidelines, Introduction to Platform technology..<br><br>UNIT- II 10 Hours<br><br>Technology development and transfer: WHO guidelines for Technology Transfer: Terminologies, Technology transfer protocol, Quality risk management, Transfer from R & D to production (Process, packaging and cleaning), Granularity of TT Process (API, excipients, finished products, packing materials) Documentation, Premises and equipments, qualification and validation, quality control, analytical method transfer, Approved regulatory bodies and agencies, Commercialization - practical aspects and problems (case studies), TOT agencies in India - APCTD, NRDC, TIFAC, BCIL, TBSE / SIDBI; Technology of Transfer (TOT) related documentation - confidentiality agreements, licensing, MoUs, legal issues.</td></tr>
</table>

| | |
|---|---|
| | **UNIT – III** **10 Hour**<br><br>**Regulatory affairs:** Introduction, Historical overview of Regulatory Affairs, Regulatory authorities, Role of Regulatory affairs department, Responsibility of Regulatory Affairs Professionals.<br><br>**Regulatory requirements for drug approval:** Drug Development Teams, Non-Clinical Drug Development, Pharmacology, Drug Metabolism and Toxicology, General considerations of Investigational New Drug (IND) Application, Investigator's Brochure (IB) and New Drug Application (NDA), Clinical research / BE studies, Clinical Research Protocols, Biostatistics in Pharmaceutical Product Development, Data Presentation for FDA Submissions, Management of Clinical Studies.<br><br>**UNIT – IV** **08 Hours**<br><br>**Quality management systems:** Quality management & Certifications: Concept of Quality, Total Quality Management, Quality by design, Six Sigma concept, Out of Specifications (OOS), Change control, Introduction to ISO 9000 series of quality systems standards, ISO 14000, NABL, GLP.<br><br>**UNIT – V** **07 Hours**<br><br>**Indian Regulatory Requirements:** Central Drug Standard Control Organization (CDSCO) and State Licensing Authority: Organization, Responsibilities, Common Technical Document (CTD), Certificate of Pharmaceutical Product (COPP), Regulatory requirements and approval procedures for New Drugs. |
| **Course Outcomes** | • To correlate the theoretical knowledge with professional and practical need of pharmaceutical industry.<br>• Know the professional practice management skills in industry. |
| **Reference Books** | • Regulatory Affairs from Wikipedia, the free encyclopedia modified on 7th April available at http,//en.wikipedia.org/wiki/Regulatory_ Affairs.<br>• International Regulatory Affairs Updates, 2005. Available at http://www.iraup.com/about.php.<br>• Douglas J Pisano and David S. Mantus. Text book of FDA Regulatory Affairs.<br>• A Guide for Prescription Drugs, Medical Devices, and Biologics' Second Edition.<br>• Regulatory Affairs brought by learning plus, inc. available at http.//www.cgmp.com/ra.htm. |

# Bachelor Of Pharmacy
# Semester-(VII)
# 2023-24

<table>
<tr><td>Course Title</td><td colspan="5">Pharmacy Practice – Theory</td></tr>
<tr><td>Course Code</td><td colspan="4">BPH403T</td><td>Total theory periods : 45 Hrs</td><td>Total Tutorial periods : 15</td></tr>
<tr><td rowspan="2">Course Credits</td><td>L</td><td>T</td><td>P</td><td>TC</td><td colspan="2" rowspan="2">Total marks in the end semester : 75<br>Minimum of class tests to be conducted : 02</td></tr>
<tr><td>3</td><td>1</td><td></td><td>4</td></tr>
<tr><td>Prerequisites</td><td colspan="6">Basic fundamental studied in previous class in B.Pharm.</td></tr>
<tr><td>Course Objectives</td><td colspan="6">Upon the completion of the course student shall be able to<br>• Know various drug distribution methods in a hospital.<br>• Appreciate the pharmacy stores management and inventory control.<br>• Monitor drug therapy of patient through medication chart review and clinical review.<br>• Detect and assess adverse drug reactions.</td></tr>
<tr><td>Course Contents</td><td colspan="6">UNIT-I 10 Hours<br>a) Hospital and its organization<br>Primary, Secondary and Tertiary hospitals, Classification based on clinical and non- clinical basis, Organization Structure of a Hospital, and Medical staffs involved in the hospital and their functions.<br>b) Hospital pharmacy and its organization<br>Definition, functions of hospital pharmacy, Organization structure, Location, Layout and staff requirements, and Responsibilities and functions of hospital pharmacists.<br>c) Adverse drug reaction<br>Classifications-Excessive pharmacological effects, secondary pharmacological effects, idiosyncrasy, allergic drug reactions, genetically determined toxicity, toxicity following sudden withdrawal of drugs,<br>Drug interaction- beneficial interactions, adverse interactions, and pharmacokinetic drug interactions, Methods for detecting 150 drug interactions, spontaneous case reports and record linkage studies, and Adverse drug reaction reporting and management.</td></tr>
</table>

**d) Community Pharmacy**

Organization and structure of retail and wholesale drug store, types and design, Legal requirements for establishment and maintenance of a drug store, Dispensing of proprietary products, maintenance of records of retail and wholesale drug store.

**UNIT-II** **10 Hours**

**a) Drug distribution system in a hospital**

Dispensing of drugs to inpatients, types of drug distribution systems, charging policy and labeling, Dispensing of drugs to ambulatory patients, and Dispensing of controlled drugs.

**b) Hospital formulary**

Definition, contents of hospital formulary, Differentiation of hospital formulary and Drug list, preparation and revision, and addition and deletion of drug from hospital formulary.

**c) Therapeutic drug monitoring**

Need for Therapeutic Drug Monitoring, Factors to be considered during the Therapeutic Drug Monitoring, and Indian scenario for Therapeutic Drug Monitoring.

**d) Medication adherence**

Causes of medication non-adherence, pharmacist role in the medication adherence, and monitoring of patient medication adherence.

**e) Patient medication history interview**

Need for the patient medication history interview, medication interview forms.

**f) Community pharmacy management**

Financial, materials, staff, and infrastructure requirements.

**UNIT-III** **10 Hours**

**a) Pharmacy and therapeutic committee**

Organization, functions, Policies of the pharmacy and therapeutic committee in including drugs into formulary, inpatient and outpatient prescription, automatic stop order, and emergency drug list preparation.

**b) Drug information services**

Drug and Poison information centre, Sources of drug information, Computerized services, and storage and retrieval of information.

**c) Patient counseling**

Definition of patient counseling; steps involved in patient counseling, and Special cases that require the pharmacist.

**d) Education and training program in the hospital**

Role of pharmacist in the education and training program, Internal and external training program, Services to the nursing homes/clinics, Code of ethics for community pharmacy, and Role of pharmacist in the interdepartmental communication and community health education.

**e) Prescribed medication order and communication skills**

Prescribed medication order- interpretation and legal requirements, and Communication skills- communication with prescribers and patients.

**UNIT-IV** **08 Hours**

**a) Budget preparation and implementation**

Budget preparation and implementation

**b) Clinical Pharmacy**

Introduction to Clinical Pharmacy, Concept of clinical pharmacy, functions and responsibilities of clinical pharmacist, Drug therapy monitoring medication chart review, clinical review, pharmacist intervention, Ward round participation, Medication history and Pharmaceutical care.

Dosing pattern and drug therapy based on Pharmacokinetic & disease pattern.

**c) Over the counter (OTC) sales**

Introduction and sale of over the counter, and Rational use of common over the counter medications.

**UNIT-V** **07 Hours**

**Drug store management and inventory control**

Organization of drug store, types of materials stocked and storage conditions, Purchase and inventory control: principles, purchase procedure, purchase order,

| | |
|---|---|
| | procurement and stocking, Economic order quantity, Reorder quantity level, and Methods used for the analysis of the drug expenditure.<br><br>**b) Investigational use of drugs**<br><br>Description, principles involved, classification, control, identification, role of hospital pharmacist, advisory committee.<br><br>**c) Interpretation of Clinical Laboratory Tests**<br><br>Blood chemistry, hematology, and urinalysis |
| **Course Outcomes** | • Students will use knowledge of drug distribution method in hospitals and apply in it the practice of pharmacy.<br>• Students will engage in innovative activities by making use of the knowledge of clinical trials.<br>• Students will effectively apply principles of drug store management and inventory control to medication use. |
| **Text Books** | 1. Merchant S.H. and Dr. J.S.Quadry. A textbook of hospital pharmacy, 4th ed. Ahmadabad: B.S. Shah Prakakshan; 2001.<br><br>2. Parthasarathi G, Karin Nyfort-Hansen, Milap C Nahata. A textbook of Clinical Pharmacy Practice- essential concepts and skills, 1st ed. Chennai: Orient Longman Private Limited; 2004.<br><br>3. William E. Hassan. Hospital pharmacy, 5th ed. Philadelphia: Lea & Febiger; 1986.<br><br>4. Tipnis Bajaj. Hospital Pharmacy, 1st ed. Maharashtra: Career Publications; 2008.<br><br>5. Scott LT. Basic skills in interpreting laboratory data, 4thed. American Society of Health System Pharmacists Inc; 2009. |
| **Journals** | 1. Therapeutic drug monitoring. ISSN: 0163-4356<br><br>2. Journal of pharmacy practice. ISSN : 0974-8326<br><br>3. American journal of health system pharmacy. ISSN: 1535-2900 (online)<br><br>4. Pharmacy times (Monthly magazine) |

# Bachelor Of Pharmacy
# Semester-(VII)
# 2023-24

<table>
<tr><td>Course Title</td><td colspan="5">Novel Drug Delivery Systems (Theory)</td></tr>
<tr><td>Course Code</td><td colspan="4">BPH704T</td><td>Total theory periods : 45 Hrs</td><td>Total Tutorial periods : 15</td></tr>
<tr><td rowspan="2">Course Credits</td><td>L</td><td>T</td><td>P</td><td>TC</td><td colspan="2">Total marks in the end semester : 75</td></tr>
<tr><td>3</td><td>1</td><td></td><td>4</td><td colspan="2">Minimum of class tests to be conducted : 02</td></tr>
<tr><td>Prerequisites</td><td colspan="6">Basic fundamental studied in previous class in B.Pharm.</td></tr>
<tr><td>Course Objectives</td><td colspan="6">Upon completion of this course the student should be able to<br>• To understand various approaches for development of novel drug delivery systems.<br>• To understand the criteria for selection of drugs and polymers for the development of Novel drug delivery systems, their formulation and evaluation</td></tr>
<tr><td>Course Contents</td><td colspan="6">UNIT-I 10 Hours<br>Controlled drug delivery systems<br>Introduction, terminology/definitions and rationale, advantages, disadvantages, selection of drug candidates. Approaches to design controlled release formulations based on diffusion, dissolution and ion exchange principles. Physicochemical and biological properties of drugs relevant to controlled release formulations.<br>Polymers<br>Introduction, classification, properties, advantages and application of polymers in formulation of controlled release drug delivery systems<br>UNIT-II 10 Hours<br>Microencapsulation<br>Definition, advantages and disadvantages, microspheres /microcapsules, microparticles, methods of microencapsulation, applications.<br>Mucosal Drug Delivery system<br>Introduction, Principles of bioadhesion / mucoadhesion, concepts, advantages and disadvantages, transmucosal permeability and formulation considerations of buccal delivery systems.</td></tr>
</table>

| | |
|---|---|
| | **Implantable Drug Delivery Systems**<br><br>Introduction, advantages and disadvantages, concept of implants and osmotic pump.<br><br>**UNIT-III** **10 Hours**<br><br>**Transdermal Drug Delivery Systems**<br><br>Introduction, Permeation through skin, factors affecting permeation, permeation enhancers, basic components of TDDS, formulation approaches.<br><br>**Gastro retentive drug delivery systems**<br><br>Introduction, advantages, disadvantages, approaches for GRDDS – Floating, high density systems, inflatable and gastro adhesive systems and their applications.<br><br>**Nasopulmonary drug delivery system**<br><br>Introduction to Nasal and Pulmonary routes of drug delivery, Formulation of Inhalers (dry powder and metered dose), nasal sprays, nebulizers<br><br>**UNIT-IV** **08 Hours**<br><br>**Targeted drug Delivery:**<br><br>Concepts and approaches for targeted drug delivery systems, advantages and disadvantages, introduction to liposomes, noisome, nanoparticles, monoclonal antibodies and their applications<br><br>**UNIT-V** **07 Hours**<br><br>**Ocular Drug Delivery Systems**<br><br>Introduction, intra ocular barriers and methods to overcome –Preliminary study, ocular formulations and ocuserts.<br><br>**Intrauterine Drug Delivery Systems**<br><br>Introduction, advantages and disadvantages, development of intra uterine devices (IUDs) and applications. |
| **Course Outcomes** | • Study various properties for sustained and controlled drug delivery systems.<br>• Learn mucosal and Transdermal drug delivery. |

| | |
|---|---|
| | • Learn about site specific drug delivery.<br>• Study ocular drug delivery its tissues and challenges, drug selection. |
| **Text Books** | 1. Y W. Chien, Novel Drug Delivery Systems, 2nd edition, revised and expanded, Marcel Dekker, Inc., New York, 1992.<br>2. Robinson, J. R., Lee V. H. L, Controlled Drug Delivery Systems, Marcel Dekker, Inc., New York, 1992.<br>3. Encyclopedia of Controlled Delivery. Edith Mathiowitz, Published by Wiley Interscience Publication, John Wiley and Sons, Inc, New York. Chichester/Weinheim.<br>4. N.K. Jain, Controlled and Novel Drug Delivery, CBS Publishers & Distributors, New Delhi, First edition 1997 (reprint in 2001).<br>5. S.P. Vyas and R.K. Khar, Controlled Drug Delivery -concepts and advances, Vallabh Prakashan, New Delhi, First edition 2002. |
| **Journals** | 1. Indian Journal of Pharmaceutical Sciences (IPA).<br>2. Indian Drugs (IDMA).<br>3. Journal of Controlled Release (Elsevier Sciences).<br>4. Drug Development and Industrial Pharmacy (Marcel & Decker).<br>5. International Journal of Pharmaceutics (Elsevier Sciences). |

# Bachelor Of Pharmacy
# Semester-(VII)
# 2023-24

<table>
<tr><td>Course Title</td><td colspan="5">INSTRUMENTAL METHODS OF ANALYSIS (Practical)</td></tr>
<tr><td>Course Code</td><td colspan="4">BPH705P</td><td>Total Practical periods : 04 Hrs / week</td></tr>
<tr><td rowspan="2">Course Credits</td><td>L</td><td>T</td><td>P</td><td>TC</td><td rowspan="2">Total marks in the end semester : 35</td></tr>
<tr><td></td><td></td><td>4</td><td>2</td></tr>
<tr><td>Prerequisites</td><td colspan="5">Basic fundamental studied in previous class B.Pharm. in subject of Pharmaceutical analysis</td></tr>
<tr><td>Course Objectives</td><td colspan="5">• To give basic knowledge on instrumental methods of analysis and train students to perform practical work on real samples to get acquainted with instrumentation and equipments which is needed in monitoring of environmental pollution.</td></tr>
<tr><td>Course Contents</td><td colspan="5">1. Determination of absorption maxima and effect of solvents on absorption maxima of organic compounds.<br>2. Estimation of dextrose by Colorimetry.<br>3. Estimation of sulfanilamide by Colorimetry.<br>4. Simultaneous estimation of ibuprofen and paracetamol by UV spectroscopy.<br>5. Assay of paracetamol by UV- Spectrophotometry.<br>6. Estimation of quinine sulfate by Fluorimetry.<br>7. Study of quenching of fluorescence.<br>8. Determination of sodium by flame photometry.<br>9. Determination of potassium by flame photometry.<br>10. Determination of chlorides and sulphates by nephelo turbidometry.<br>11. Separation of amino acids by paper chromatography.<br>12. Separation of sugars by thin layer chromatography.<br>13. Separation of plant pigments by column chromatography.<br>14. Demonstration experiment on HPLC.<br>15. Demonstration experiment on Gas Chromatography.</td></tr>
<tr><td>Course Outcomes</td><td colspan="5">• Proficiency in professional sampling and sample treatment prior to analysis.<br>• Capability of treatment and evaluation of the result of analysis.<br>• Capability of performing measurement on basic analytical instruments.</td></tr>
</table>

| | |
|---|---|
| **Text Books** | 1. Instrumental Methods of Chemical Analysis by B.K Sharma.<br>2. Organic spectroscopy by Y.R Sharma.<br>3. Text book of Pharmaceutical Analysis by Kenneth A. Connors.<br>4. Vogel's Text book of Quantitative Chemical Analysis by A.I. Vogel.<br>5. Practical Pharmaceutical Chemistry by A.H. Beckett and J.B. Stenlake.<br>6. Organic Chemistry by I. L. Finar.<br>7. Organic spectroscopy by William Kemp.<br>8. Quantitative Analysis of Drugs by D. C. Garrett.<br>9. Quantitative Analysis of Drugs in Pharmaceutical Formulations by P. D. Sethi.<br>10. Spectrophotometric identification of Organic Compounds by Silverstein |