

NU/AC/AC-130325/9/25 - 81  
Date: 17.05.2025

**NOTIFICATION**

- Read: 1. **R-44 – Empowering Academic Council to approve Teaching & Examination Scheme, Syllabi, etc published vide notification No. NU-442 dated 27.01.2004**  
2. **Notification No. NU-112 dated 23.12.2022 - Revision in Teaching & Examination Scheme of 1<sup>st</sup> to 6<sup>th</sup> year and Syllabi of the 1<sup>st</sup> year of Pharm.D. programme**  
3. **Resolution No. 4 – Faculty of Pharmacy meeting – 13.02.2025**  
4. **Resolution No. 9 – Academic Council meeting – 13.03.2025**

Sub: **Introduction of Teaching & Examination Scheme of 4<sup>th</sup> to 6<sup>th</sup> year and Syllabi of 4<sup>th</sup> year of 'Pharm.D. (Post Baccalaureate)' programme**

It is hereby notified for information of all concerned that the Academic Council in its meeting held on 13.03.2025 under resolution No. 9 and in exercise of powers conferred upon it by the Board of Governors under regulation referred at serial 1 above and taking into consideration the recommendations of the Faculty of Pharmacy, has resolved to approve introduction of the Programme Structure, Teaching & Examination Scheme and Syllabi of **Pharm.D. (Post Baccalaureate)** programme for the students to be admitted in the 4<sup>th</sup> year of Pharm.D. programme (*lateral entry for the students who have completed B.Pharm. programme*), to be made effective from academic year 2025-26 onwards, attached herewith as **Appendix-A**.

  
Executive Registrar

Encl.: Appendix-A [Pages 1 to 20]

To,  
1. Dean, Faculty of Pharmacy  
2. All Heads of Dept.  
3. Dy. Registrar (Exam)

Copy to,  
1. OS (IP)  
2. Exam Section (IP)  
3. Library (IP)  
4. P.A. to ER

c.f.w.cs. to Director General



**Nirma University**  
**Institute of Pharmacy**  
**Teaching & Examination Scheme of Pharm. D. / Pharm. D [Post Baccalaureate(PB)]**  
**Fourth Year**

| Sr.<br>No.   | Course<br>Code | Course Title                         | Teaching Scheme                 |                                                         |                                |               | Examination Scheme         |     |                     |    |                        |    |
|--------------|----------------|--------------------------------------|---------------------------------|---------------------------------------------------------|--------------------------------|---------------|----------------------------|-----|---------------------|----|------------------------|----|
|              |                |                                      | No. of<br>hours<br>of<br>Theory | No. of<br>hours of<br>Practical<br>/Hospital<br>Posting | No. of<br>hours of<br>Tutorial | Credit        | Duration of<br>Examination |     | Marks for<br>Theory |    | Marks for<br>Practical |    |
|              |                |                                      |                                 |                                                         |                                |               | YEE                        | PRE | YEE                 | SE | YEE                    | SE |
| 1            | PD401          | Pharmacotherapeutics-III             | 3                               | 3                                                       | 1                              | 12            | 3.0                        | 4.0 | 70                  | 30 | 70                     | 30 |
| 2            | PD402          | Hospital Pharmacy                    | 2                               | 3                                                       | 1                              | 10            | 3.0                        | 4.0 | 70                  | 30 | 70                     | 30 |
| 3            | PD403          | Clinical Pharmacy                    | 3                               | 3                                                       | 1                              | 12            | 3.0                        | 4.0 | 70                  | 30 | 70                     | 30 |
| 4            | PD404          | Biostatistics & Research Methodology | 2                               | -                                                       | 1                              | 6             | 3.0                        | -   | 70                  | 30 | -                      | -  |
| 5            | PD405          | Biopharmaceutics & Pharmacokinetics  | 3                               | 3                                                       | 1                              | 12            | 3.0                        | 4.0 | 70                  | 30 | 70                     | 30 |
| 6            | PD406          | Clinical Toxicology                  | 2                               | -                                                       | 1                              | 6             | 3.0                        | -   | 70                  | 30 | -                      | -  |
| 7            | PD407          | Pharmacotherapeutics - I & II*       | 3                               | 3                                                       | 1                              | 17            | 3.0                        | 4.0 | 70                  | 30 | 70                     | 30 |
| <b>Total</b> |                |                                      | <b>15/18*</b>                   | <b>12/15*</b>                                           | <b>6/7*</b>                    | <b>58/70*</b> |                            |     |                     |    |                        |    |

\* For Pharm. D [Post Baccalaureate(PB)]

PRE: Practical Examination

YEE: Year End Examination

SE: Sessional Examination

**Fifth Year**

| Sr.<br>No.   | Course<br>Code | Course Title                                                    | Teaching Scheme                 |                                            |                                |           | Examination Scheme         |     |                     |    |                        |    |
|--------------|----------------|-----------------------------------------------------------------|---------------------------------|--------------------------------------------|--------------------------------|-----------|----------------------------|-----|---------------------|----|------------------------|----|
|              |                |                                                                 | No. of<br>hours<br>of<br>Theory | No. of<br>hours of<br>Hospital<br>posting* | No. of<br>hours of<br>Tutorial | Credit    | Duration of<br>Examination |     | Marks for<br>Theory |    | Marks for<br>Practical |    |
|              |                |                                                                 |                                 |                                            |                                |           | YEE                        | PRE | YEE                 | SE | YEE                    | SE |
| 1            | PD501          | Clinical Research                                               | 3                               | -                                          | 1                              | 8         | 3.0                        | -   | 70                  | 30 | -                      | -  |
| 2            | PD502          | Pharmacoepidemiology and Pharmacoeconomics                      | 3                               | -                                          | 1                              | 8         | 3.0                        | -   | 70                  | 30 | -                      | -  |
| 3            | PD503          | Clinical Pharmacokinetics & Pharmacotherapeutic Drug Monitoring | 2                               | -                                          | 1                              | 6         | 3.0                        | -   | 70                  | 30 | -                      | -  |
| 4            | PD504          | Clerkship *                                                     | -                               | -                                          | 1                              | 2         | -                          | -   | -                   | -  | 70                     | 30 |
| 5            | PD505          | Project work (Six Months)                                       | -                               | 20                                         | -                              | 8         | -                          | -   | -                   | -  | 100**                  |    |
| <b>Total</b> |                |                                                                 | <b>8</b>                        | <b>20</b>                                  | <b>4</b>                       | <b>32</b> |                            |     |                     |    |                        |    |

PRE: Practical Examination

YEE: Year End Examination

SE: Sessional Examination

\* Attending ward rounds on daily basis

\*\* 70 Marks for Thesis work and 30 marks for Viva voce

**Sixth Year**

| Sr.<br>No. | Course<br>Code | Course Title                              | Teaching Scheme                 |                                 |                                |        | Examination Scheme         |     |                     |    |                        |    |
|------------|----------------|-------------------------------------------|---------------------------------|---------------------------------|--------------------------------|--------|----------------------------|-----|---------------------|----|------------------------|----|
|            |                |                                           | No. of<br>hours<br>of<br>Theory | No. of<br>hours of<br>Practical | No. of<br>hours of<br>Tutorial | Credit | Duration of<br>Examination |     | Marks for<br>Theory |    | Marks for<br>Practical |    |
|            |                |                                           |                                 |                                 |                                |        | YEE                        | PRE | YEE                 | SE | YEE                    | SE |
| 1          | PD601          | Hospital Residency Training (Internship)# | -                               | -                               | -                              | 40     | -                          | -   | -                   | -  | 100**                  | -  |

PRE: Practical Examination

YEE: Year End Examination

SE: Sessional Examination

# Six months in General Medicine department, two months each in three other speciality departments

\*\* 70 Marks for Thesis work and 30 marks for Viva voce

*[Signature]*

## NIRMA UNIVERSITY

|                              |                                                                                                                                                                                                                                                                                               |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Institute:</b>            | <b>Institute of Pharmacy</b>                                                                                                                                                                                                                                                                  |
| <b>Name of Programme:</b>    | <b>Pharm.D. and Pharm.D. (PB)</b>                                                                                                                                                                                                                                                             |
| <b>Course Code:</b>          | <b>PD401</b>                                                                                                                                                                                                                                                                                  |
| <b>Course Title:</b>         | <b>Pharmacotherapeutics - III</b>                                                                                                                                                                                                                                                             |
| <b>Course Type:</b>          | ( <input checked="" type="checkbox"/> Core/ <input type="checkbox"/> Value Added Course / <input type="checkbox"/> Departmental Elective/<br><input type="checkbox"/> Institute Elective/ <input type="checkbox"/> University Elective/( <input type="checkbox"/> Open Elective<br>Any other) |
| <b>Year of introduction:</b> | <b>2025-2026</b>                                                                                                                                                                                                                                                                              |

| L | T | Practical component |    |   |   | C  |
|---|---|---------------------|----|---|---|----|
|   |   | LPW                 | PW | W | S |    |
| 3 | 1 | 3                   | -  | - | - | 12 |

### Course Learning Outcomes (CLO):

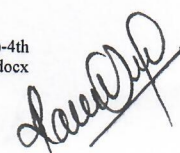
**Upon completion of the course the student shall be able to:**

1. Analyse the pathophysiology and therapeutic approach to management of the diseases like gastrointestinal, hematological, neurological and psychiatric management (BL4).
2. Assess different treatment plans and outcomes for these disorders to ensure the best possible results (BL5).
3. Evaluate the research methods and findings to support evidence-based practices in clinical settings (BL5).
4. Create clear treatment goals, choose suitable therapies, and monitor treatment results (BL6).
5. Design detailed care plans and treatment strategies, working with a healthcare team to improve patient outcomes (BL6).

### Syllabus:

**Total Teaching hours: 90**

| Unit    | Contents                                                                                                                                                                                                                             | Teaching hours |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| Unit-I  | <b>Gastrointestinal system:</b> Peptic ulcer disease, Gastro Esophageal Reflux Disease, Inflammatory bowel disease, Liver disorders - Alcoholic liver disease, Viral hepatitis including jaundice, and Drug induced liver disorders. | 20 Hours       |
| Unit-II | <b>Haematological system:</b> Anaemias, Venous thromboembolism, Drug induced blood disorders.                                                                                                                                        | 15 Hours       |



|          |                                                                                                                                     |          |
|----------|-------------------------------------------------------------------------------------------------------------------------------------|----------|
| Unit-III | <b>Nervous system:</b> Epilepsy, Parkinsonism, Stroke, Alzheimer's disease,                                                         | 18 Hours |
| Unit-IV  | <b>Psychiatry disorders:</b> Schizophrenia, Affective disorders, Anxiety disorders, Sleep disorders, obsessive compulsive disorders | 18 Hours |
| Unit-V   | Pain management including Pain pathways, neuralgias, headaches.                                                                     | 10 Hours |
| Unit-VI  | Evidence Based Medicine                                                                                                             | 3 Hours  |

(Note: The syllabus will include etiopathogenesis and pharmacotherapy of above-mentioned diseases/ associated systems)

|                         |                                                                                             |         |
|-------------------------|---------------------------------------------------------------------------------------------|---------|
| Self-Directed Learning: | Case studies based on the topics covered in theory and observations from hospital training. | 6 Hours |
|-------------------------|---------------------------------------------------------------------------------------------|---------|

**Tutorials** 30 Hours  
Tutorials will be based on the Syllabus

|                                |                                                                                                                                                                                                                |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Suggested Readings/References: | <b>Textbooks:</b><br>1) Clinical Pharmacy and Therapeutics - Roger and Walker, Churchill Livingstone publication<br>2) Pharmacotherapy: A Pathophysiologic approach - Joseph T. Dipiro et al. Appleton & Lange |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Reference books:**

1. Pathologic basis of disease - Robins SL, W.B.Saunders publication
2. Pathology and therapeutics for Pharmacists: A Basis for Clinical Pharmacy Practice - Green and Harris, Chapman and Hall publication
3. Clinical Pharmacy and Therapeutics - Eric T. Herfindal, Williams and Wilkins Publication
4. Applied Therapeutics: The clinical Use of Drugs. Lloyd Young and Koda-Kimble MA
5. Avery's Drug Treatment, 4th Edn, 1997, Adis International Limited.
6. Relevant review articles from recent medical and pharmaceutical literature.

**Practicals:**

**Teaching hours: 3hrs./week**

Hospital postings for a period of at least 50 hours is required to understand the principles and practice involved in ward round participation and clinical discussion on selection of drug therapy. Students are required to maintain a record of 15 cases observed in the ward and the same should be submitted at the end of the course for evaluation. Each student should present at least two medical cases they have observed and followed in the wards.

### Assignments:

Students are required to submit written assignments on the topics given to them. Topics allotted should cover recent developments in drug therapy of various diseases. A minimum of THREE assignments [1500 – 2000 words] should be submitted for evaluation.

### Format of the assignment:

1. Minimum & Maximum number of pages
2. Reference(s) shall be included at the end.
3. Assignment can be a combined presentation at the end of the academic year
4. It shall be computer draft copy
5. Name and signature of the student
6. Time allocated for presentation may be 8+2 Min.

### Scheme of Practical Examination:

|                  | Sessionals   | Annual       |
|------------------|--------------|--------------|
| Synopsis         | 05           | 15           |
| Major experiment | 10           | 25           |
| Minor experiment | 03           | 15           |
| Viva             | 02           | 15           |
| <b>Max marks</b> | <b>20</b>    | <b>70</b>    |
| <b>Duration</b>  | <b>03hrs</b> | <b>04hrs</b> |

Note : Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).



## NIRMA UNIVERSITY

|                              |                                                                                                                                                                                                                                                                                               |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Institute:</b>            | <b>Institute of Pharmacy</b>                                                                                                                                                                                                                                                                  |
| <b>Name of Programme:</b>    | <b>Pharm.D. and Pharm.D. (PB)</b>                                                                                                                                                                                                                                                             |
| <b>Course Code:</b>          | <b>PD402</b>                                                                                                                                                                                                                                                                                  |
| <b>Course Title:</b>         | <b>Hospital Pharmacy</b>                                                                                                                                                                                                                                                                      |
| <b>Course Type:</b>          | ( <input checked="" type="checkbox"/> Core/ <input type="checkbox"/> Value Added Course / <input type="checkbox"/> Departmental Elective/<br><input type="checkbox"/> Institute Elective/ <input type="checkbox"/> University Elective/( <input type="checkbox"/> Open Elective<br>Any other) |
| <b>Year of introduction:</b> | <b>2025-2026</b>                                                                                                                                                                                                                                                                              |

| L | T | Practical component |    |   |   | C  |
|---|---|---------------------|----|---|---|----|
|   |   | LPW                 | PW | W | S |    |
| 2 | 1 | 3                   |    |   |   | 10 |

### Course Learning Outcomes (CLO):

Upon completion of the course the student shall be able to:

1. Explain various drug distribution methods used in hospital pharmacies, including their advantages and limitations. (BL2)
2. Apply professional practice management skills to optimize hospital pharmacy operations and improve patient care (BL3)
3. Analyse clinical scenarios and provide unbiased, evidence-based drug information to healthcare professionals (BL4)
4. Evaluate the manufacturing practices of various pharmaceutical formulations within a hospital setting to ensure compliance with quality standards (BL5).
5. Design and conduct practice-based research projects to improve hospital pharmacy services and patient outcomes (BL6)

### Syllabus:

**Total Teaching hours: 60**

| Unit    | Content                                                                                                                                                                                                                                                                                                                                            | Teaching hours |
|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| Unit-I  | <b>Hospital - its Organisation and functions</b><br><br><b>Hospital pharmacy-Organisation and management</b><br>a) Organizational structure-Staff, Infrastructure & work load statistics<br>b) Management of materials and finance<br>c) Roles & responsibilities of hospital pharmacist<br><br><b>The Budget – Preparation and implementation</b> | 9 Hours        |
| Unit-II | <b>Hospital drug policy</b><br>a) Pharmacy and Therapeutic committee (PTC)<br>b) Hospital formulary<br>c) Hospital committees                                                                                                                                                                                                                      | 15 Hours       |



|                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                             |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
|                                | <ul style="list-style-type: none"> <li>- Infection committee</li> <li>- Research and ethical committee</li> <li>d) developing therapeutic guidelines</li> <li>e) Hospital pharmacy communication - Newsletter</li> </ul>                                                                                                                                                                                                                                                                         |                             |
| Unit-III                       | <b>Hospital pharmacy services</b><br>a) Procurement & warehousing of drugs and Pharmaceuticals<br>b) Inventory control<br>Definition, various methods of Inventory Control<br>ABC, VED, EOQ, Lead time, safety stock<br>c) Drug distribution in the hospital<br>i) Individual prescription method<br>ii) Floor stock method<br>iii) Unit dose drug distribution method<br>d) Distribution of Narcotic and other controlled substances<br>e) Central sterile supply services – Role of pharmacist | 14 Hours                    |
| Unit-IV                        | <b>Manufacture of Pharmaceutical preparations</b><br>a) Sterile formulations – large and small volume parenterals<br>b) Manufacture of Ointments, Liquids, and creams<br>c) Manufacturing of Tablets, granules, capsules, and powders<br>d) Total parenteral nutrition<br><b>Radio Pharmaceuticals – Handling and packaging</b>                                                                                                                                                                  | 14 Hours                    |
| Unit-V                         | <b>Continuing professional development programs</b><br>Education and training<br><b>Professional Relations and practices of hospital pharmacist</b>                                                                                                                                                                                                                                                                                                                                              | 4 Hours                     |
| Self-Directed Learning (SDL)   | Case studies based on the topics covered in theory and observations from hospital training.<br><br><b>Tutorials:</b><br>Tutorials will be based on above syllabus                                                                                                                                                                                                                                                                                                                                | 4 Hours<br><br><br>30 Hours |
| Self Study:                    | Case studies based on the topics covered in the theory                                                                                                                                                                                                                                                                                                                                                                                                                                           | 4 hrs                       |
| Suggested Readings/References: | <b>Text books: (latest editions)</b><br>1) Hospital pharmacy by William .E. Hassan<br>2) A text book of Hospital Pharmacy by S.H.Merchant & Dr. J.S. Qadry. Revised by R.K.Goyal & R.K. Parikh<br><br><b>Reference books: (latest editions)</b><br>1. WHO consultative group report.<br>2. R.P.S. Vol.2. Part –B; Pharmacy Practice section.<br>3. Handbook of pharmacy – health care. Edt. Robin J Harman. The Pharmaceutical press.                                                            |                             |

**Practicals:****Teaching hours: 3hrs./Week**

1. Assessment of drug interactions in the given prescriptions
2. Manufacture of parenteral formulations, powders.
3. Drug information queries.
4. Inventory control

**List of Assignments:**

1. Design and Management of Hospital pharmacy department for a 300 bedded hospital.
2. Pharmacy and Therapeutics committee – Organization, functions, and limitations.
3. Development of a hospital formulary for 300 bedded teaching hospital
4. Preparation of ABC analysis of drugs sold in one month from the pharmacy.
5. Different phases of clinical trials with elements to be evaluated.
6. Various sources of drug information and systematic approach to provide unbiased
7. Drug information.
8. Evaluation of prescriptions generated in hospital for drug interactions and find out the suitable management.

**Special requirements:**

1. Each college should sign MoU with nearby local hospital having minimum 150 beds for providing necessary training to the students on hospital pharmacy activities.
2. Well equipped with various resources of drug information.

**Scheme of Practical Examination:**

|                  | <b>Sessionals</b> | <b>Annual</b> |
|------------------|-------------------|---------------|
| Synopsis         | 05                | 15            |
| Major experiment | 10                | 25            |
| Minor experiment | 03                | 15            |
| Viva             | 02                | 15            |
| <b>Max marks</b> | <b>20</b>         | <b>70</b>     |
| <b>Duration</b>  | <b>03hrs</b>      | <b>04hrs</b>  |

Note : Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).

## NIRMA UNIVERSITY

|                              |                                                                                                                                                                                                                                                                                             |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Institute:</b>            | <b>Institute of Pharmacy</b>                                                                                                                                                                                                                                                                |
| <b>Name of Programme:</b>    | <b>Pharm.D. and Pharm.D. (PB)</b>                                                                                                                                                                                                                                                           |
| <b>Course Code:</b>          | <b>PD403</b>                                                                                                                                                                                                                                                                                |
| <b>Course Title:</b>         | <b>Clinical Pharmacy</b>                                                                                                                                                                                                                                                                    |
| <b>Course Type:</b>          | <input checked="" type="checkbox"/> Core/ <input type="checkbox"/> Value Added Course / <input type="checkbox"/> Departmental Elective/<br><input type="checkbox"/> Institute Elective/ <input type="checkbox"/> University Elective/( <input type="checkbox"/> Open Elective<br>Any other) |
| <b>Year of introduction:</b> | <b>2025-2026</b>                                                                                                                                                                                                                                                                            |

| L | T | Practical component |    |   |   | C  |
|---|---|---------------------|----|---|---|----|
|   |   | LPW                 | PW | W | S |    |
| 3 | 1 | 3                   | -  | - | - | 12 |

### Course Learning Outcomes (CLO):

Upon completion of the course the student shall be able to:

1. Monitor patient drug therapies, identify potential drug-related problems, and develop solutions to optimize therapeutic outcomes (BL3).
2. Demonstrate effective patient counselling techniques to ensure the safe and effective use of medications. (BL3)
3. Analyse clinical situations to detect medication errors and adverse drug reactions (ADR), and collaborate with healthcare professionals to manage and prevent them (BL4)
4. Evaluate drug and poison information resources to provide unbiased, evidence-based information to healthcare professionals and patients. (BL5)
5. Interpret laboratory investigation results and correlate them with clinical conditions to guide therapeutic decision-making. (BL4)
6. Develop and implement clinical pharmacy interventions to support advanced clinical decision-making. (BL6)

### Syllabus:

**Total Teaching hours: 90**

| Unit   | Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Teaching hours |
|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| Unit-I | <b>Definitions, development and scope of clinical pharmacy</b><br><b>Introduction to daily activities of a clinical pharmacist</b> <ol style="list-style-type: none"> <li>a. Drug therapy monitoring (medication chart review, clinical review, pharmacist interventions)</li> <li>b. Ward round participation</li> <li>c. Adverse drug reaction management</li> <li>d. Drug information and poisons information</li> <li>e. Medication history</li> <li>f. Patient counselling</li> <li>g. Drug utilisation evaluation (DUE) and review (DUR)</li> <li>h. Quality assurance of clinical pharmacy services</li> </ol> | 14 Hours       |

|                              |                                                                                                                                                                                                                                                                                                                                                                                                                                           |          |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| Unit-II                      | <b>Patient data analysis</b><br>The patient's case history, its structure and use in evaluation of drug therapy & Understanding common medical abbreviations and terminologies used in clinical practices.                                                                                                                                                                                                                                | 3 Hours  |
| Unit-III                     | <b>Clinical laboratory tests used in the evaluation of disease states, and interpretation of test results</b><br>a. Haematological, Liver function, Renal function, thyroid function tests<br>b. Tests associated with cardiac disorders<br>c. Fluid and electrolyte balance<br>d. Microbiological culture sensitivity tests<br>e. Pulmonary Function Tests                                                                               | 18 Hours |
| Unit-IV                      | <b>1. Drug &amp; Poison information.</b><br>a. Introduction to drug information resources available<br>b. Systematic approach in answering DI queries<br>c. Critical evaluation of drug information and literature<br>d. Preparation of written and verbal reports<br>e. Establishing a Drug Information Centre<br>f. Poisons information- organization & information resources<br><b>2. Critical evaluation of biomedical literature</b> | 12 Hours |
| Unit-V                       | <b>Pharmacovigilance</b><br>a. Scope, definition and aims of pharmacovigilance<br>b. Adverse drug reactions - Classification, mechanism, predisposing factors, causality assessment [different scales used]<br>c. Reporting, evaluation, monitoring, preventing & management of ADRs<br>d. Role of pharmacist in management of ADR.                                                                                                       | 20 Hours |
| Unit-VI                      | Pharmaceutical care concepts, Communication skills including patient counselling techniques, medication history interview, presentation of cases, Critical Evaluation of Biomedical Literature, Medication errors                                                                                                                                                                                                                         | 17 Hours |
| Self-Directed Learning (SDL) | Case studies based on the topics covered in the theory                                                                                                                                                                                                                                                                                                                                                                                    | 6 Hours  |
|                              | <b>Tutorials:</b><br>Tutorials will be based on above syllabus                                                                                                                                                                                                                                                                                                                                                                            | 30 Hours |

|                                |                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Suggested Readings/References: | <b>Textbooks: (latest editions)</b><br>1) Practice Standards and Definitions - The Society of Hospital Pharmacists of Australia.<br>2) Basic skills in interpreting laboratory data - Scott LT, American Society of Health System Pharmacists Inc.<br>3) Biopharmaceutics and Applied Pharmacokinetics - Leon Shargel, Prentice Hall publication. |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

- 4) A text book of Clinical Pharmacy Practice; Essential concepts and skills,
- 5) Dr.G.Parthasarathi etal, Orient Orient Langram Pvt.Ltd. ISSN8125026

**Reference books: (latest editions)**

1. Australian drug information -Procedure manual. The Society of Hospital Pharmacists of Australia.
2. Clinical Pharmacokinetics - Rowland and Tozer, Williams and Wilkins Publication.
3. Pharmaceutical statistics. Practical and clinical applications. Sanford Bolton, Marcel Dekker, Inc.

**Practical's:**

**Teaching hours: 3hrs./Week**

Students are expected to perform practicals in the following areas covering the topics dealt in theory class.

- a. Answering drug information questions (4 Nos)
- b. Patient medication counselling (4 Nos)
- c. Case studies related to laboratory investigations (4 Nos)
- d. Patient medication history interview (3 Nos)
- e. Drug therapy monitoring
- f. Critical evaluation of biomedical literature
- g. Medication errors
- h. Pharmaceutical calculations
- i. ADR reporting

**Assignment:**

Students are expected to submit THREE written assignments (1500 – 2000 words) on the topics given to them covering the following areas dealt in theory class. Drug information, Patient medication history interview, Patient medication counselling, Critical appraisal of recently published articles in the biomedical literature which deals with a drug or therapeutic issue.

**Format of the assignment:**

1. Minimum & Maximum number of pages.
2. Reference(s) shall be included at the end.
3. Assignment can be a combined presentation at the end of the academic year.
4. It shall be computer draft copy.
5. Name and signature of the student.
6. Time allocated for presentation may be 8+2 Min.

**Scheme of Practical Examination:**

|                  | Sessionals   | Annual       |
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|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Institute:</b>            | <b>Institute of Pharmacy</b>                                                                                                                                                                                                                                                                |
| <b>Name of Programme:</b>    | <b>Pharm.D. and Pharm.D. (PB)</b>                                                                                                                                                                                                                                                           |
| <b>Course Code:</b>          | <b>PD404</b>                                                                                                                                                                                                                                                                                |
| <b>Course Title:</b>         | <b>Biostatistics &amp; Research Methodology</b>                                                                                                                                                                                                                                             |
| <b>Course Type:</b>          | <input checked="" type="checkbox"/> Core/ <input type="checkbox"/> Value Added Course / <input type="checkbox"/> Departmental Elective/<br><input type="checkbox"/> Institute Elective/ <input type="checkbox"/> University Elective/( <input type="checkbox"/> Open Elective<br>Any other) |
| <b>Year of introduction:</b> | <b>2025-2026</b>                                                                                                                                                                                                                                                                            |

| L | T | Practical component |    |   |   | C |
|---|---|---------------------|----|---|---|---|
|   |   | LPW                 | PW | W | S |   |
| 2 | 1 | -                   | -  | - | - | 6 |

### Course Learning Outcomes (CLO):

Upon completion of the course the student shall be able to:

- 1 Discuss the basic framework of the research process and research methodology, along with research designs and techniques. (BL2)
- 2 Calculate students test, chi-square test, analysis of variance (One-way and two-ways) and data visualizations. (BL3)
- 3 Apply nonparametric test, linear regression, and correlation analysis. (BL3)
- 4 Use software for statistical analysis and various statistical methods in epidemiology. (BL3)
- 5 Analyze data distribution and reporting methods in clinical research. (BL4)
- 6 Outline the types of clinical studies, data distribution types, data visualizations, and computer applications in pharmacy. (BL5)

### Syllabus:

**Total Teaching hours: 60**

| Unit    | Contents                                                                                                                                                                                                                | Teaching hours |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| Unit-I  | <b>Research Methodology</b>                                                                                                                                                                                             | 10 Hours       |
|         | a) Types of clinical study designs: Case studies, observational studies, interventional studies,                                                                                                                        |                |
|         | b) Designing the methodology                                                                                                                                                                                            |                |
|         | c) Sample size determination and Power of a study<br>Determination of sample size for simple comparative experiments, determination of sample size to obtain a confidence interval of specified width, power of a study |                |
|         | d) Report writing and presentation of data                                                                                                                                                                              |                |
| Unit-II | <b>Biostatistics</b>                                                                                                                                                                                                    | 10 Hours       |
|         | a) Introduction                                                                                                                                                                                                         |                |
|         | b) Types of data distribution                                                                                                                                                                                           |                |
|         | c) Measures describing the central tendency distributions-<br>average, median, mode                                                                                                                                     |                |

- d) Measurement of the spread of data-range, variation of mean, standard deviation, variance, coefficient of variation, standard error of mean.

Unit-III      **Data graphics**      8 Hours  
Construction and labeling of graphs, histogram, piecharts, scatter plots, semilogarithmic plots.

Unit-IV      **Basics of testing hypothesis**      10 Hours  
a) Null hypothesis, level of significance, power of test, P value, statistical estimation of confidence intervals.  
b) Level of significance (Parametric data)- students t test (paired and unpaired), chi square test, Analysis of Variance (one-way and two-way)  
c) Level of significance (Non-parametric data)- Sign test, Wilcoxon's signed rank test, Wilcoxon rank sum test, Mann Whitney U test, Kruskal-Wallis test (one way ANOVA)  
d) Linear regression and correlation- Introduction, Pearson's and Spearman's correlation and correlation co-efficient.  
e) Introduction to statistical software: SPSS, Epi Info, SAS.

Unit-V      **Statistical methods in epidemiology**      8 Hours  
Incidence and prevalence, relative risk, attributable risk

Unit-VI      **Computer applications in pharmacy**      10 Hours  
Computer System in Hospital Pharmacy: Patterns of Computer use in Hospital Pharmacy – Patient record database management, Medication order entry – Drug labels and list – Intravenous solution and admixture, patient medication profiles, Inventory control, Management report & Statistics.  
Computer In Community Pharmacy: Computerizing the Prescription Dispensing process Use of Computers for Pharmaceutical Care in community pharmacy Accounting and General ledger system  
Drug Information Retrieval and Storage: Introduction – Advantages of Computerized Literature Retrieval Use of Computerized Retrieval

Self-Study:      Case studies based on the topics covered in the theory      4 Hours

**Tutorials:**      30 Hours  
Tutorials will be based on above syllabus

Suggested Readings/References:      **Reference books: (latest editions)**  
a. Pharmaceutical statistics- practical and clinical applications, Sanford Bolton 3rd edition, publisher Marcel Dekker Inc. New York.  
b. Drug Information- A Guide for Pharmacists, Patrick M Malone, Karen L Kier, John E Stanovich, 3rd edition, McGraw Hill Publications 2006

## NIRMA UNIVERSITY

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|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Institute:</b>            | <b>Institute of Pharmacy</b>                                                                                                                                                                                                                                                                |
| <b>Name of Programme:</b>    | <b>Pharm.D. and Pharm.D. (PB)</b>                                                                                                                                                                                                                                                           |
| <b>Course Code:</b>          | <b>PD405</b>                                                                                                                                                                                                                                                                                |
| <b>Course Title:</b>         | <b>BIOPHARMACEUTICS AND PHARMACOKINETICS</b>                                                                                                                                                                                                                                                |
| <b>Course Type:</b>          | <input checked="" type="checkbox"/> Core/ <input type="checkbox"/> Value Added Course / <input type="checkbox"/> Departmental Elective/<br><input type="checkbox"/> Institute Elective/ <input type="checkbox"/> University Elective/( <input type="checkbox"/> Open Elective<br>Any other) |
| <b>Year of introduction:</b> | <b>2025-2026</b>                                                                                                                                                                                                                                                                            |

| L | T | Practical component |    |   |   | C  |
|---|---|---------------------|----|---|---|----|
|   |   | LPW                 | PW | W | S |    |
| 3 | 1 | 3                   | -  | - | - | 12 |

### Course Learning Outcomes (CLO):

Upon completion of the course the student shall be able to:

1. Analyze the pharmacokinetics of drugs within the ADME and predict drug behavior in the human body (BL 4).
2. Develop and evaluate one-compartment model to calculate and interpret key pharmacokinetic parameters, including drug concentration over time (BL 5).
3. Apply multi-compartment pharmacokinetic models to explain complex drug distribution and elimination patterns (BL 3).
4. Evaluate the implications of non-linear pharmacokinetics and utilize non-compartmental analysis to interpret pharmacokinetic data (BL 5).
5. Design and assess bioavailability and bioequivalence study protocols to ensure effective and safe drug dosing (BL 6).
6. Calculate and interpret pharmacokinetic parameters in clinical settings, integrating data from patient-specific case studies (BL 4).

**Syllabus:**  
**hours**

**Total Teaching hours: 90**

| Unit    | Contents                                                                                                                                                                                                                                                                          | Teaching hours |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| Unit-I  | <b>Introduction to Biopharmaceutics:</b><br>Absorption of drugs from gastrointestinal tract, Drug Distribution, Drug Elimination.                                                                                                                                                 | 15 Hours       |
| Unit-II | <b>a) Introduction to Pharmacokinetics:</b><br>Mathematical models, Drug levels in blood, Pharmacokinetic model, Compartment models, Pharmacokinetic study.<br><b>b) One compartment open model:</b><br>Intravenous Injection (Bolus), Intravenous infusion, Oral administration. | 20 Hours       |

Unit-III      **a) Multicompartment models:**      15 Hours  
 Two compartment open model - IV bolus, IV infusion and oral administration.  
**b) Multiple Dosage Regimens:**  
 One Compartment Open Model - Repetitive Intravenous injections, Repetitive Extravascular dosing, Two Compartment Open Model

Unit - IV      **a) Nonlinear Pharmacokinetics:**      15 Hours  
 Introduction, Factors causing Non-linearity, Michaelis-Menten method of estimating parameters.  
**b) Noncompartmental Pharmacokinetics.**  
 Statistical Moment Theory, MRT for various compartment models, Physiological Pharmacokinetic model.

Unit - V      **Bioavailability and Bioequivalence:**      15 Hours  
 Introduction, Bioavailability study protocol, Methods of Assessment of Bioavailability.

Self-Director Learning: Case studies and calculation related to the topics covered in the theory      10 Hours

**Tutorials**      30 Hours  
 Tutorials will be based on above syllabus

Suggested Readings/References:

**Reference books: (Latest edition)**

1. Biopharmaceutics and Clinical Pharmacokinetics by, Milo Gibaldi.
2. Remington's Pharmaceutical Sciences by Mack Publishing Company, Pennsylvania.
3. Pharmacokinetics: by Milo Gibaldi Donald, R. Mercel Dekker Inc.
4. Hand Book of Clinical Pharmacokinetics, By Milo Gibaldi and Laurie Prescott by ADIS Health Science Press.
5. Biopharmaceutics and Pharmacokinetics; by Robert F Notari.
6. Biopharmaceutics; by Swarbrick.
7. Biopharmaceutics and Pharmacokinetics-A Treatise, by D M Brahmanekar and Sunil Jaiswal, Vallabh Prakashan Pitampura, Delhi
8. Clinical Pharmacokinetics, Concepts and Applications: by Malcolm Rowland and Thomas, N. Tozen, Lea and Febrger, Philadelphia.
9. Dissolution, Bioavailability and Bioequivalence, by Abdou H.M, Mack, Publishing Company, Pennsylvania.
10. Biopharmaceutics and Clinical Pharmacokinetics-An introduction by Robert F Notari Marcel Dekker Inc, New York and Basel.
11. Encyclopedia of Pharmaceutical Technology, James Swarbrick, James, C. Roylan, Marcel Dekker Inc, New York.
12. Shargel's Applied Biopharmaceutics & Pharmacokinetics, McGraw Hill
13. Basic Pharmacokinetics by Sunil Jambhekar, Philip J Breen, Pharmaceutical Press

Suggested  
List of  
Experiments:  
3 hrs./Week

1. Improvement of dissolution characteristics of slightly soluble drugs by some methods.
2. Comparison of dissolution studies of two different marketed products of same drug.
3. Influence of polymorphism on solubility and dissolution.
4. Protein binding studies of a highly protein bound drug and poorly protein bound drug.
5. Extent of plasma-protein binding studies on the same drug (i.e. highly and poorly protein bound drug) at different concentrations in respect of constant time.
6. Bioavailability studies of some commonly used drugs on animal/human model.
7. Calculation of  $K_a$ ,  $K_e$ ,  $t_{1/2}$ ,  $C_{max}$ , AUC, AUMC, MRT etc. from blood profile data.
8. Calculation of bioavailability from urinary excretion data for two drugs.
9. Calculation of AUC and bioequivalence from the given data for two drugs.
10. In vitro absorption studies.
11. Bioequivalency studies on the different drugs marketed – e.g. Tetracycline, Sulphamethoxazole, Trimethoprim, Aspirin etc., on animals and human volunteers.
12. Absorption studies in animal inverted intestine using various drugs.
13. Effect on contact time on the plasma protein binding of drugs.
14. Studying metabolic pathways for different drugs based on elimination kinetics data.
15. Calculation of elimination half-life for different drugs by using urinary elimination data and blood level data.
16. Determination of renal clearance.

#### Scheme of Practical Examination:

|                  | Sessionals   | Annual       |
|------------------|--------------|--------------|
| Identification   | 04           | 10           |
| Synopsis         | 04           | 10           |
| Major Experiment | 07           | 20           |
| Minor Experiment | 03           | 15           |
| Viva             | 02           | 15           |
| <b>Max Marks</b> | <b>20</b>    | <b>70</b>    |
| <b>Duration</b>  | <b>03hrs</b> | <b>04hrs</b> |

Note: Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance)

# NIRMA UNIVERSITY

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|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Institute:</b>            | <b>Institute of Pharmacy</b>                                                                                                                                                                                                                                                                |
| <b>Name of Programme:</b>    | <b>Pharm.D. and Pharm.D. (PB)</b>                                                                                                                                                                                                                                                           |
| <b>Course Code:</b>          | <b>PD406</b>                                                                                                                                                                                                                                                                                |
| <b>Course Title:</b>         | <b>Clinical Toxicology</b>                                                                                                                                                                                                                                                                  |
| <b>Course Type:</b>          | <input checked="" type="checkbox"/> Core/ <input type="checkbox"/> Value Added Course / <input type="checkbox"/> Departmental Elective/<br><input type="checkbox"/> Institute Elective/ <input type="checkbox"/> University Elective/( <input type="checkbox"/> Open Elective<br>Any other) |
| <b>Year of introduction:</b> | <b>2025-2026</b>                                                                                                                                                                                                                                                                            |

| L | T | Practical component |    |   |   | C |
|---|---|---------------------|----|---|---|---|
|   |   | LPW                 | PW | W | S |   |
| 2 | 1 | -                   | -  | - | - | 6 |

## Course Learning Outcomes (CLO):

Upon completion of the course the student shall be able to:

1. Analyse the general principles involved in the management, prevention, and treatment of various poisonings. (BL4)
2. Apply toxicokinetic principles to evaluate the absorption, distribution, metabolism, and excretion of poisons in clinical settings. (BL3)
3. Classify various agents responsible for acute and chronic poisoning, including heavy metals, drugs, plants, and animal toxins. (BL4)
4. Evaluate clinical symptoms and Management strategies for addiction and substance dependence. (BL5)
5. Create a comprehensive toxicological management strategy for both acute and chronic poisoning scenarios. (BL 6)

## Syllabus:

**Total Teaching hours: 60**

| Unit     | Contents                                                                                                                                                                                                                        | Teaching hours |
|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| Unit-I   | a. General principles involved in the management of poisoning<br>b. Antidotes and the clinical applications.<br>c. Supportive care in clinical Toxicology.<br>d. Gut Decontamination.<br>e. Elimination Enhancement.            | 10 Hours       |
| Unit-II  | Toxicokinetics                                                                                                                                                                                                                  | 2 Hours        |
| Unit-III | Clinical symptoms and management of acute poisoning with the following agents –<br>a) Pesticide poisoning: organophosphorous compounds, carbamates, organochlorines, pyrethroids.<br>b) Opiates overdose.<br>c) Antidepressants | 15 Hours       |

|                              |                                                                                                                                                                                                                                                                              |          |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
|                              | d) Barbiturates and benzodiazepines.<br>e) Alcohol: ethanol, methanol.<br>f) Paracetamol and salicylates.<br>g) Non-steroidal anti-inflammatory drugs.<br>h) Hydrocarbons: Petroleum products and PEG.<br>i) Caustics: inorganic acids and alkali.<br>j) Radiation poisoning |          |
| Unit-IV                      | Clinical symptoms and management of chronic poisoning with the following agents –<br>Heavy metals: Arsenic, lead, mercury, iron, copper                                                                                                                                      | 5 Hours  |
| Unit-V                       | a. <b>Venomous snake bites:</b> Families of venomous snakes, clinical effects of venoms, general management as first aid, early manifestations, complications and snake bite injuries.<br>b. <b>Envenomations</b> – Arthropod bites and stings.                              | 10 Hours |
| Unit-VI                      | Plants poisoning. Mushrooms, Mycotoxins, Food poisonings                                                                                                                                                                                                                     | 4 Hours  |
| Unit-VII                     | <b>Substance abuse:</b> Signs and symptoms of substance abuse and treatment of dependence<br>a) CNS stimulants: amphetamine<br>b) Opioids<br>c) CNS depressants<br>d) Hallucinogens: LSD<br>e) Cannabis group<br>f) Tobacco                                                  | 10 Hours |
| Self-Directed Learning (SDL) | Case studies based on the topics covered in theory and observations from hospital training.                                                                                                                                                                                  | 4 Hours  |
|                              | <b>Tutorials</b><br>Tutorials will be based on above syllabus                                                                                                                                                                                                                | 30 Hours |

|                                |                                                                                                                                                                                                                                                                                                                           |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Suggested Readings/References: | <b>Reference books: (latest editions)</b><br>a. Matthew J Ellenhorn. ELLENHORNS MEDICAL TOXICOLOGY – DIAGNOSIS AND TREATMENT OF POISONING. Second edition. Williams and Willkins publication, London<br>b. V V Pillay. HANDBOOK OF FORENSIC MEDICINE AND TOXICOLOGY. Thirteenth edition 2003 Paras Publication, Hyderabad |
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## NIRMA UNIVERSITY

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|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Institute:</b>            | <b>Institute of Pharmacy</b>                                                                                                                                                                                                                                                                  |
| <b>Name of Programme:</b>    | <b>Pharm.D. and Pharm.D. (PB)</b>                                                                                                                                                                                                                                                             |
| <b>Course Code:</b>          | <b>PD407</b>                                                                                                                                                                                                                                                                                  |
| <b>Course Title:</b>         | <b>Pharmacotherapeutics I &amp; II</b>                                                                                                                                                                                                                                                        |
| <b>Course Type:</b>          | ( <input checked="" type="checkbox"/> Core/ <input type="checkbox"/> Value Added Course / <input type="checkbox"/> Departmental Elective/<br><input type="checkbox"/> Institute Elective/ <input type="checkbox"/> University Elective/( <input type="checkbox"/> Open Elective<br>Any other) |
| <b>Year of introduction:</b> | <b>2025-2026</b>                                                                                                                                                                                                                                                                              |

| L | T | Practical component |    |   |   | C  |
|---|---|---------------------|----|---|---|----|
|   |   | LPW                 | PW | W | S |    |
| 3 | 1 | 3                   | -  | - | - | 12 |

### Course Learning Outcomes (CLO):

Upon completion of the course the student shall be able to:

1. Apply pharmacological principles to the management of selected disease states across various systems, including cardiovascular, respiratory, endocrine, and infectious diseases. (BL 3)
2. Analyze the pathophysiology and pharmacotherapy of selected disease states to determine appropriate therapeutic strategies (BL 4)
3. Evaluate prescribing guidelines for pediatric, geriatric, pregnant, and breastfeeding patients to ensure safe and effective medication use. (BL5)
4. Develop evidence-based treatment plans for the rational use of medications in managing selected disease states, adhering to current clinical guidelines and standards. (BL 6)
5. Interpret clinical data from hospital training, including case presentations and drug therapy evaluations, to enhance clinical decision-making skills. (BL 5)

### Syllabus:

**Total Teaching hours: 90**

| Unit    | Contents                                                                                                                                                                     | Teaching hours |
|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| Unit-I  | <b>Cardiovascular system:</b> Hypertension, Congestive cardiac failure, Angina Pectoris, Myocardial infarction, Hyperlipidaemias, Electrophysiology of heart and Arrhythmias | 13 Hours       |
| Unit-II | <b>Respiratory system:</b> Introduction to Pulmonary function test, Asthma, Chronic obstructive airways disease, Drug induced pulmonary diseases                             | 6 Hours        |

|                              |                                                                                                                                                                                                                                                                                                                                                             |          |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| Unit-III                     | <b>Endocrine system:</b> Diabetes, Thyroid diseases, Oral contraceptives, Hormone replacement therapy, Osteoporosis                                                                                                                                                                                                                                         | 8 Hours  |
| Unit-IV                      | <b>General prescribing guidelines for</b><br>a. Paediatric patients<br>b. Geriatric patients<br>c. Pregnancy and breast feeding                                                                                                                                                                                                                             | 4 Hours  |
| Unit-V                       | <b>Ophthalmology:</b> Glaucoma, Conjunctivitis- viral & bacterial                                                                                                                                                                                                                                                                                           | 3 Hours  |
| Unit-VI                      | <b>Introduction to rational drug use:</b> Definition, Role of pharmacist, Essential drug concept, Rational drug formulations                                                                                                                                                                                                                                | 2 Hours  |
| Unit-VII                     | <b>Infectious disease:</b> Guidelines for the rational use of antibiotics and surgical Prophylaxis, Tuberculosis, Meningitis, Respiratory tract infections, Gastroenteritis, Endocarditis, Septicemia, Urinary tract infections, Protozoal infection- Malaria, HIV & Opportunistic infections, Fungal infections, Viral infections, Gonorrhoea and Syphilis | 20 Hours |
| Unit-VIII                    | <b>Musculoskeletal disorders:</b> Rheumatoid arthritis, Osteoarthritis, Gout, Spondylitis, Systemic lupus erythematosus.                                                                                                                                                                                                                                    | 7 Hours  |
| Unit-IX                      | <b>Renal system:</b> Acute Renal Failure, Chronic Renal Failure, Renal Dialysis, Drug induced renal disorders                                                                                                                                                                                                                                               | 5 Hours  |
| Unit-X                       | <b>Oncology:</b> Basic principles of Cancer therapy, General introduction to cancer chemotherapeutic agents, Chemotherapy of breast cancer, leukemia. Management of chemotherapy nausea and emesis                                                                                                                                                          | 7 Hours  |
| Unit-XI                      | <b>Dermatology:</b> Psoriasis, Scabies, Eczema, Impetigo<br><br>(Note: The syllabus will include etiopathogenesis and pharmacotherapy of above-mentioned diseases/ associated systems)                                                                                                                                                                      | 5 Hours  |
| Self-Directed Learning (SDL) | Case studies based on the topics covered in theory and observations from hospital training.                                                                                                                                                                                                                                                                 | 10 Hours |
|                              | <b>Tutorials:</b><br>Tutorials will be based on above syllabus                                                                                                                                                                                                                                                                                              | 30 Hours |

Suggested Readings/ References:

**Textbooks:**

- 3) Clinical Pharmacy and Therapeutics - Roger and Walker, Churchill Livingstone publication

- 4) Pharmacotherapy: A Pathophysiologic approach - Joseph T. DiPiro et al. Appleton & Lange

**Reference books:**

7. Pathologic basis of disease - Robins SL, W.B.Saunders publication
8. Pathology and therapeutics for Pharmacists: A Basis for Clinical Pharmacy Practice - Green and Harris, Chapman and Hall publication
9. Clinical Pharmacy and Therapeutics - Eric T. Herfindal, Williams and Wilkins Publication
10. Applied Therapeutics: The clinical Use of Drugs. Lloyd Young and Koda-Kimble MA
11. Avery's Drug Treatment, 4th Edn, 1997, Adis International Limited. Relevant review articles from recent medical and pharmaceutical literature.

**Practicals:**

**Teaching hours: 3 Hrs./Week**

Hospital postings in various departments designed to complement the lectures by providing practical clinical discussion; attending ward rounds; follow up the progress and changes made in drug therapy in allotted patients; case presentation upon discharge. Students are required to maintain a record of cases presented and the same should be submitted at the end of the course for evaluation. A minimum of 20 cases should be presented and recorded covering most common diseases.

**Assignments:**

Students are required to submit written assignments on the topics given to them. Topics allotted should cover recent developments in drug therapy of various diseases. A minimum of THREE assignments [1500 – 2000 words] should be submitted for evaluation.

**Format of the assignment:**

1. Minimum & Maximum number of pages.
2. Reference(s) shall be included at the end.
3. Assignment can be a combined presentation at the end of the academic year.
4. It shall be computer draft copy.
5. Name and signature of the student.
6. Time allocated for presentation may be 8+2 Min.

**Scheme of Practical Examinations:**

|                  | Sessionals   | Annual       |
|------------------|--------------|--------------|
| Synopsis         | 05           | 15           |
| Major experiment | 10           | 25           |
| Minor experiment | 03           | 15           |
| Viva             | 02           | 15           |
| <b>Max marks</b> | <b>20</b>    | <b>70</b>    |
| <b>Duration</b>  | <b>03hrs</b> | <b>04hrs</b> |

Note : Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).