

**Bachelor of Pharmacy IInd Semester
(Theory and Practical)**

S No.	Course	Subject name	Credits		Sessional			Exam	Total
			T	P	TA	MSE	Total	ESE	
1	GSP-201	Professional Communication-II	3	0	30	20	50	50	100
2	GSP-202	Pharmaceutical Organic Chemistry I	3	0	30	20	50	50	100
3	GSP-203	Physical Pharmacy-I	3	0	30	20	50	50	100
4	GSP-204	Pharmaceutical Analysis- I	3	0	30	20	50	50	100
5	GSP-205	Unit Operation I	3	0	30	20	50	50	100
6	GSP-206	Human Anatomy Physiology & Pathophysiology-II	4	0	30	20	50	50	100
PRACTICAL									
1	GSP-201P	Professional Communication-I	0	2	30	20	50	50	100
2	GSP-202P	Organic Chemistry I	0	2	30	20	50	50	100
3	GSP-203P	Physical Pharmacy-I	0	2	30	20	50	50	100
4	GSP-204P	Pharmaceutical Analysis- I	0	2	30	20	50	50	100
5	GSP-205P	Unit Operation I	0	2	30	20	50	50	100
Total									1100

T- Theory, P- Practical, TA- Teacher Assessment, MSE- Mid Semester Examination, ESE- End semester examination.

GSP-201

PROFESSIONAL COMMUNICATION-II

UNIT-1.

Grammar: tenses, voice and narration

UNIT-2.

Verbal and Non-Verbal Communication: Media communication, participating in discussions, conduct of seminars and conferences, interacting with learners and teachers, role of wit and humour in communication.

UNIT- 3

Writing Skills: more complex exercises on Letter writing, Précis writing, and Essay writing.

Reading Skills: Passages for comprehension.

Listening Skills: developing listening skills through guided listening exercises.

Speaking Skills: How to prepare for interview, interview questions, interview tips for face to face interviews, mock interview sessions and preparing for question answer sessions.

UNIT- 4.

Word Power for Development of Appropriate Vocabulary: Development of more complex vocabulary, synonyms, antonyms, homonyms and homophones.

UNIT- 5.

Organizational Behaviour: Importance of attitude and its effect on communication, importance of communication in interpersonal and foundations of individual behaviour.

GSP-201P

PROFESSIONAL COMMUNICATION (PRACTICAL)

Experiment based on theory topics.

BOOKS RECOMMENDED:

1. Wren and Martin. Rev. by NDV. Prasad Rao. High School English Grammar and Composition. S. Chand & Company: New Delhi.
2. Robbins, S., Organizational Behaviour. Dorling Kindersley: New Delhi, 2013.
3. Raman, Meenakshi and Sangeeta Sharma. Technical Communication: Principles and Practice. 2nd ed. Oxford University Press: New Delhi, 2011.
4. Miglani, Seema and Shikha Goyal. English for Professionals: A Book of Communication Skills in English. 2nd ed. Nirmal: Kurukshetra, 2013.
5. Steinberg, S. Introduction to Communication Course Book 1: The Basics. 3rd ed. Reprint, The University of South Africa: Cape Town, 2006.
6. Miglani, Seema. Communication Skills. Vayu Education: Delhi, 2009.
7. Cutler, Wade E. Triple Your Reading Speed. Pocket Books: NY, 2002. [Also on Google Books]
8. Gangal, J. K. A Practical Course in Effective English Speaking Skills. PHI Learning: New Delhi, 2012.

9. A Practical Course for Developing Writing Skills in English. PHI Learning: New Delhi, 2011.

GSP-202

PHARMACEUTICAL ORGANIC CHEMISTRY-I

UNIT-1.

Structure and Properties: Atomic Structure, atomic orbital, molecular orbital, hybridization, sigma and Pi bond, covalent, electrovalent and co-ordinate bond, inductive effect, resonance, Classification and Nomenclature of organic compounds.

UNIT-2.

Isomerism, geometrical isomerism, Stereochemistry including optical activity, stereoisomerism, specification of configuration and conformational analysis.

UNIT-3.

Important methods of preparation, reactions with special reference to mechanism of the following classes of compounds: Alkanes, alkenes, alkynes and dienes, free radical substitution reaction, alkyl halides, Alcohols.

UNIT-4.

Aromatic Compounds, aromatic character, structure of benzene, resonance, orientation of aromatic substitution, arenes, amines (aliphatic & aromatic), phenols, aryl halides.

UNIT-5.

Aldehydes and ketones (aliphatic & aromatic), carboxylic acids & their derivatives, di & tricarboxylic acids, hydroxy acids. Organometallic Compounds- Grignard reagent, organolithium compounds, their preparation & synthetic application.

GSP-202P

PHARMACEUTICAL ORGANIC CHEMISTRY-I (PRACTICAL)

1. Identification of elements and functional groups in given organic compounds.
2. Purification of solvents like Toluene Chloroform, Acetone and preparation of absolute Alcohol.
3. Synthesis of compounds involving benzylation and acetylation.
4. Synthesis of Picric acid, Aniline, Acetanilide, Aspirin, Hippuric acid, p- Bromo acetanilide, Iodoform and Oxalic acid.

BOOKS RECOMMENDED:

1. Mann, F.G, & Saunders, B.C., Practical Organic Chemistry, ELBS/ Longman.
2. Vogel A.I., Textbook of Practical Organic Chemistry, ELBS/Longman.
3. Morrison, R.T., and Boyd R.N., Organic Chemistry, Prentice Hall of India Pvt. Ltd, New Delhi.
4. Finar, I.L., Organic Chemistry, Vol. I & II, ELBS/Longman.
5. Jain, M.K. Organic Chemistry, Sohan Lal Nagin Chand & Co. 60 B, Bunglaw Road, Delhi.

6. Hendrikson, Organic Chemistry.
7. Godly, E.W. Naming organic compounds.
8. Kalsi, Organic reactions Stereochemistry & Mechanism.

GSP-203

PHYSICAL PHARMACY– I

UNIT-1.

Matter, Properties of Matter: State of matter, change in the state of matter, latent heats and vapour pressure, sublimation critical point, Eutectic mixtures, gases, relative humidity, liquid complexes, liquid crystals, glassy state, solids crystalline, amorphous and polymorphism.

UNIT-2.

Solubility and Distribution Phenomenon: Solute– solvent interactions, solubility of gases in liquids, solubility of liquids in liquids, solubility of solids in liquids, factors affecting solubility.

UNIT-3.

Buffers: Buffers equations and buffer capacity in general buffers in pharmaceutical systems, preparation, stability buffered isotonic solutions measurements of tonicity, calculations and methods of adjusting isotonicity.

UNIT-4.

Solutions: Ideal and real solutions, solutions of gases in liquids, Colligative properties, partition coefficient, conductance and its measurement Debye Huckel theory.

UNIT-5.

Chemical Kinetics: Zero, first and second order reactions, complex reactions, theories of reaction kinetics, characteristics of homogeneous and heterogeneous catalysis, acid base and enzyme catalysis.

GSP-203P

PHYSICAL PHARMACY– I (PRACTICAL)

1. To determine the distribution coefficient (partition coefficient) of iodine between carbon tetrachloride and water.
2. To plot the mutual solubility curve of phenol- water system and report the critical solution temperature.
3. Determination of rate constant of simple reaction.
4. To determine the percent w/v composition of a sugar solution using polarimeter.
5. To compare theoretical pH values (using Henderson- Hasselbalch equation) with the experimental values (using ph meter).
6. Determine the pH given solution using universal indicator system.
7. To determine dissociation constant (k_a or pK_a) of a weak acid (acetic acid) using conductivity meter
8. To determine the molecular weight of a nonvolatile substance by ebullioscopic method (Landsberger's method)
9. To determine the molecular weight of a substance using the principle of freezing point depression method (Rast- Camphor method).

10. To determine solubility of solids (benzoic acid) at different temperatures and to determine the molar heat of fusion of benzoic acid.
11. To determine solubility of three liquids co-existing together (co-solvency effect).
12. To prepare buffer solution as given IP.

BOOKS RECOMMENDED:

1. Martin A, Bustamante P. & Chun A.H.C- Physical Pharmacy, Lea & Febiger, Philadelphia
2. Pali S.R., and Prabartak, S.K.D.E., Practical Physical Chemistry, Haltone Limited, Calcutta.
3. Shoemaker, D.P. Garland, C.W., Experiments of Physical Chemistry, MC Graw Hill Book Co.
4. Bahl B.S., Tuli G.D. & Bahl Arun, Essential of Physical Chemistry, S. Chand & Co.
5. Negi A.S. & Anand S.C. Textbook of Physical Chemistry Wiley Eastern Ltd.
6. Glasstone S. & Lewis D, Elements of Physical Chemistry, Macmillan Education.
7. Atkins P & Paula, J.D. Atkins Physical Chemistry Oxford University Press.

GSP-204**PHARMACEUTICAL ANALYSIS – I****UNIT -1.**

General Concept Of Analysis: Significance of quantitative analysis in quality control, different techniques of analysis, preliminaries and definitions, precision and accuracy, Fundamentals of volumetric analysis, methods of expressing concentration, primary and secondary standards.

UNIT 2.

Acid Base Titration: Acid-base concepts, role of solvent, relative strengths of acids and bases, ionization, law of mass action, common-ion effect, ionic product of water, pH, hydrolysis of salts, Henderson-Hasselbach equation, buffer solution, neutralization curves, acid-base indicators, theory of indicators, choice of indicators, mixed indicators, polyprotic system.

UNIT 3.

Oxidation Reduction Titrations: Concepts of oxidation and reduction, redox reactions, strengths and equivalent weights of oxidizing and reducing agents, theory of redox titrations, redox indicators, oxidation reduction curves, iodimetry and iodometry, titrations involving ceric sulphate, potassium iodate, potassium bromate, potassium permanganate, potassium dichromate.

UNIT 4.

Precipitation Titrations: Precipitation reactions, solubility products; effect of acids, temperature and solvent upon the solubility of precipitate. Argentometric titrations and titrations involving ammonium or potassium thiocyanate, Gaylussac methods, Mohr's method, Volhard's method and Fajan's methods.

Gravimetric Analysis: Precipitation techniques, Solubility products; Digestional washing of the precipitate, filtration, Filter papers and crucibles, Ignition, Thermogravimetric curves, Specific examples like barium as barium sulphate, aluminium as aluminium oxide, Organic precipitants.

UNIT 5.

Complexometric Titrations: Introduction, titration curves, types of EDTA titrations, titration of mixtures, metal ion indicators, standard EDTA solutions.

GSP-204P**PHARMACEUTICAL ANALYSIS–I (PRACTICAL)**

1. To study the analytical balance and calibrate the weights provided in the weight box
2. To calibrate the given volumetric flask of 100ml. and 50ml.

Acid base titration

3. To prepare 1 N HCL and standardize it.
4. To prepare 0.1N H₂So₄ and standardize it.
5. To prepare 0.1 N NaOH and standardize it against succinic acid / oxalic acid.
6. To prepare 0.1N H₂So₄ and standardize it against previously standardize NaOH.
7. To perform the assay of Boric Acid.

8. To perform the analysis of mixture of boric acid and borax.
9. To perform the analysis of mixture of Sodium bi carbonate and Sodium carbonate.
10. To perform the analysis of mixture of Sodium carbonate and Sodium Hydroxide.

Oxidation – reduction titration

11. To prepare 0.1N KMnO_4 and standardize it against oxalic acid / sodium oxalate.
12. To perform assay of $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$
13. To prepare 0.1N $\text{Na}_2\text{S}_2\text{O}_3$ solution and standardize it.
14. To prepare and standardize 0.05N iodine solution.
15. Assay of ascorbic acid.

Precipitation and Complexometric methods

16. To prepare 0.1N AgNO_3 . And standardize it.
17. To prepare 0.1 N NH_4SCN / NaCl solution and standardize it against previously standardized AgNO_3 solution.
18. Preparation and standardization of 0.05M disodium EDTA solution.
19. Determination of the percentage of CaCO_3 / MgSO_4 .

BOOKS RECOMMENDED:

1. Beckett. AH. and Stanlake, J.B. Practical Pharmaceutical Chemistry, Athilone Press, London.
2. Barner JD, Thomas MJK, Mendham J. and Denney RC. Vogel's Textbook of Quantitative Inorganic Analysis including Elementary Instrumental Analysis. The ELBS and Longman London,
3. Atherden, I.M. Bentley and Driver's Text book of Pharmaceutical Chemistry. Oxford University Press, Delhi.
4. Gary, D.C. Analytical Chemistry. John Wiley and Sons, New York,
5. Alexeyev, V., Quantitative Analysis. Mir Publishers, Moscow.

GSP-205

UNIT OPERATION- I

UNIT-1.

Centrifugation: Principle, Factor affecting centrifugation, Material of construction, Applications advantages and disadvantages of perforated basket centrifuge, tubular bowl centrifuge, conical disc centrifuge, ultra centrifuge.

UNIT-2.

Basis of Unit Operations: Mechanism of Fluid flow, Significance of Reynolds Number, Distribution of Velocities across the Tube, Heat Transfer, Methods of Heat Transfer, Combination of Heat Transfer Methods, Mass Transfer, Solid / Fluid Mass Transfer, Application in Unit Operation.

UNIT- 3.

Size Reduction: Objectives, Factors Affecting, Energy Requirements, Mechanisms, Methods of size reductions. Equipments used- Principle, material of construction, Applications advantages and disadvantages of cutter mill, hammer mill, roller mill, ball mill, fluid energy mill, wet grinding.

Size Separation: Standards for Powders, Pharmacopoeal classification, Sieves, Materials used for Sieves, Sieving Methods, Fluid Classification Methods, Sedimentation and Elutriation, Equipments used: Principle, material of construction, Applications advantages and disadvantages of cyclone separator, sedimentation tank.

UNIT-4.

Mixing: Definition and objectives, Type of Mixtures, Liquid Mixing, Powder Mixing, Semi solids, mixing equipment: Principle, material of construction, Applications advantages and disadvantages of shaker mixer, propeller mixer, turbine mixer, paddle mixer, planetary mixer, double cone mixer, V mixer, sigma mixer and colloid mill, ultrasonic mixer.

UNIT- 5.

Filtration: Factors Affecting, Rate of Filtration, Properties of the filter medium and filter cake, Mechanism of Filtration, Filter Media and aids, Principle, material of construction , Applications advantages and disadvantages of Industrial Filters, Filter Leaf, Filter Press, Rotary Filter, membrane filter, ultra filter, Edge Filter and filters for gases.

GSP-205P

UNIT OPERATION- I (PRACTICAL)

Experiment based on theory topics.

BOOKS RECOMMENDED.

1. Badger W.L. and Banchemo J.T. Introduction to Chemical Engineering Mc Graw Hill International Book Co., London.
2. Perry R.H. & Chilton C.H. Chemical Engineers Handbook, Mc Graw Kogakusha Ltd.

3. McCabe W.L. and Smith J.C. Unit Operation of Chemical Engineering Mc Graw Hill International Book Co., London.
4. Sambhamurthy, Pharmaceutical Engineering, New Age Publishers.
5. Cooper and Gunn's Tutorial Pharmacy, CBS Publishers, New Delhi.

GSP-206

HUMAN, ANATOMY, PHYSIOLOGY AND PATHO PHYSIOLOGY -II

UNIT-1.

Autonomic Nervous System- Physiology and functions of the autonomic nervous system. Mechanism of neurohumoral transmission in A.N.S.

UNIT-2.

Urinary System: Various parts, structures and functions of the kidney and urinary tract. Physiology of urine formation and acid -base balance.

UNIT-3.

Reproductive System- Male and female reproductive systems and their hormones, physiology of menstruation, coitus and fertilization, Sex differentiation, spermatogenesis and oogenesis.

UNIT-4.

Pathophysiology Of The Diseases- Cryptorchidism, testicular atrophy, proctitis, carcinoma of prostate, syphilis, gonorrhoea, ectopic pregnancy, preeclampsia, trichomoniasis, genital herpes simplex.

UNIT-5.

Concepts Of Health & Disease- agents causing communicable diseases & prevention of disease. Classification of food requirements, Balanced diet, Nutritional deficiency disorders, their treatment & prevention, specification for drinking water.

BOOKS RECOMMENDED.

1. Ross and Wilson, Human anatomy and Physiology, Churchill Livingstone London.
2. Guyton AC, Hall JE, Text book of Medical Physiology, WB Saunders Company.
3. Robbins SL, Kumar V, Basic Pathology, WB Saunders.
4. Chatterjee, C.C, Human Physiology, Medical allied agency, Calcutta.
5. Shalya, Subhas, Human Physiology, CBS Publisher, New Delhi.
6. Chaurasia, B.D, Human anatomy, Regional and applied. Part-1, CBS publisher, New Delhi
7. Ranade VG, Test book of Practical Physiology, Pune Vidyarthi Griha Prakashan.