

# Practical Pharmaceutical Organic Chemistry I and II

Course Codes **BP208P** and **BP305P**

for **Second and Third Semesters Bachelor of Pharmacy**

covers practicals ranging from identification to synthesis of organic compounds. This book is specially designed and edited in accordance with the syllabus framed by the Pharmacy Council of India (PCI) for second and third semesters BPharmacy and second year DPharmacy students. It contains all types of basic organic qualitative analysis including identification test, preliminary test, solubility test, detection of extra elements, detection of functional group, determination of physical constant and identification of the compound, confirmatory test, derivatives preparation, melting point and boiling point determination, synthesis of organic compounds, and construction of molecular models for unknown organic compound.

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**CBS Publishers & Distributors Pvt Ltd**

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ISBN: 978-93-5466-497-7



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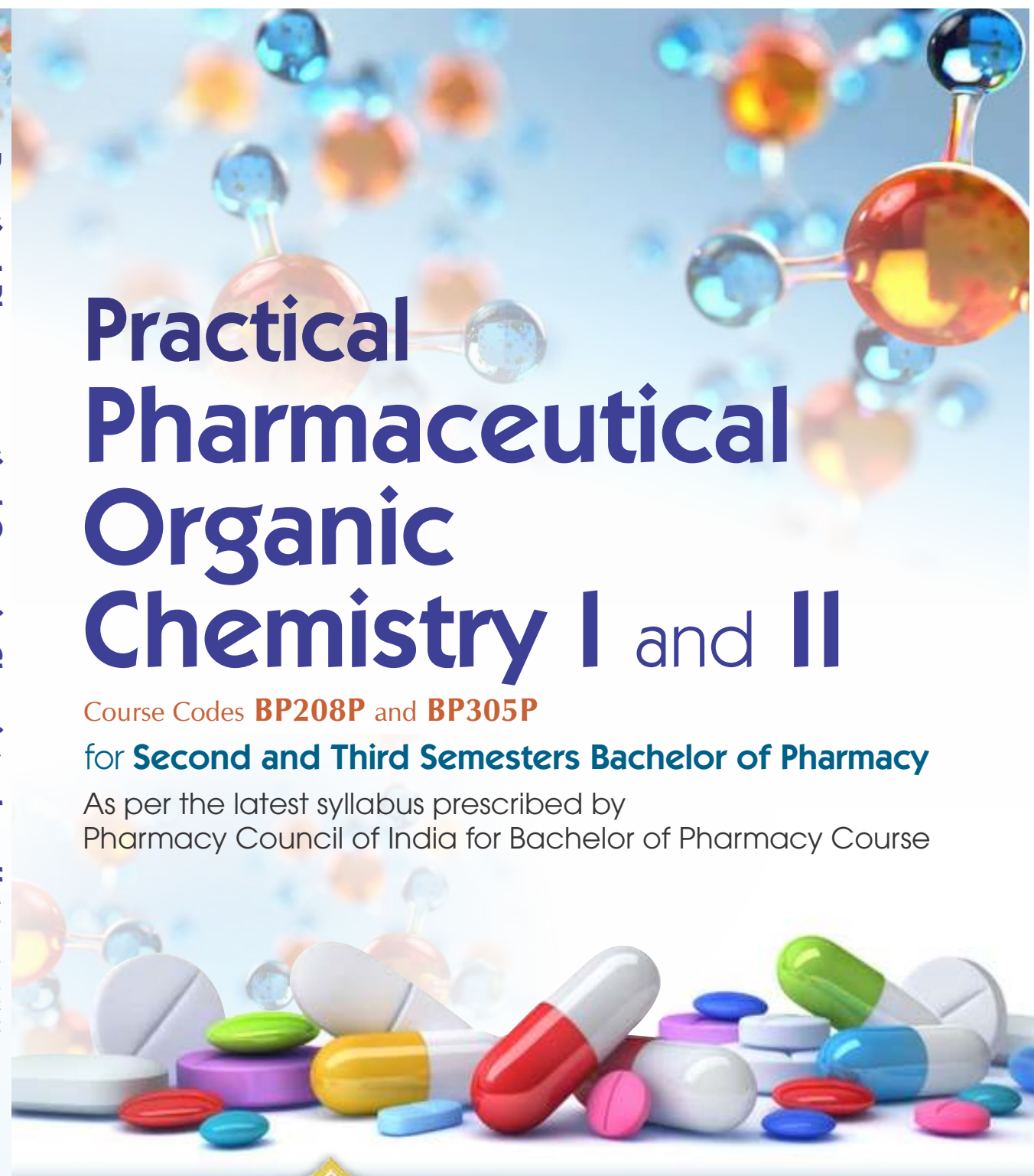
Nema | Sahu  


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As per the latest syllabus prescribed by  
Pharmacy Council of India for Bachelor of Pharmacy Course



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**Rajesh Kumar Nema**  
**Anjali Sahu**

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### Practical Pharmaceutical Organic Chemistry I

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**Experimental Pharmaceutical Organic Chemistry II**  
Course Code: BP305P

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# Syllabus

**BPharm—Semester II**  
**Course Code: BP208P**  
**PHARMACEUTICAL ORGANIC CHEMISTRY I**  
**(Practical)**

4 hours/week

1. Systematic qualitative analysis of unknown organic compounds like
  - a. Preliminary test: Color, odour, aliphatic/aromatic compounds, saturation and unsaturation, etc.
  - b. Detection of elements like nitrogen, sulphur and halogen by Lassaigne's test
  - c. Solubility test
  - d. Functional group test like phenols, amides/urea, carbohydrates, amines, carboxylic acids, aldehydes and ketones, alcohols, esters, aromatic and halogenated hydrocarbons, nitro compounds and anilides.
  - e. Melting point/boiling point of organic compounds
  - f. Identification of the unknown compound from the literature using melting point/boiling point.
  - g. Preparation of the derivatives and confirmation of the unknown compound by melting point/boiling point.
  - h. Minimum 5 unknown organic compounds to be analysed systematically.
2. Preparation of suitable solid derivatives from organic compounds
3. Construction of molecular models

**BPharm—Semester III**  
**Course Code: BP305P**  
**PHARMACEUTICAL ORGANIC CHEMISTRY II**  
**(Practical)**

4 hours/week

- I. Experiments involving laboratory techniques
  - Recrystallization
  - Steam distillation
- II. Determination of following oil values (including standardization of reagents)
  - Acid value
  - Saponification value
  - Iodine value
- III. Preparation of compounds
  - Benzanilide/phenyl benzoate/acetanilide from aniline/phenol/aniline by acylation reaction.
  - 2,4,6-Tribromo aniline/para bromoacetanilide from aniline/acetanilide by halogenation (bromination) reaction.
  - 5-Nitro salicylic acid/meta dinitrobenzene from salicylic acid/nitro benzene by nitration reaction.

- Benzoic acid from benzyl chloride by oxidation reaction.
- Benzoic acid/salicylic acid from alkyl benzoate/alkyl salicylate by hydrolysis reaction.
- 1-Phenyl azo-2-naphthol from aniline by diazotization and coupling reactions.
- Benzil from benzoin by oxidation reaction.
- Dibenzal acetone from benzaldehyde by Claisen-Schmidt reaction.
- Cinnammic acid from benzaldehyde by Perkin reaction.
- P-Iodo benzoic acid from P-amino benzoic acid.

# Safety Instructions to the Students



During working in various laboratories, students should be very careful in performing experiments and follow the appropriate safety procedures practiced in the clinical laboratory that understand proper laboratory safety and increase awareness of the possible risks/hazards involved with laboratory work and to realize that the laboratory is generally a safe place to work (if safety guidelines are properly followed). Here we list some of the most common lab safety rules out there, to help you.

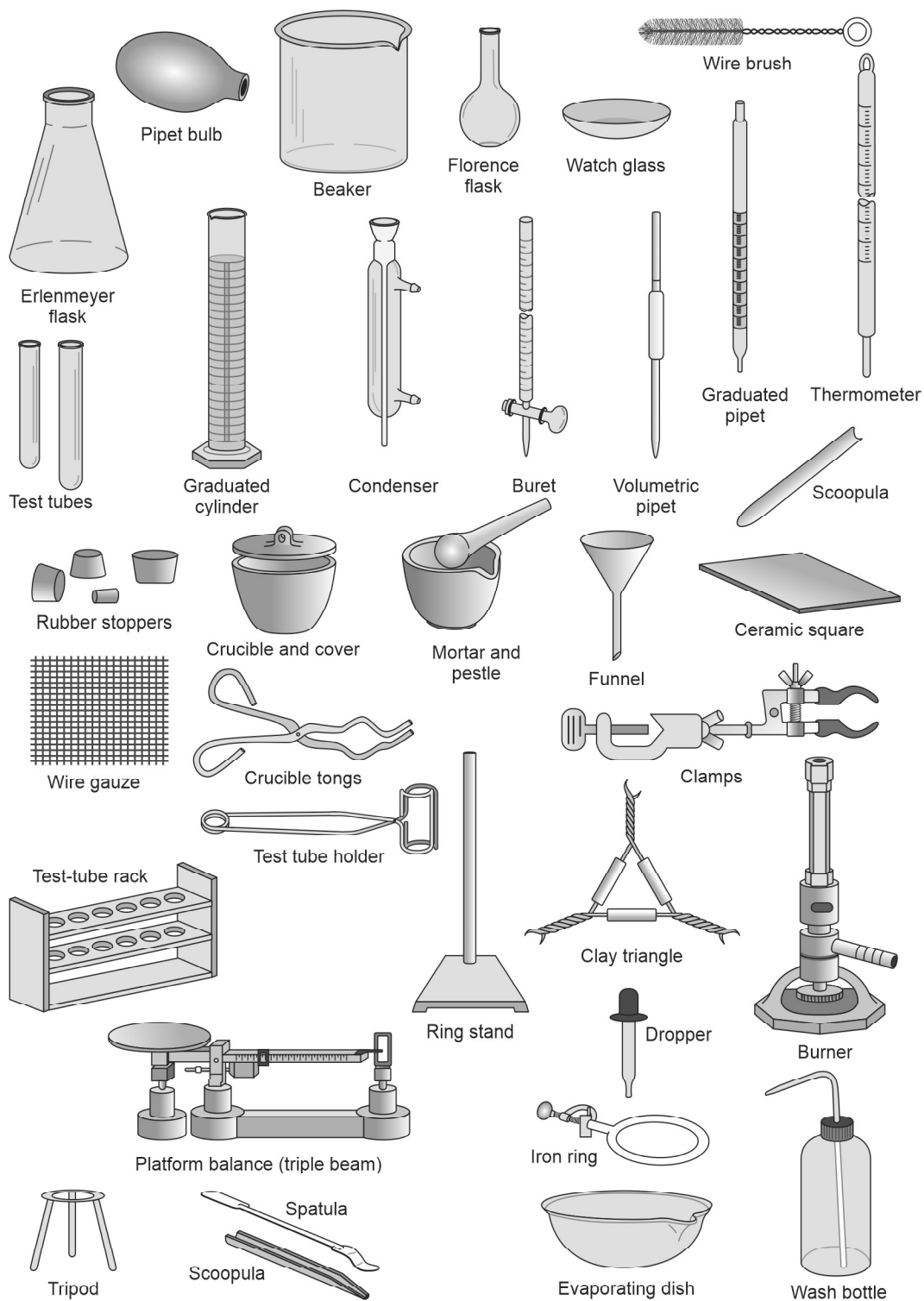
- Always wear a full-length, long-sleeved laboratory coat (apron), should be worn buttoned and wear shoes while working in the laboratory.
- Use safety goggles when required.
- Do not keep your blazer and bags on the bench.
- Wear sensible clothing including footwear. Loose clothing should be secured so they do not get caught in a flame or chemicals.
- Do not use mobile phone in the laboratory.
- Do not eat/drink in the laboratory. Any type of food/chewing gum/gutkha/pan masala/tobacco/smoking are strictly prohibited in the laboratory.
- Always keep the working area tidy and clean.
- Know the standard operating procedures (SOP) of all instruments and follow all instructions given by the teacher.
- Handle all hazardous material safely by following universal precautions at all times.
- All chemicals in the laboratory are to be considered dangerous. Do not taste/sniff chemicals/smell any chemical unnecessarily.
- Never mix the chemicals unless it is required in the experiment. Do not bring the reagent bottle to your seat.
- Use properly cleaned pipettes, droppers and spatulas to take out reagents and solutions.
- Toxic and corrosive materials (acids and alkali) are used frequently. They must be handled with extreme care. Always add acid slowly to water.
- Sodium hydroxide, phenol and bromine are corrosive and can cause serious burns. Use great care to avoid contact with skin, eyes and clothing. In case of accident wash the affected area with plenty of cold water.



- Do not pipette concentrated acids by mouth. Mechanical pipetting devices must be used for pipetting all liquids.
- Use dilute acids or alkaline solutions if concentration is not specified.
- Always use volatile chemicals, strong acid and bases, under ventilating hood. Keep away from flames.
- Many organic solvents are flammable and toxic, e.g. acetone, alcohols and ethers are toxic, so never heat on direct flame. Hot water bath is used. Do not allow any solvent to come into contact with your skin.
- Many organic substances are hazardous to health, so avoid breathing toxic vapors. Before removing any of the contents from a chemical bottle, read the label twice.
- All chemicals should always be clearly labeled with the name of the substance, its concentration, date of preparation.
- Always use weighing bottle/watch glass/butter paper for weighing of chemicals.
- Do not leave lit bunsen burners unattended.
- Open doors and windows and keep the exhaust fan on while working in the laboratory.
- Turn off all electricity switches, heating apparatus, gas valves and water faucets when not in use.
- Open flames/transfer of flame should never be used in the laboratory. Turn off the gas at gas outlet valve after using.
- Use tongs or heat-protective gloves when holding/touching heated apparatus.
- Never point a test tube being heated at another student or yourself. Never look into a test tube while you are heating it.
- Keep solids out of the sink.
- Dispose of lab waste materials properly.
- Know the locations and operating procedures of all safety equipment.
- Know locations and operating procedures of all fire exits, fire extinguishers and fire alarms.
- Never lift any glassware, solutions, or other types of apparatus above eye level.
- Keep your hands dry when working with electricity. Do not use defect sockets, plugs, switches or any other defective pieces of equipment.
- Use glassware with care, used glassware must be cleaned and dried after completion of practical.
- Before leaving the lab, clean all pieces of equipment, glassware and the work area which you have been using. Return equipment and glassware to their proper places in the laboratory.
- Check all electrical and gas devices are switched off before leaving the laboratory.
- Always wash your hands with soap and water before leaving the laboratory.
- Read procedures and precautions carefully and follow them.
- Do not perform unscheduled and unapproved experiments.
- Use common sense while working in the laboratories.

# Common Laboratory Apparatus and Glasswares

## Laboratory Apparatus



### Some Laboratory Glasswares

