## Structure for Second Semester of Master of Pharmacy Course

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Subject</th>
<th>Teaching Scheme</th>
<th>Marking Scheme</th>
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<tbody>
<tr>
<td></td>
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<td>Credits</td>
<td>Theory Practical Ext Intl Ext Intl</td>
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<tr>
<td>1.</td>
<td>Research Methodology</td>
<td>07</td>
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<td>2.</td>
<td>Subject Specialization of Paper – III</td>
<td>07 08</td>
<td>80 20</td>
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<td>3.</td>
<td>Subject Specialization of Paper – IV</td>
<td>08</td>
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<td><strong>Total</strong></td>
<td><strong>22 08</strong></td>
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**Total Credits:** 22
1. Research-Meaning, purpose, Types, (Educational, Clinical, Experimental, Historical descriptive, Basic allied and Patent oriented Research) objective of Research
2. Literature survey-Use of Library, books and journals-Medlines-Internet, Patent Search, and reprints of articles as a source for Literature survey.
3. Selecting a problem and preparing Research proposals
4. Methods and tools use in research –
   A. Qualities studies, quantitative studies
   B. Simple data organization descriptive data analysis,
   C. Limitation & sources of Error
   D. Inquiries in form of Questionnaire, etc.
5. Documentation-
   A. “How” of documentation
   B. Techniques of documentation
   C. Importance of documentation
   D. Use of computer packages in documentation.
   Different parts of the Research paper
   1. Title –Title of project with authors name
   2. Abstract- Statement of the problem, Background list in brief and Purpose and scope.
   3. Key Words.
   5. Results- tables, graphs, figures & statistical presentation
   6. Discussion support or non support of hypothesis, practical & theoretical Implications
   7. Conclusion
   8. Acknowledgements.
   9. References
   10. Errata
   11. Importance of Spell check for entire project
   12. Uses of footnotes
7. Presentation (especially for oral presentation)
   Importance, types different skills, contained, format of model, introduction, Poster, Gestures, eye contact, facial, expressions, stage, fright, volume- pitch, speed, pause & language, Visual aids & seating, Questionnaire
9. Sources for procurement research grants – international agencies, Government and private bodies.
10. Industrial-institution interaction- Industrial projects, their, feasibility reports. Interaction with industries.
References Books:

1. Research in Education- John V. Best, John V. Kahn 7th edition
2. Presentation skills - Michael Hallon- Indian Society for Institute education
3. Practical Introduction of Copyright - Gavin Mcfarlane
5. Scientist in legal Systems- Ann labor science
7. Writing a technical paper- Donald Menzel
9. Protection of industrial Property rights- P. Das & Gokul Das
10. Spelling for the millions- Edna Furmees
11. Preparation for publication – King Edward Hospital Fund for London
12. Information Technology – The Hindu speaks
15. Manual for the preparation of industrial feasibility studies

2. Stereochemistry and Chiral Techniques.
   a. Principles of stereochemistry pincluding pgeometric pisomerism, poptical isomerism and conformational isomerism.
   b. Stereochemistry of compounds with asymmetric plane.
   d. Role of stereochemistry in pharmacokinetics and pharmacodynamics

3. Synthon Aroach:
Definition, terms and abbreviation, rules and guidelines used in synthesis of following drugs.
Pyrimethamine, pIbuprofen, pDiclofenac, pRosiglitazone, pCetirizine, pCiprofloxacin, Captopril, and Losartan

4. Green Chemistry:: Solvent free reaction, water as a solvent, ionic liquids, supercritical liquids, supported reagents and catalyst.

5. Introduction to microwave reactions, ultrasound reactions, nanochemistry

Specialization paper - III
Advance Organic Chemistry- II
Practical
(Six hours per week, 8 credits)

Laboratory pexamination pincluding poral pand practical pexamination pin pgeneral pcourse illustrative of theory section in the syllabus.

Reference Books:
4. Jie Jack Li - Name Reactions, Springer
5. Eliel – Stereochemistry of Carbon Compounds
6. S. Warren - Designing Organic Synthesis, Wiley India Ltd.
8. C. Oliver Ka e and others – Practical Microwave Synthesis for Organic Chemist, Willey Interscience.
9. G. B. Sergeev – Nanochemistry, Elsevier publication
2. Various targets for drug action and theory of drug action – agonist, antagonist, blockers and enzyme inhibition (IC50, EC50 concept) - an overview
3. A general study of stereochemistry and physicochemical properties of the drug/drug-like molecules and their importance in drug action. Correlation between physicochemical properties and drug action, establishing structure activity relationship (SAR) and its analysis. Isosterism and bio-isosterism as guides to structural variations and Prodrug design its application in lead optimization.
4. Various approaches to drug discovery
   a. 3D QSAR – importance and various models (COMFA, MSA, HASL, Apex 3D, DISCO, GFA) used for it.
6. Computer Aided Drug Design (CADD) – Molecular modeling
   a. Basic concepts of computational chemistry like Quantum Mechanics, Molecular Mechanics, Force Field, Energy minimization, Conformational generation and analysis, geometry optimization, Molecular Dynamics
   b. Ligand based drug design, Analogue approach, Pharmacophore Mapping, importance of ligand shape and Excluded volume techniques, Artificial intelligence methods.
   c. Structure based drug design, requirement of SBDD, utilization of target structure derived from NMR and X-ray crystallography techniques, understanding of drug–receptor/enzyme/target interactions, preparation of protein/target along with active site analysis, docking process, various docking methods. De-novo drug design.
   d. Drug design based on antagonism and enzyme inhibition. Various software used in CADD
7. Virtual screening of huge compound databases by using Pharmacophore mapping as well as docking methods
8. Pharmacokinetics (Absorption, Distribution, Metabolism Elimination i.e. ADME) in drug discovery.

References Books:

2. H Smith & H J William – Introduction to the Principal of Drug Design, John Wright & Sons Ltd.
7. Molecular Modeling in Drug Design by Cohen N. C.
8. C. G. Wermuth - The Practice of Medicinal Chemistry, Elsevier publication.