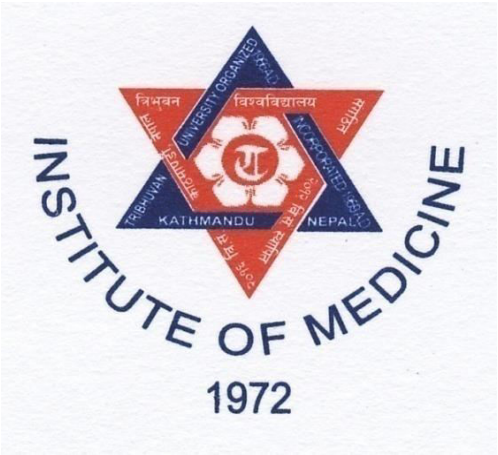
Curriculum

on

Bachelor in Pharmacy

(B. Pharm)



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INSTITUTE OF MEDICINE

NATIONAL CENTRE FOR HEALTH PROFESSIONS EDUCATION

Maharajgunj, Kathmandu, Nepal

2020 (2076

COURSE OF SECOND YEAR

PHARMACEUTICS I (PHYSICAL PHARMACY)

Subject: Theory	Year: Second	Code: BP 501 A
Full Marks: 100	Total Teaching hours: 90	Credit hour: 6

Course Description: The course deals with the various physical, physicochemical properties and principle involved in dosage forms and formulations. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development and stability studies of pharmaceuticals.

General objectives:

At the end of the course, the student will be able to

- **a.** Explain various physicochemical properties of drug molecules in the designing the dosage form
- **b.** Discuss the principles of chemical kinetics & to use them in assigning expiry date for Formulation
- **c.** Demonstrate use of physicochemical properties in evaluation of dosage forms.
- **d.** Discussphysicochemical properties of drug molecules in formulation research and Development

Specific objectives:

Unit 1: Physical properties of Drug molecules [5 Hrs]

After the completion of the course, students will be able to

- a Definephysical properties of drug molecules (surface tension, parachor, viscosity, dissociation constant)
- b Determine these parameters by different experimental method
- c Discuss the application of these parameters

Unit 2: Colligative properties [6 Hrs]

After the completion of the course, students will be to

- a Define and list colligative properties
- b Explain the derivations for relation with molecular weight of solute with vapor pressure, elevation of boiling point,depression of freezing pointand osmotic pressure.
- c Discuss related numerical problems on colligative properties.

Unit 3: Photochemistry [6 Hrs]

After the completion of the course, students will be able to

- a Discuss basic concept of photochemistry including consequences of light absorption
- b Derive Lambert-Beer law
- c Explain First and Second law of photochemistry
- **d** Discuss related numerical problems on Photochemistry

Unit 4: Buffer system [8 Hrs]

After the completion of the course, students will be able to

a Derive Henderson Hasselbalch equation
b Discuss Sorensen's pH scale
c Discuss pH determination methods (electrometric)
d Define buffer capacity
e Mention buffers in pharmaceutical and biological systems
f Describe applications of buffered isotonic solutions
g Discuss related numerical problems on Buffer system.

Unit 5: Solubility [10 Hrs]

After the completion of the course, students will be able to

a Discuss solvent-solute interactions
b Discuss solubility of solid in liquid
c Analyze solubility of partial miscible liquids including critical solution temperature for phenol-water system, Triethylamine-water system and nicotine-water system
d Discuss related numerical problems on solubility

Unit 6: Colloidal solution [5 Hrs]

After the completion of the course, students will be able to

a Defineand classify colloids
b Discuss properties of colloids
c Explain methods of preparation and purification of colloids
d Discuss Tyndal effect and Brownian movement
e Describe stability of colloids
f Discuss protective action of lyophilic sol(gold number).

Unit 7: Rheology [5 Hrs]

After the completion of the course, students will be able to

a Explain Newtonian and Non-Newtonian systems
b Discuss application of Rheology to pharmacy

Unit 8: Distribution law [5 Hrs]

After the completion of the course, students will be able to

a Explain distribution law
b Disucss the limitation and applications of distributin law.
c Discuss effect of molecular association and dissociation (Derivation of equations),
d Describe simple and multiple steps extraction
e Discuss related numerical problems on distribution law.

Unit 9: Rate of reactions [12 Hrs]

After the completion of the course, students will be able to

a Define zero, first and second orders reactions
b Discuss rates and molecularity of a reaction
c Discuss factors influencing rate of reactions

d Discuss derivations of integrated rate equation for zero,first and second order reactions (for only one reactant)
e Explain different methods for determination of order of reaction
f Mention applications of chemical kinetics to the stability testing of pharmaceuticals
g Discuss related numerical problems on Rate of reactions

Unit 10: Surface chemistry [10 Hrs]

After the completion of the course, students will be able to

a Define adsorption and Adsorption isotherms.
b Discuss mechanism and types of adsorption.
c Explain Freundlich and Langmuir theory of adsorption (Derivation of equation)

Unit 11: Micrometrics [4 Hrs]

After the completion of the course, students will be able to

a Define micrometrics
b Discuss particle size distribution
c Describe methods of determining particle size, shape and surface area
d Disucss derived properties of powders.
e Discuss application of micrometrics

Unit 12: Suspension and Emulsion [10 Hrs]

After the completion of the course, students will be able to

a Discuss the concept of suspensions and emulsion
b Discuss ideal requirements of an ideal suspension and emulsion
c Explain mechanism of action of suspending and emulsifying agent
d List the emulsifying and suspending agents used in Pharmacy
e Discuss deflocculation and flocculation of suspensions,
f Discuss rheology of suspensions
g Discuss different types of emulsion and methods for their identification
h Explain formulation of emulsions
i Discuss instability of emulsions
j Discuss related numerical problems onn Emulsion and Suspension.

Unit 13: Chemistry of Complexes compounds [4 Hrs]

After the completion of the course, students will be able to

a Disucss different types of complexes (metal complexes, organic molecular complexes, inclusion compounds)
b Describe different methods of analysis of complexes.

PHARMACEUTICS I (PHYSICAL PHARMACY)

Subject: Practical	Year: Second	Code: BP 501 B
Full Marks: 50	Total Teaching hours: 90	Credit hour: 2

At the end of the course, students will be able to

1. Determine viscosity of newtonian and non-newtonian liquids using Ostwald's viscometer.
2. Determine surface tension of liquids by dropnumber method.
3. Prepare buffers and measure pH using pH meter.
4. Demonstrate flow properties of granules viz. rate of flow, angle of repose, bulk density.
5. Determine partition coefficient of Iodine between water and carbon tetrachloride.
6. Perform verification of Freundlich and Langmuir adsorption isotherms and determination of constants of Freundlich and Langmuir adsorption for adsorption of acetic acid on activated charcoal.
7. Determine Critical Miscelle Concentration (CMC) of a surfactant by surface tension measurements.
8. Demonstrate the kinetics of saponification ethyl acetate with sodium hydroxide.
9. Determine solubility of Benzoic acid and study of additive of electrolyte on the solubility at room temperature.
10. Determine solubility of $BaCl_2$ Gravimetrically.
11. Determine of the sedimentation volume(Physical stability) of suspension.
12. Demonstrate the kinetics of oxidation of potassium Iodide by Iodine clock method.
13. Perform verification of Lambert's Beer's law and determination of the concentration of known solution of unknown strength.
14. Determine the heat of neutralisation of sodium hydroxide and sulphuric acid.

Reference books (Latest Editions)

1. Agrawal S. P. Physical Pharmacy.CBS Publishers and Distributors Pvt Ltd
2. Patrick J. S. Martin's Physical Pharmacy and Pharmaceutical sciences: Physical Chemical and Biopharmaceutical Principles in the Pharmaceutical Sciences. Lippincott Williams & Wilkins.
3. Martin A. M. N, Banker G.S, Chun A.H.C. Advance in Pharmaceutical Sciences. Academic Press London.
4. Mill C.C. Casson N. Rheology of disperse system, Pergamon Press, New Dehli.
5. Subramanyam C.V.S. Physical Pharmacy, Vallabh Prakashan.