



# MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY BATHINDA-151001 (PUNJAB), INDIA

(A State University Estb. by Govt. of Punjab vide Punjab Act No. 5 of 2015 and Approved u/s 2(f) & 12 (B) of UGC; Member AIU)

Department: **Pharmaceutical Sciences & Technology**

Program: **M. Pharmacy**

## **COs, POs, PSOs Mapping**

|   |  |   |
|---|--|---|
| <b>Subject:</b> Modern Pharmaceutical Analytical Techniques | <b>Subject Code:</b> <b><u>MPL101T</u></b> | <b>Semester:</b> <b><u>1<sup>st</sup></u></b> |
| <b>Credit:</b> <b><u>4</u></b>                              | <b>L T P</b> <b><u>4 0 0</u></b>           | <b>Duration:</b> <b><u>60 Hrs.</u></b>        |

| COs        | Statement  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 |
|------------|--|-----|-----|-----|-----|-----|-----|
| <b>CO1</b> | Chemicals and Excipients   | 2   | 3   | 1   | 2   | 2   | 2   |
| <b>CO2</b> | The analysis of various drugs in single and combination dosage forms | 3   | 2   | 1   | 2   | 2   | 3   |
| <b>CO3</b> | Theoretical and practical skills of the instruments                  | 2   | 3   | 1   | 2   | 2   | 2   |

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low)- upto 30%

2. Moderate (Medium) – above 30% and upto70%

3. Substantial (High) – above 70%



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Department: **Pharmaceutical Sciences & Technology**

Program: **M. Pharmacy**

|   |                                     |  |
|---|-------------------------------------|--|
| <b>Subject:</b> Advanced Pharmacology-I | <b>Subject Code:</b> <u>MPL102T</u> | <b>Semester:</b> <u>1<sup>st</sup></u> |
| <b>Credit:</b> <u>4</u>                 | <b>L T P</b> <u>4 0 0</u>           | <b>Duration:</b> <u>60 Hrs.</u>        |

| COs        | Statement  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 |
|------------|--|-----|-----|-----|-----|-----|-----|
| <b>CO1</b> | Discuss the pathophysiology and pharmacotherapy of certain diseases  |     | 2   | 2   |     |     | 2   |
| <b>CO2</b> | Explain the mechanism of drug actions at cellular and molecular level                                      |     | 3   | 2   |     | 1   | 2   |
| <b>CO3</b> | Understand the adverse effects, contraindications and clinical uses of drugs used in treatment of diseases |     | 2   | 3   |     | 1   | 3   |

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Department: **Pharmaceutical Sciences & Technology**

Program: **M. Pharmacy**

|  |  |   |
|--|--|---|
| <b>Subject:</b> Pharmacological & Toxicological Screening Methods- I | <b>Subject Code:</b> <b><u>MPL103T</u></b> | <b>Semester:</b> <b><u>1<sup>st</sup></u></b> |
| <b>Credit:</b> <b><u>4</u></b>                                       | <b>L T P</b> <b><u>4 0 0</u></b>           | <b>Duration:</b> <b><u>60 Hrs.</u></b>        |

| COs        | Statement   | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 |
|------------|---|-----|-----|-----|-----|-----|-----|
| <b>CO1</b> | Appraise the regulations and ethical requirement for the usage of experimental animals.   |     | 1   | 2   |     |     | 2   |
| <b>CO2</b> | Describe the various animals used in the drug discovery process and good laboratory practices in maintenance and handling of experimental animals |     | 2   | 2   | 3   | 1   | 3   |
| <b>CO3</b> | Describe the various newer screening methods involved in the drug discovery process   |     | 2   | 3   |     | 1   | 3   |
| <b>CO4</b> | Appreciate and correlate the preclinical data to humans   | 2   |     | 3   |     |     | 3   |

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Program: **M. Pharmacy**

|   |                                     |  |
|---|-------------------------------------|--|
| <b>Subject:</b> Cellular and Molecular Pharmacology | <b>Subject Code:</b> <u>MPL104T</u> | <b>Semester:</b> <u>1<sup>st</sup></u> |
| <b>Credit:</b> <u>4</u>                             | <b>L T P</b> <u>4 0 0</u>           | <b>Duration:</b> <u>60 Hrs.</u>        |

| COs | Statement   | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 |
|-----|---|-----|-----|-----|-----|-----|-----|
| CO1 | Explain the receptor signal transduction processes.   |     | 2   | 2   |     |     | 2   |
| CO2 | Explain the molecular pathways affected by drugs.   |     | 3   | 2   |     |     | 2   |
| CO3 | Appreciate the applicability of molecular pharmacology and biomarkers in drug discovery process |     | 3   | 3   |     | 1   | 3   |
| CO4 | Demonstrate molecular biology techniques as applicable for pharmacology                         | 1   | 2   | 1   |     |     | 2   |

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Program: **M. Pharmacy**

|  |                                     |  |
|--|-------------------------------------|--|
| <b>Subject:</b> Pharmacology Practical - I | <b>Subject Code:</b> <u>MPL105P</u> | <b>Semester:</b> <u>1<sup>st</sup></u> |
| <b>Credit:</b> <u>6</u>                    | <b>L T P</b> <u>0 0 6</u>           | <b>Duration:</b> <u>180 Hrs.</u>       |

| COs | Statement  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 |
|-----|--|-----|-----|-----|-----|-----|-----|
| CO1 | Able to perform handling of experimental animals.  |     | 2   | 3   |     |     | 2   |
| CO2 | To study techniques of blood sampling, anesthesia and euthanasia of experimental animals.              |     | 1   | 2   |     |     | 2   |
| CO3 | To perform different functional observation battery tests.   |     | 1   | 1   |     |     | 1   |
| CO4 | To evaluate activity of compounds belonging to different classes of drugs.                             | 1   | 2   | 2   | 1   | 1   | 2   |
| CO5 | Appraise the regulations and ethical requirement for the usage of experimental animals.                | 1   | 1   | 1   | 2   | 2   | 2   |
| CO6 | Able to understand the theoretical and practical skills of the instruments of Pharmacology laboratory. | 1   | 2   | 1   |     |     | 2   |

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|  |                                     |                                 |
|--|-------------------------------------|---------------------------------|
| <b>Subject:</b> Advanced pharmacology - II | <b>Subject Code:</b> <u>MPL201T</u> | <b>Semester:</b> <u>2nd</u>     |
| <b>Credit:</b> <u>4</u>                    | <b>L T P</b> <u>4 0 0</u>           | <b>Duration:</b> <u>60 Hrs.</u> |

| COs | Statement  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 |
|-----|--|-----|-----|-----|-----|-----|-----|
| CO1 | Explain the mechanism of drug actions at cellular and molecular level                                      |     | 3   | 2   |     | 1   | 2   |
| CO2 | Discuss the Pathophysiology and pharmacotherapy of certain diseases  |     | 2   | 1   |     | 1   | 2   |
| CO3 | Understand the adverse effects, contraindications and clinical uses of drugs used in treatment of diseases |     | 3   | 3   |     |     | 3   |

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|  |                              |  |
|--|------------------------------|--|
| <b>Subject:</b> Pharmacological and toxicological screening Methods-II | <b>Subject Code:</b> MPL202T | <b>Semester:</b> <u>2<sup>nd</sup></u> |
| <b>Credit:</b> <u>4</u>  | <b>L T P</b> <u>4 0 0</u>    | <b>Duration:</b> <u>60 Hrs.</u>        |

| COs | Statement   | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 |
|-----|---|-----|-----|-----|-----|-----|-----|
| CO1 | Explain the various types of toxicity studies   |     | 1   | 2   |     |     | 3   |
| CO2 | Appreciate the importance of ethical and regulatory requirements for toxicity studies |     | 2   | 2   |     |     | 3   |
| CO3 | Demonstrate the practical skills required to conduct the preclinical toxicity studies |     | 2   | 3   |     | 1   | 3   |

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|  |                                     |  |
|--|-------------------------------------|--|
| <b>Subject:</b> Principles of drug discovery | <b>Subject Code:</b> <u>MPL203T</u> | <b>Semester:</b> <u>2<sup>nd</sup></u> |
| <b>Credit:</b> <u>4</u>                      | <b>L T P</b> <u>4 0 0</u>           | <b>Duration:</b> <u>60 Hrs.</u>        |

| COs | Statement  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 |
|-----|--|-----|-----|-----|-----|-----|-----|
| CO1 | Explain the various stages of drug discovery   |     | 3   | 2   | 1   | 2   | 2   |
| CO2 | Appreciate the importance of the role of genomics, proteomics and bioinformatics in drug discovery |     | 3   | 2   | 1   | 2   | 2   |
| CO3 | Explain various targets for drug discovery.  |     | 2   | 2   | 1   | 1   | 2   |
| CO4 | Explain various lead seeking method and lead optimization  |     | 2   | 1   | 1   | 1   | 2   |
| CO5 | Appreciate the importance of the role of computer aided drug design in drug discovery              |     | 2   | 2   | 1   | 2   | 2   |

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|   |                                     |  |
|---|-------------------------------------|--|
| <b>Subject:</b> Clinical Research and Pharmacovigilance | <b>Subject Code:</b> <u>MPL204T</u> | <b>Semester:</b> <u>2<sup>nd</sup></u> |
| <b>Credit:</b> <u>4</u>                                 | <b>L T P</b> <u>4 0 0</u>           | <b>Duration:</b> <u>60 Hrs.</u>        |

| COs | Statement  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 |
|-----|--|-----|-----|-----|-----|-----|-----|
| CO1 | Explain the regulatory requirements for conducting clinical trial                          |     | 2   | 2   |     |     |     |
| CO2 | Demonstrate the types of clinical trial designs  |     | 1   | 2   |     |     |     |
| CO3 | Explain the responsibilities of key players involved in clinical trials                    |     | 1   |     |     |     |     |
| CO4 | Execute safety monitoring, reporting and close-out activities                              |     | 1   |     |     |     |     |
| CO5 | Explain the principles of Pharmacovigilance  |     | 2   |     |     |     |     |
| CO6 | Detect new adverse drug reactions and their assessment                                     |     | 2   |     |     |     |     |
| CO7 | Perform the adverse drug reaction reporting systems and communication in Pharmacovigilance |     | 2   |     |     |     |     |

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|  |                                     |  |
|--|-------------------------------------|--|
| <b>Subject: <u>Pharmacology Practical-II</u></b> | <b>Subject Code: <u>MPL205P</u></b> | <b>Semester: <u>2<sup>nd</sup></u></b> |
| <b>Credit: <u>6</u></b>                          | <b>L T P <u>0 0 6</u></b>           | <b>Duration: <u>180 Hrs.</u></b>       |

| COs        | Statement  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 |
|------------|--|-----|-----|-----|-----|-----|-----|
| <b>CO1</b> | To appraise the regulations and ethical requirement for the usage of experimental animals. |     | 1   | 3   |     |     | 2   |
| <b>CO2</b> | To understand and evaluate different samples using bioassays.                              | 1   | 1   | 2   |     |     | 1   |
| <b>CO3</b> | To record and analyze the DRC, ECG and strength of unknown sample.                         | 1   | 2   | 1   |     |     | 2   |
| <b>CO4</b> | To demonstrate the practical skills required to conduct the preclinical toxicity studies.  | 1   | 1   | 3   |     |     | 3   |

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