SWAMI VIVEKANAND UNIVERSITY, SIRONJA, SAGAR (M.P.)

SYLLABUS

For
Bachelor of Pharmacy
Course Code: BPY

Department of Pharmacy
Faculty of Pharmacy

Duration of Course	:	4 Year
Examination Mode	:	Semester
Examination System	:	Grading

Swami Vivekanand University, Sironja, Sagar (M.P.)
2014-2015

Swami Vivekanand University, Sagar (M.P.)

Semester-I

Remedial Mathematics (BPY-0101(A))

Paper code	Title of the Paper	Periods Per week				Distribution of Marks										Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d = a+c)	Practical		LW (g)	Total (h= e+g)			
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)					
BPY-0101 (A)	Remedial Mathematics	4	-	-	4	70	22	20	10	100	-	-	-	-		100	3 Hrs

UNIT I — Marks: 14

Trigonometry: Measurement of angle, T-ratios, addition, subtraction and transformation formulae, T-ratios of multiple, sub multiple, allied and certain angles. Application of logarithms in pharmaceutical computations.

UNIT II — Marks: 14

Analytical plane Geometry: Certain Co-ordinates, Distance between two points, area of triangle, a locus of points, straight line, slope and intercept form, double-intercept form, normal (perpendicular form), slope-point and two point form, general equation of first degree.

UNIT III — Marks: 14

Calculus:

Integral: Integration as inverse of differentiation, indefinite integrals of standard forms, integration by parts, substitution and partial fractions, formal evaluation of definite integrals.

Differential: Limits and functions, definition of differential coefficient, Differentiation of standard functions including function of a function (Chain rule). Differentiation of implicit functions, logarithmic differentiation, parametric differentiation, successive differentiation.

UNIT IV — Marks: 14

Algebra: Equation reducible to quadratics, Simultaneous equations (linear and quadratic), Determinations. Properties of solution of simultaneous equations by Cramer's rule, Matrices, definition of special kinds of matrices, arithmetic operations on matrices, inverse of a matrix. Solution of simultaneous equations by matrices, pharmaceutical applications of determinants and matrices, Evaluation on Enl, En2 and En3.

UNIT V **Marks: 14**

Menstruation and its pharmaceutical applications. Measures of Central Value objectives and pre-requisites of an ideal measure, Mean, Mode and median.

Recommended Books

1. Loney S.L., Plane Trigonometry.
2. Ray M., Algebra.
3. Basu K.P., Intermediate Algebra.
4. Paria G., Differential Calculus, Scholar's Publications, Indore.
5. Paria G., Integral Calculus, Scholar's Publications, Indore.
6. Paria G., Co-ordinate Geometry, Scholar's Publications, Indore.

Remedial Biology (BPY 0101(B))

Paper code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d = a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0101(B)	Remedial Biology	4	-	2	6	70	22	20	10	100	30	9	20	50	150	3 Hrs

Unit I — Marks: 14

Structure and Functions:

i. Cell- the unit of life.

ii. Biomolecules – Lipids, polysaccharides, Proteins and nucleic acids. Enzymes and cofactors, their classification, chemistry, mechanism of action and factors affecting enzyme activity.

iii. Cell cycle and cell division, stages of mitosis and meiosis, and their significance.

Unit II — Marks: 14

Genetics Evolution:

i. Principles of inheritance and variation – Mendals laws, Inheritance of one gene and two gene, sex determination, mutation and genetic disorders.

ii. Molecular basis of inheritance – DNA, RNA, Replication, Transcription, Genetic code, Translation, regulation of gene expression, DNA fingerprinting, Human Genome Project.

Unit III — Marks: 14

Evolution: Origin of life, theory of evolution of life forms, Evidences for evolution, Adaptive radiation, Biological evolution, Hardy- Weinberg principle.

Unit IV — Marks: 14

Plant Anatomy and Physiology:

i. Morphology and Anatomy of flowering plant and its parts like root, stem, bark, wood, leaf, flower, fruit and seed. Modification of root and stem.

ii. Transportation, photosynthesis and respiration in plants, Plant growth and development.

iii. Structure of plant cell, Different types of plant tissues and their functions.

Unit V Marks: 14

Living systems:

i. Biological classification – Five kigdoms Monera, Prostita, Fungi, plantae and animalia. Viruses, viroids and lichens.

ii. Animal kingdom - Classification and its basis

iii. Plant kingdom – Algae, bryophytes, Pteridophytes, Gymnosperms, Angiosperms. Plant life cycles and alteration of generations.

List of Practicals

1. To study the simple and compound microscope.
2. To study the microscopic section of the Monocot and Dicot plant.
3. To identify the part of the plant by given section (leaf).
4. To identify the part of the plant by given section (seed).
5. To identify the part of the plant by given section (bark).
6. To identify the part of the plant by given section (stem).
7. To identify the part of the plant by given section (root).
8. To identify and differentiate the parts of the given plant sample morphologically.

Computer Applications (BPY-0102)

Paper code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d = a+c)	Practical					
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)	L W (g)	Total (h= e+g)		
BPY-0102	Computer Applications	4	-	2	6	70	22	20	10	100	30	9	20	50	150	3 Hrs

Unit I — Marks: 14

Introduction to Computer- Its Types and uses, Computer Generations, Hardware, software, Elements of computer system, Number Systems:- Decimal, Binary, Octal, hexadecimal, Storage Devices- primary memory, Secondary Memory, Input and output devices.

Unit II — Marks: 14

Data Transmission and Networks- Basic Concepts LAN, MAN, WAN. Network Topologies, TCP/IP, Worldwide web, URL, HTML. Transmission Media.

Unit III — Marks: 14

Operating system- Basic Concepts, Organization, functions, operations and types, Features of DOS, Windows and Unix operating systems. Dos Commands.

Unit IV — Marks: 14

Application software- Word processing, formatting, printing setups, mail merge, Table Handling, picture handling, spreadsheet programs, workbooks/ worksheets, formatting of sheets, formulae and functions, graphs, Import and export of files / data. Presentation Packages, Slide designing.

Unit V — Marks: 14

Programming – High Level languages, Machine languages, Syntax, semantics. Compiler, Interpreter Algorithms and Flowchart.

Programming Language 'C' – Data types, Constants, variables, Operators, symbolic constants, input and output, increment and decrement operators. Control Structures: while, do- while, for, if, if-else, and switch statement. Functions, header files, recursion, pointers and arrays, structures.

List of Practicals

Introduction to various components of computer, Use of External & Internal DOS Commands, MS- Office – MS Word, MS, Excel, Powerpoint. A simple documentation preparation & printing. Usage of printer & other components. Simple programs in C.

Recommended Books

1. V. Rajaraman: Fundamentals of computer, Iind Edition, East Economy Edition.
2. E. Balaguruseamy: Programming In C, TMH Pub
3. D.S. Yadav: Fundamentals of Information Technology, New Age Publication.
4. P.K. Sinha: Fundamentals of Computer
5. Computer Architecture (Schaum's outline) CARTER, TMH

Pharmaceutics –I (Introduction to Pharmaceutics)
BPY-0103

Paper code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d = a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0103	Pharmaceutics - I	4	-	2	6	70	22	20	10	100	30	9	20	50	150	3 Hrs

Unit I — Marks: 14

History of pharmaceutical practice through ages. Various systems of medicines. Significance of pharmacopoeias with special reference to Indian, British, United States, International and Extra pharmacopoeias.

Unit II — Marks: 14

Definition, general formulation, principles and procedures adopted for dispensing and official products of the following- Solutions, Aromatic waters, Syrups, Mixtures, Elixers, Spirits, Linctuses, liniments, lotions, Mixtures, Glycerites, powders, Gargles, Mouth washes, Inhalations , Ointments, Creams, Pastes, Mucilages, Jellies, Infusion, Decoctions, Tinctures and Extracts, Mucilages, Jellies, Infusion, Decoctions, Tinctures and Extracts, Milk and Magmas, Suppositories and ophthalmics, Suspension, Emulsions, Capsules, Tablet triturates.

Unit III — Marks: 14

Routes of administration and classification of pharmaceutical dosage form.

Unit IV — Marks: 14

Detailed methods employed in the preparation of plant extractives.

Unit V — Marks: 14

Pharmaceutical Calculation: Different systems of weights and measures, Dilution and conc. of solutions, Percentage solution, Calculation by allegation, Proof Spirits, Calculation of doses, Displacement value.

List of Experiments

1. Study Indian Pharmacopoeia, British Pharmacopoeia, United States Pharmacopoeia and Extra Pharmacopoeia.
2. Prepare and submit Aqueous Iodine Solution I.P.
3. Prepare and submit Weak Iodine Solution I.P.
4. Prepare and submit Strong Iodine Solution I.P.
5. Prepare and submit Conc. Dill Water I.P.
6. Prepare and submit Camphor Water I.P.
7. Prepare and submit Simple Syrup I.P.
8. Prepare and submit Simple syrup U.S.P.
9. Prepare and submit Chloroform Water I.P.
10. Prepare and submit Simple elixir I.P.
11. Prepare and submit Cresol with Soap Solution I.P.
12. Prepare and submit chloroxylenol Solution I.P.
13. Prepare and submit Chloroform Spirit I.P.
14. Prepare and submit Turpentine Liniment I.P.
15. Prepare and submit Calamine Lotion I.P.
16. Prepare and submit Calamine Lotion USP, oily.
17. Prepare and submit Liquid.
18. Prepare and submit Milk of Magnesia I.P
19. Prepare and submit Bentonite Magma U.S.P.
20. Prepare and submit Borax Glycerin I.P. Paraffin Emulsion I.P
21. To prepare & submit lubricating jelly with cellulose ether base.
22. To prepare & submit compound syrup of ferrous phosphate IP 55 (Parrishs Food) by chemical interaction.
23. Prepare and submit Tragacanth Mucilage I.P.
24. Prepare and submit Tannic acid Glycerin I.P.
25. Prepare and submit Mandle's Paint. B.P.
26. Prepare and submit Simple Linctuses I.P.
27. Prepare and submit Menthol and Eucalyptus Inhalation B.P.C
28. Prepare and submit orange / lemon Tincture I.P.
29. Prepare and submit compound benzoin Tincture I.P.
30. To prepare & submit codeine linctuses NFI , BNF.
31. To prepare & submit zinc sulphate & zinc chloride mouthwash IP.
32. To prepare & submit Potassium permanganate gargle NFI 1979.
33. To prepare & submit salicylic acid lotion BPC.
34. To prepare magnesium trisilicate mixture BPC.
35. To prepare & submit Chalk mixture pediatric BPC.
36. To prepare & submit magnesium hydroxide mixture BP.
37. To prepare & submit castor oil emulsion NFI .
38. To prepare & submit liquid paraffin & magnesium hydroxide emulsion BPC.
39. To prepare & submit lubricating gel.
40. To prepare & submit Peppermint water IP.
41. To prepare & submit sodium chloride solution IP.
42. To prepare & submit sodium chloride mouthwash .
43. To prepare & submit oral rehydration salt BP.
44. To prepare & submit soap liniment.
45. To prepare & submit sodium alginate jelly.

Recommended Books

1. Indian Pharmacopoeia.
2. British Pharmacopoeia.
3. United State Pharmacopoeia.
4. Lachmen, L. & Lieberman, H.A., "Theory and Practice of Industrial Pharmacy", Verghese publishing house, Bombay.
5. Gennaro, A.R., Remington's "The Science and practice of Pharmacy", Lippincot, Wiliams & Wilkins, Philadelphia.
6. Aulton, M.E., "Pharmaceutics- The science of doses form design", Churchill Livingstone, London.
7. Banker and Rhodes, Modern Pharmaceutics. Marcel Dekker Inc. NY.
8. Kibbe**, "**Hand book of Pharmaceutical Excipients., Pharmaceutical Press, London.
9. Martin, Physical Pharmacy.
10. N. K. Jain, Text Book of Professional Pharmacy, CBS Publishers & Distributors. New Delhi.
11. N.K. Jain, Pharmaceutical product development, CBS Publishers & Distributors. New Delhi.
12. B. M. Mithal, Text Book of Pharmaceutical Formulation.
13. Loyd.V.Allen, Jr. Nicho las, G. Popovich, Howad C. Ansel, Pharmaceutical Dosage Forms & Drug Delivery System.
14. Textbook of Pharmaceutics, Bentley, E.A. Rawlins

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Pharmaceutical Chemistry I (Physical Chemistry)
BPY-0104

Paper code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d = a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0104	Pharmaceutical chemistry-I	4	-	2	6	70	22	20	10	100	30	9	20	50	150	3 Hrs

Unit I — Marks: 14

States of Matter

Gaseous State: Measurable properties of gases; Gas laws - Bo yle's law, Charle's law, Graham's law of diffusion, Avogadro's law, Dalton's law of partial pressure; Concept of Absolute scale of temperature; Ideal gas equation, Kinetic theory of gases; Concept of average, root mean square and most probable velocities; Real gases, deviation from Ideal behaviour, compressibility factor, van der Waals equation, liquefaction of gases, critical constants.

Liquid State: Solutions, Lowering of vapour pressure and Raoult's Law, osmosis and osmotic pressure, measurement of osmotic pressure, isotonic solutions, pharmaceutical applications of osmosis, theories of semipermeable membranes, colligative properties, elevation of boiling point and its experimental determination, depression of freezing point and its determination, distribution law and solvent extraction method, electrolyte and non electrolytes, Debye-Huckel theory, ionic equilibria in blood, characterization of acid base functional groups.

Solid State: Classification of solids: molecular, ionic, covalent and metallic solids, amorphous and crystalline solids (elementary idea); Bragg's Law and its applications, Unit cell and lattices, packing in solids (fcc, bcc and hcp lattices), voids, calculations involving unit cell parameters, imperfect ion in solids; electrical, magnetic and dielectric properties.

Unit II — Marks: 14

Atomic, Molecular Structure and Chemical Bonding

Atomic Structure

Origin of the elements, valency, the mole concept, molar mass, compounds, chemical formulae. Introduction to atomic structure. Electronic configuration of atoms and relationship to structure of the Periodic Table. Properties of atoms, size, ionization potential, electronegativities etc. Quantum numbers, orbitals and the Aufbau process. Rydberg formula, Bohr atom, dual wave/particle nature of light and electrons. Angular and radial wavefunctions of atomic orbitals. H atom spectrum.

Molecular structure and chemical bonding:
LCAO approximation, molecular orbital theory and molecular orbital energy level diagrams. Polarisation and polarisibility of molecules. Molecular orbital electronic configuration of homonuclear diatomic molecules. Hydrogen bonding. Valence bond theory- important features, concept of hybridization involving s, p, d and f orbitals, shapes of molecules, VSEPR theory. Electron spin. Polyelectronic atoms and the orbital approximation. Quantum Mechanics

Postulates of quantum mechanics: Eigenvalues and expectation values. Time independent Schrodinger equation. The Born interpretation of the wavefunction. Solutions for particles in boxes. Schrodinger equation applied to vibrational and rotational motion. Interelectronic repulsion: SCF methodology and Hartree-Fock wavefunctions. Slater type orbitals. Spin-orbit coupling. Atomic states and Hund's rules.

Unit III Marks: 14

Physico-chemical properties of substances
Polarity of substances, dipole moment, dielectric constant, refractive index, optical rotation, density, specific gravity, viscosity, molar refraction, parachor relative permitivity, Bonding and non-bonding interactions, roentgen diffraction, polymorphism, isomorphism, isotroBPY, anisotroBPY, liquid crystals.

Unit IV Marks: 14

Chemical equilibrium
Law of chemical equilibrium, Equilibrium constant, equilibrium degree of conversion and its control by reaction, conditions, LeChatelier principle, standard change of Gibbs energy during reaction, Equilibrium constants and their significance, Factors affecting equilibrium concentration, pressure, temperature , effect of catalyst.Acid-base catalysis, decomposition of medicinal compounds, accelerated stability analysis, kinetics of enzyme catalysed reactions.Integrated rate equations for simple reaction types. Use of integrated rate equations to determine order. Fractional lives. Molecularity *vs*. order
Kinetics of more complex reactions: approach to equilibrium, parallel and consecutive reactions. Rate determining step. Steady state approximation and its uses.Effect of temperature on rate and rate constant. Arrhenius equation, significance of activation energy. Kinetics of reactions in the gas phase - simple collision theory. Reactions in solution - transition state theory. Enthalpy and entropy of activation. Effects of solvent polarity and viscosit y on rates of reaction.Further applications of the steady state approximation - radical chain reactions. General definitions. Stoichiometry *vs* mechanism. Dependence of rate on concentration: rate constant and order of reaction. Experimental determination of rates of reaction. Determination of orders from rate measurements.

Phase equilibrium
Gibbs phase rule, types of systems, one component equilibrium, Clapeyron and Clausius-Clapeyron equations, two component systems, Henry´s law, sparingly miscible

liquids, solubility of solid substances, system solid substance - solvent, melts, Raoult´s law and its application, cryoscoBPY and ebullioscoBPY, osmotic pressure, three component systems, Nernst distribution law, extraction, ternary diagram, system of three liquids, interfacial phenomena, adsorption on solid surfaces. Phase diagram of mixture fractional distillation, eutectic mixtures.

Surface Chemistry

Adsorption: Physisorption and chemisorption and their characteristics, factors affecting adsorption of gases on solids -Freundlich and Langmuir adsorption isotherms, adsorption from solutions.

Catalysis: Homogeneous and heterogeneous, activity and selectivity of solid catalysts, enzyme catalysis and its mechanism. Acid base catalysis, theories of catalysis, catalytic poisoning and Pharmaceutical application of catalysis.

Unit V Marks: 14

Thermodynamics

Fundamentals of thermodynamics: System and surroundings, extensive and intensive properties, state functions, types of processes. Spontaneity of chemical change; Free Energy. Equilibrium; EnthalBPY and EntroBPY and spontaneous change

First law of thermodynamics: Concept of work, heat internal energy and enthalBPY, standard state, thermochemistry, thermochemical laws, heat capacity, molar heat capacity, Hess's law of constant heat summation; Enthalpies of bond dissociation, combustion, formation, atomization, sublimation, phase transition, hydration, ioniz-ation and solution.

Second law of thermodynamics: Spontaneity of processes; ΔS of the universe and ΔG of the system as criteria for spontaneity, ΔG^o (Standard Gibbs energy change) and equilibrium constant.

Third Law of Thermodynamics: calculation of absolute entropies; specific heat; variation in enthalBPY with temperature. Helmholtz and Gibbs energies, chemical potential, conception of absolute entroBPY. Calculations involving entroBPY and enthalBPY; dealing with ions etc. Variation of G and K with temperature: Ellingham Diagrams, Giauque Function.

List of Practicals

1. To study the effect of salt/Sugar in different concentration on density of water.
2. Determination of the viscosity of a liquid by Ostwald viscometer.
3. To study the effect of concentration on viscosity.
4. Determination of specific gravity of liquids using BPYcnometer and density bottle.
5. To study the effect of temperature on density of given liquid.
6. Determination of the surface tension of a pure liquid by the capillary rise method.
7. To determine the surface tension of liquid using stalagmometer.
8. To study the effect of surfactant on surface tension.
9. To study the effect of temperature on surface tension.
10. To study the effect of temperature on viscosity

11. Determination of the percentage composition of mixture of ethanol and water by surface tension method.
12. Determination of interfacial tension between benzene and water by the drop size method.
13. Determination of the percent composition of a mixture of ethanol and water by viscometric method.
14. Determination of distribution coefficient of substance between two immiscible liquids. (succinic acid between ether and distilled water).
15. Determination of the mutual solubility curve of phenol and water.
16. Determination of the parachor value of an organic liquid.
17. Determination of solubility of benzoic acid over a range of temperatures and calculation of its heat of solution.
18. Preparation of buffer solutions and measurement of pH.
19. Distillation of a mixture.
20. Determination of phase diagram in ternary system containing a single pair of sparingly miscible liquids.

Recommended Books

1. P W Atkins, the Elements of Physical Chemistry, 2nd Ed., OUP, 1996
2. P W Atkins, Physical Chemistry 7th Ed., OUP, 2002
3. B G Cox, Modern Liquid Phase Kinetics, Oxford Science Publications, 1994.
4. J.R. Barrante: Physical Chemistry of Life Sciences, Printeil.
5. K.J. Laidler: Physical Chemistry with Biological Applications, Benjamin.
6. S.C. Wallwork: Physical Chemistry for Students of Pharmacy and Biology, Longman.
7. L.M. Atherden: Bentley and Driver's-Textbook of Pharmaceutical Chemistry, Oxford University Press, Delhi.
8. A.J. Mce: Physical Chemistry, E.L. B.S., London.
9. H.H.Willard, L.L. Merritt and J.A. Dean: Instrumental Methods of Analysis, Van Nostrand Reinhold, New York.
10. Samuel Glasstone and David Lewis: Elements of Physical Chemistry, Macmiilan Press, London.
11. A.H. Beckett and J.B. Staenlake: Practical Pharmaceutical Chemistry, Vol. I and II. The Athlone Press of the University of London.
12. Gross J.M. and Wiseall B. Principle of Physical Chemistry, Macdonald and Evans Plymouth, England.
13. Gareth Morris J. A Biologists Physical Chemistry, Edward Arnold, London.
14. Martin A.N. Physical Pharmacy, Lea and Febiger, Philadelphia.
15. Chang R. Physical Chemistry with Application to Biological System. Collier Macmilliar Publisher, London.
16. Barrow G.M. Physical Chemistry. McGraw-Hill, London.
17. Yadav J.B. Advanced Practical Physical Chemistry, Geol Publisher House, Meenet, India.
18. Vogel's Text Book of Quantitative Inorganic Analysis including Elementary Instrumental Analysis, Longman, London.

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Pharmaceutical Chemistry II (Inorganic Chemistry)
BPY -0105

Paper code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d = a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0105	Pharmaceutical chemistry-II	4	-	2	6	70	22	20	10	100	30	9	20	50	150	3 Hrs

Unit I — Marks: 14

Elements and periodicity

Modem periodic law and present form of the periodic table, s, p, d and f block elements, periodic trends in properties of elements- atomic and ionic radii, ionization enthalBPY, electron gain enthalBPY, valence, oxidation states and chemical reactivity.

Unit II — Marks: 14

Essential and Trace Elements

Study the role of essential and trace elements in biological systems and their toxicity.

Major Intra and extra cellular electrolytes: Major physiological ions, electrolytes used in replacement theraBPY, physiological acids-base balance, electrolytes used in acid- base theraBPY, electrolyte combination therapy.

Unit III — Marks: 14

Inorganic Agents

Occurrence, preparation, physical characteristics, chemical properties, purity test, incompatibilities, assay and pharmaceutical uses of inorganic official compounds of the following elements; Aluminum, Sodium, Magnesium, Lithium, Calcium, Iron, Copper, Silver, Antimony, Iodine, Boron, Potassium, Zinc, Nitrogen.

Sources of impurities in pharmaceutical substances

Importance of limit test and general principles and procedure for limit tests of chloride, sulphate, iron, arsenic, lead and heavy metals.

Unit IV — Marks: 14

Reagents: Preparation, properties and uses of the following reagents; Nesslers reagent, boron trifluoride, Grignard reagent, Potassium permanganate, potassium dichromate, Hydrogen peroxide, Iodine solution.

Unit V Marks: 14

Radiopharmaceutical

Basic properties, production, quality control, stability, clinical and medicinal applications of radioisotopes used in pharmacy and medicine preparations of diagnostic and therapeutic agents.

List of Practicals

1. Standardization of hydrochloric acid.
2. Standardization of sodium hydroxide.
3. Standardization of sulphuric acid.
4. Standardization of sodium thiosulphate.
5. Standardization of potassium permanganate.
6. Limit test for Chloride.
7. Limit test for Arsenic.
8. Limit test for Sulfate.
9. Limit test for Lead.
10. Limit test for Heavy metals.
11. Determination of strength of solution of ammonia.
12. Quantitative determination of boric acid.
13. Preparation of Alum (potassium and ammonium).
14. Preparation of Ferrous sulfate.
15. Preparation of dibasic calcium phosphate.
16. Preparation of ferric ammonium citrate.
17. Preparation of light and heavy magnesium oxide.
18. Preparation of magnesium carbonate.
19. Preparation of calcium carbonate.
20. Preparation of magnesium trisilicate.
21. Preparation of zinc sulphate.
22. Assay of ferrous sulphate.
23. Assay of iodine solutions.
24. Assay of sodium bicarbonate
25. Assay of sodium carbonate.
26. Purification of Copper sulfate.

Recommended Books

1. L.M. Atherdon, Bently and Drivers: Textbook of pharmaceutical chemistry, Oxford, University press.
2. Pharmacopoeia of India, Govt. of India, Ministry of Health, Delhi.
3. J.H. Block, E. Roche, T.O. Soine and C. O. Wilson: Inorganic Medicinal and Pharmaceutical chemistry, Lee Febiger, Philadelphia. PA.
4. Roger's Inorganic Pharmaceutical Chemistry of Lea and Febiger, Philadelphia, USA.
5. M. Ali: Text book of Pharmaceutical Inorganic chemistry, CBS, New Delhi.
6. Mellor's Modern Inorganic Chemistry, Longman Green and Co., Ltd., London.
7. Atkins P.W. Physical Chemistry, Oxford 1990 2.
8. Barrow G.M. Physical Chemistry, McGraw-Hill 1989
9. Beckett & Stenlake, Practical Pharmaceutical Chemistry
10. Liptrot G.F. Modern Inorganic Chemistry, Blantyre Printing
11. British Pharmacopoeia, Stationary Press, Royal Society of Pharmaceutical Press, London.
12. United State Pharmacopoeia, United State Pharmacopoeial Convention, Inc., 12601. Twinbrook Parkway, Rockyville M.D. 20852 USA.
13. Lovis F. Fiesev D.C. Experiments in Inorganic Chemistry, Health and Company, Boston.
14. Vogel Text Book of Quantitative Chemical Analysis, Longman, London.
15. Remington Practical of the Science and Pharmacy, Mack Publishing Company, Eston, Pennsylvania, USA.

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Semester-II

Advanced Mathematics BPY-0201

Paper Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d= a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0201	Advance Mathematics	4	-	-	4	70	22	20	10	100	-	-	-	-	100	3 Hrs

UNIT-I **(Marks-14)**

Biometrics: Significant digits and rounding of numbers, data collection, random and non-random sampling methods, sample size, data organization, diagrammatic representation of data, bar, pie, 2-D and 3-D diagrams, measures of central tendency, measures of dispersion, standard deviation, standard error of means, coefficient of variations, confidence (fiducial) limits.

UNIT-II **(Marks-14)**

Differential equations and its Applications: Revision of integral calculus, definition and formation of differential equations, equations of first order and first degree, variable separable, homogeneous and linear differential equations and equations reducible to such types, linear differential equations of order greater than one with constant coefficients, complementary function and particular Integral, Simultaneous linear differential equations, pharmaceutical applications.

UNIT-III **(Marks-14)**

Laplace Transforms: Definition, transforms of elementary functions, properties of linearity and shifting, inverse Laplace transforms, transforms of derivatives, solution of ordinary and simultaneous differential equations.

UNIT-IV **(Marks-14)**

Correlation and regression: Method of least squares, statistical inference, Student's and paired t-test, F-test and elements of ANOVA, kurtosis and skewness, Applications of statistical concepts in Pharmaceutical Sciences.

UNIT-V **(Marks-14)**

Probability: probability and events, Bayes theorem, probability theorems, probability distributions, elements of binomal and poisson distribution, normal distribution curve and properties,

Books Recommended:

1. Paria G., Ordinary Differential Equations with Laplace transform, Scholar's Publications, Indore.

2. Paria G., Differential Calculus, Scholar's Publications, Indore.

3. Paria G., Integral Calculus, Scholar's Publications, Indore.

4. Paria G., Statistics and Stochastic Process Part I and II, Scholar's Publications, Indore.

5. Baisnab A, and M Jas, Introduction to statistics.

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Pharmaceutics-II (Physical Pharmacy) BPY-0202

Paper Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d= a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0202	Pharmaceutics-II(Physical Pharmacy)	4	-	2	6	70	22	20	10	100	30	9	20	50	150	3 Hrs

UNIT-I (Marks-14)

Solubility and Distribution Phenomenon: General principles: the phase rule, solubility expressions; Solvent-solute interaction: polar solvents, nonpolar solvents, semipolar solvents; Solubility of gases in liquids: Effect of pressure, temperature, salting out, effect of chemical reaction; Solubility of liquids in liquids: Ideal and real solution, complete miscibility, partial miscibility, influence of foreign substance, three component systems, dielectric constant and solubility, molecular connectivity, molecular surface are and solubility; Solubility of solids in liquids: Ideal solutions, Phase diagrams and the ideal solubility equation, nonideal solution, extended Hildebrand solubility approach, salvation and association in solutions of polar compounds, solubility and the heat of solution, solubility of strong electrolytes, solubility of slightly soluble electrolytes, solubility of weak electrolyte, the influence of solvents on the solubility of drugs, combined effect of pH and solvents, influence of surfactants; influence of hydrotropic agents on solubility of drugs**.** Distribution of solutes between immiscible solvents.

Diffusion and Dissolution: Concept of diffusion, Study state diffusion: Fick's first law, Fick's second law, study state, Procedure and apparatus. Dissolution: dissolution rate, dissolution of tablets, capsules and granules, Powder Dissolution: The Hixson-Crowell cube Root Law. Drug release: Drugs in polymer matrices, release from granular matrices, multilayer diffusion, membrane control and diffusion layer control phenomenon, diffusion principle in biological system.

UNIT-II (Marks-14)

Micromeritics and Powder Rheology: Introduction, Particle size and size distribution: Average particle size, particle size distribution, number and weight distribution, particle number; Methods for determination particle size: optical microscoBPY, sieving, sedimentation; introduction to latest technique in particle analysis Particle volume measurement; Particle shape and surface area: particle shape, specific surface; Methods for determining surface area: adsorption method, air permeability method, pore size; Derived properties of powders: Porosit y, packing arrangement, densities of powder, bulkiness and flow properties, Compaction: Compressed tablet, Pharmaceutical application.

UNIT-III (Marks-14)

Coarse Dispersion: Suspension: Interfacial properties of suspended particles, Settling in suspensions: theory of sedimentation, effect of Brownian Movement, Sedimentation of flocculated particles, Sedimentation parameters. Formulation of suspensions: Wetting of particles, Controlled flocculation, Flocculation in Structured Vehicles, Rheologic consideration, Preparation of suspensions, Physical stability of suspensions. **Emulsions:** Emulsion types, Pharmaceutical applications, Theories of emulsification, Physical stability of emulsions, Preservation of emulsions, Rheologic properties of emulsions. **Semi-solids**: Gels, Syneresis and swelling, Classification of Pharmaceutical semisolids, Hydrophilic properties of Semisolids, Rheologic properties of semisolids, Universe of Topical Medications. Drug Kinetics in Coarse disperse system, Drug Diffusion in Coarse Disperse Systems.

UNIT-IV (Marks-14)

Surface and Interfacial Phenomenon: Liquid interfaces: surface and interfacial tensions, surface free energy. Measurement of surface and interfacial tensions: Capillary rise method, The DuNouy Ring Method. Adsorption at liquid interfaces: surface active agents, Systems of Hydrophile - Lipophile classification, Type of mono-layers at liquid interfaces. Adsorption at solid interface, the solid-interface, the solid-liquid interface, Activated Charcoal, Wetting, Application of surface-active agents, Electric properties of interfaces.

Viscosity and Rheology: Newtonian Systems: Newton's Law of flow; kinematics viscosity; Temperature dependence and theory of viscosit y. Non-Newtonian Systems: plastic flow, pseudoplastic and dilatant flow. Thixotropy: measurement thixotropy, Bulges and spurs, Negative thixotropy, Thixotropy in formulations. Determination of Rheologic properties: choice of viscometer, Capillary viscometer, Falling sphere viscometer, Cup and bob viscometer, Cone and plate Viscometer, Pharmaceutical application of Rheology

UNIT-V (Marks-14)

Complexation and protein binding: Classification of complexes, methods of preparation and analysis, Pharmaceutical applications. Protien binding: Binding equilibria, equilibrium dialysis and ultrafilration, dyanamic dialysis, hydrophobic interaction, self-association, factors affecting complexation and protein binding.

Buffered and isotonic solutions: The buffer equation: Common Ion Effect and the Buffer Equation for a weak Acid and its salt, The buffer equation for a weak base and its salt. Factors influencing the pH of buffer solutions. Buffer capacity: Calculation of buffer capacity. Buffer in pharmaceutical systems and biologic system: In vivo biologic buffer systems, Pharmaceutical buffers, influence o f buffer capacit y and pH on Tissue Irritation, pH and Solubility. Buffered isotonic solutions: Measurement of tonicity, tonicity calculations, Methods of adjusting isotonicity and pH.

Colloids: Introduction to the dispersed System, Types of colloidal systems, Optical properties of the colloids, kinetic properties of the colloids, electrical properties of the colloids, Solubilization, Pharmaceutical application of the colloids, advanced thermodynamics of Micellization.

List of Practicals:

1. Determine the following derived properties of the given powdered sample
   (a) Flow property (b) Bulk density (c) Granule density
   (d) True density (e) Porosity (f) Carr's Index
   (g) haussner's ratio
2. Determine the particle size and particle size distribution in the given sample of powder by optical microscopy.
3. Determine particle size distribution of the given granules by sieving method.
4. Determine the Critical Micelle Concentration (CMC) of the given surfactant by Surface tension method.
5. Determine the surface tension of the given sample by drop count and drop weight Method.

6. Determine partition coefficient of the given drug between benzene and water or octanol and water system
7. Determine the effect of salt on the solubility of given drug.
8 . Determine the percent composition of an unknown solution of glycerin in water using Ostwald's viscometer
9. Formulate suspension of the given drug and evaluate it for sedimentation parameters.
10. Study the effect of thickening agent concentration on the sedimentation of the suspension of the given drug.
11. Plot phase diagram of phenol-water system
12. Study the effect of shear rate on the flow of 1% methyl cellulose solution.
13. Prepare acetate buffer and compare theoretical pH value with the experimental value.
14. Determine the viscosity of the following Newtonian and Non-Newtonian system
    (a) Water (b) Simple syrup I.P.
    (c) Diclofenac gel (d) Tooth paste
15. Determine the HLB value of the given surfactant
16. Determine the optimum concentration of Bentonite required for the maximum physical stability of calamine lotion.
17. To observe the effect of hydrotropic agent sodium citrate on the solubility of salicylic acid.
18. Evaluate the given sample of emulsion on the following parameters
    (a) Type of emulsion (b) Globule size distribution
    (c) Physical stability (d) Viscosity

Books Recommended:

1. Lachman, L., Lieberman, H.A. and Kanig, J.L., The Theory and Pratice of Industrial Pharmacy, Lea and Philadelphia.
2. Allen, L.V., Popovich, N.G., Ansel, H.C., Ansel's Pharmaceutical Dosage Forms and Drug Delivery Systems, Lippincott Williams and Wilkins.
3. Banker G.S. and Rhode C.T., Modern Pharmaceutics, Marcell Decker Inc., New York.
4. Aulton, M.E., Pharmaceutics The Science of Dosage Form Design, Churchill Livingstone, London.
5. Carter, S.J., Cooper and Gunn's Tutorial Pharmacy, CBS Publishers and Distributors, New Delhi.
6. Martin A., Physical Pharmacy, Lippincott Williams and Wilkins.
7. Gennaro, A.R., Remington: The Science and Practice of Pharmacy, Lippincott Williams and Wilkins.

Swami Vivekanand University, Sagar(M.P.)

Pharmaceutical Chemistry-III (Organic)-BPY-0203

Paper Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d= a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0203	Pharmaceutical Chemistry-III(Organic-I)	4	-	2	6	70	22	20	10	100	30	9	20	50	150	3 Hrs

UNIT-I (Marks-14)

Hydrocarbons: Alkanes and cycloalkanes: Nomenclature, Physical and chemical properties of alkanes, Conformations and Stability of Acyclic Alkanes and Cycloalkanes.

Alkenes and alkynes: Nomenclature, Physical and Chemical properties of alkenes, isomerism, and general methods of preparation.

Aromatic hydrocarbons: Benzene and its homologues (Polynuclear compounds), nomenclature, sources of aromatic hydrocarbons, structure of benzene, chemical reaction of benzyne-mechanism and SNAr Mechanism of nucleophilic substitution. Directive influence of substituents and their effect on reactivity.

Dienes and the Allyl system: Conjugation, Reactivity.

UNIT-II (Marks-14)

Stereochemistry: Stereo-isomerism, classification and Nomenclature, Optical activity, Chirality, R/S Classification of Chiral Carbons. Miscellaneous Stereochemistry, Diastereomers; Racimic modification, Resolution of racimic mixtures.

Structure and Properties: Electronegativity, Polarit y, Resonance; Electrophiles/Nucleophiles, Orbitals, π-Bonds, Hybridization and Shape, Isomerism, Polarity, Intermolecular Forces, isotope effects and isotopic labelling.

Reactive Intermediates: Stability and reactivity of Radicals, Cations, Anions, Nitrene and Nitrenium ion.

UNIT-III (Marks-14)

Organic compounds with functional groups containing oxygen (Part I-): Alcohols: Nomenclature, Synthesis, reactivity of different Alcohols; conversion of Alcohols to Tosylates or Halides.

Phenols: Nomenclature, methods of preparation, physical and chemical properties; chemical reactivity of phenols in electrophilic substitutions, acidic nature of phenol**Ethers:** electronic structure, structure of functional group, nomenclature, important methods of preparation, physical and chemical properties, some commercially important compounds.

Organic compounds with functional groups containing oxygen (Part II): Aldehydes and ketones : Electronic structure of carbonyl group, nomenclature, important methods of preparation, physical properties and chemical reactions, relative reactivity of aldehydic and ketonic groups, aldol condensation. nucleophilic addition reaction to >C=O groups.

Carboxylic acids: Electronic structure of -COOH, Nomenclature, important methods of preparation, physical properties and effect of substituents on α-carbon on acid strength, chemical reactions.

Derivatives of carboxylic acids: Electronic structure of acid chloride, acid anhydride, ester and amide groups, Nomenclature, important methods of preparation, comparative reactivity of acid derivatives.

UNIT-IV (Marks-14)

Organic Compounds with functional group containing Nitrogen:

Structure, Nomenclature of Amino and Diazo Compounds.

Amines: Primary, secondary and tertiary amines, a general awareness, important methods of preparation, physical properties, basic character of amines, chemical reactions.

Diazonium salts: Preparation, chemical reaction and uses of Benzene diazonium chloride. Some commercially important nitrogen containing carbon compounds, (Aniline, TNT)

UNIT-V (Marks-14)

Organic compounds with functional groups containing halogens (X):

Nomenclature, Structure, Properties, Reactivity of Alkyl Halides (haloalkanes and haloarenes): The SN2 and SN1 Substitution Reaction, The E1 and E2 Elimination Reactions, Substitution vs. Elimination reaction, reactivity of C-X bond in haloalkanes and haloarene

List of Practicals:

1. Purify the given organic compounds by distillation.
2. Purify the given organic compounds by recrystillazation.
3. Introduction to the use of stereo models.
4. Synthesis, Purification, Characterization (by using Solubility, Melting Point, T.L.C. and percentage purity) of organic compounds and percent yield calculations of the following compounds:

a) 2, 4, 6-trinitro phenol (Picric acid) from phenol
b) 2, 4, 6-tribromoaniline from aniline
c) 2, 4, 6-tribromo phenol from phenol
d) Iodoform from ethyl alcohol
e) Phenylbutazone from phenol
f) Methly orange
g) Methly red
h) Benzanilide from aniline
i) Phthalidimide from phthalic anhydride
j) Thiourea
k)Phenylurea
l) Flourescein

Books Recommended:

1. Organic Chemistry, R.T. Morrison and R.N. Boyd, 6th Edition, New York.
2. Organic Chemistry, T.W.G. Solomons, 8th Edition, John Wiley & Sons, Inc
3. Advanced Organic Chemistry, J. March, Reaction Mechanisms and Structure, John Wiley and Sons, N.Y.
4. Mechanisms and structure in Organic Chemistry, E.S. Gould, Hold Rinchart and Winston, New York.
5. Advanced Organic Chemistry, Reaction Mechanisms, Bernard Miller, 2nd edition, Pearson education Ptc. Ltd. Singapore.
6. Named Organic Reactions, Thomas Lane & Andreas Plagens, 2nd edition, John Wiley and Sons, N.Y).
7. Organic Chemistry Finar Vol-1 & 2.
8. Structure and Mechanism in Organic Chemistry, Ingold, C. K., Cornell University.
9. Stereochemistry of Carbon Compounds, Eliel, E.L., McGraw Hill, New York.
10. Elements of Stereochemistry, Eliel, E.L., Wiley, New York.

Swami Vivekanand University, Sagar(M.P.)

Pharmacognosy-I BPY-0204

Paper Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d= a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0204	Pharmacognosy-I	4	-	2	6	70	22	20	10	100	30	9	20	50	150	3 Hrs

UNIT-I **(Marks-14)**

Definition, history, scope and development of Pharmacognosy. Scheme for pharmacognostical study of crude drug. Sources of crude drugs and methods of their classification. Traditional and alternative systems of medicines.

UNIT-II **(Marks-14)**

Study of following families with spatial reference to medicinally important plants;apocyanaceae, solanaceae, graminae, labiatae, cruciferae, papaveraceae,umbelifereae, leguminosae, rubiaceae and liliaceae.

UNIT-III **(Marks-14)**

General methods of their isolation, classification, properties and systematic pharmacognostic study of –

a. Fixed oil, fats and waxes and drugs belonging to this class likes; Castor oil, Olive oil Linseed oil, Karanj Oil, Neem Oil, Beeswax, Cocoa butter, Hydnocarpus oil, Kokum butter, Cod-liver oil, Shark liver oil, Woolfat, Lard, Yellow bees wax, Carnauba wax

b. Carbohydrates, and drugs belonging to this class like; Agar, Gaur gum, Acacia, Ghatti gum Honey, Isapgol, Starch, Sterculia, Tragacanth, Bael**,** Pectin, Asafoetida, Benzoin, colophonoy. Capsicum, Canabis, Myrrh, Guggul, Kaladana,

c. Tannins and drugs belonging to this class like Myrobalan, Bahera, Arjuna bark, Ashoka bark, Amla, black & Pale catechu.

d. Resins and resin combinations and drugs belonging to this class like; Podophyllum, Tolu & Peru balsam, Turmeric, Ginger, Ipomoea, Myrobalan,

e.Fibres: Plant fibres, Animal fibre, Synthetic fibres, Mineral fibre, Flax, Cotton, Silk, Wool.

f. Pharmaceutical aids like; Talc, Kaolin, Bentonite, Gelatin, Kiesalghur, Asbestose.

UNIT-IV (Marks-14)

Quality Control of Crude Drugs**:** Different types of Adulteration and the evaluation using various methods like Organoleptic, Microscopic, Physical, Chemical and Biological, Quantitative microscopy.

UNIT-V (Marks-14)

Cultivation collection, drying, natural drying, artificial drying, processing and storage of crude drugs. Factors affecting cultivation of medicinal plants like climate, altitude, temperature, humidity, rainfall, soils, fertilizers and mannures.

Pest control and natural pest control agents. Methods of pest control like mechanical, agricultural, biological chemical etc.

List of Practicals:

1. Study of different types of microscopes, camara lucida.

2. Morphological identification of following drugs Bael, Capsicum, Kaladana, catechu, guggul, honey.

3. Morphological identification of following drugs Arjuna bark, ashoka bark. Amla. Ghatugum and Bahera

4. Perform the morphological, microscopic and chemical evaluation "Ginger".

5. Perform morphological, microscopic and chemical evaluation of "Turmeric".

6. Perform morphological and chemical evaluation of "Myroballan".

7. Perform morphological and chemical evaluation of "Agar and Acacia".

8. Perform morphological and chemical evaluation of "Tragacanth".

9. Perform morphological, microscopic and chemical evaluation of "Isapgol".

10. Perform morphological, microscopic and chemical evaluation of "Starches obtain from potato, rice, maize and wheat".

11. Perform morphological and chemical evaluation of "Asafoetida".

12. Perform morphological and chemical evaluation of "Castor oil, linseed oil, olive oil, cod-liver oil".

13. Perform morphological and chemical evaluation of neem oil, coca butter and wool fat.
14. Perform morphological and chemical evaluation of lard, bees wax and carnauba.
15. Perform morphological and chemical evaluation of "Bees wax".
16. Perform morphological and chemical evaluation of "Benzoin".
17. Perform morphological, microscopic and chemical evaluation of "nylon, Silk and Cotton".
18. Perform morphological, microscopic and chemical evaluation of "Talc and Podophyllum".
19. Perform morphological, microscopic and chemical evaluation of "Peru and Tolu Balsam".
20. Identify the given mixture/sample of powder drugs by morphological microscopical and chemical evaluation.

Books Recommended:

1. Text Book of Pharmacognosy – C.S.Shah & J.S.Quadry
2. Text Book of Pharmacognosy – T.E. Wallis
3. Pharmacognosy – Trease & Evans
4. Pharmacognosy – Brady & Taylor
5. Text Book of Pharmacognosy – V.K. Kapoor & S.S.Handa
6. Pharmacognosy – C.K.Kokate, A.P.Purohit, S.B.Gokhale.

Anatomy Physiology And Health Education–BPY-0205

Paper Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d= a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0205	Anatomy, Physiology & Health Education (APHE-I)	4	-	2	6	70	22	20	10	100	30	9	20	50	150	3 Hrs

UNIT-I (Marks-14)

Scope of anatomy and physiology and basic terminology used in these subjects.

Structure of cell, its components and their function:

Elementary Tissues of the Human Body: Epithelial, connective, muscular and nervous tissues; their sub-types and characteristics.

UNIT-II (Marks-14)

Health Education: First aid: emergency treatment of shock, snake bites, burns, poisoning, fractures and resuscitation methods.

UNIT-III (Marks-14)

Skeletal Muscles: Their gross anatomy, physiology of muscle contraction, physiological properties of skeletal muscle and their disorders.

Skeletal System: Structure, composition and functions of skeleton, Classification of joints, Types of movement at joint, disorders of joints.

Lymph and lymphatic system: Composition, formation and circulation of lymph, disorders of lymph and lymphatic system. Basic physiology and functions of spleen.

UNIT-IV (Marks-14)

Haemopoietic System : Composition and functions of blood and its elements, their disorders, blood groups and their significance, mechanism of coagulation; disorders of platelets and

coagulation.

Respiratory System: Anatomy of respiratory organs, Functions of respiration, Mechanism and regulation of respiration, Respiratory volumes and vital capacity.

UNIT-V **(Marks-14)**

Cardiovascular System: Basic anatomy of the heart, physiology of heart, blood vessels and circulation. Basic understanding of cardiac cycle, heart sounds and electrocardiogram. Blood pressure and its regulation. Brief outline of cardiovascular disorders like; hypertension, hypotension, arteriosclerosis, angina, myocardial infraction, congestive heart failure and cardiac arrhythmias.

List of Practicals:

1. Determine WBC count of the given blood sample

2. Determine RBC count of the given blood sample

3. Determine differential WBC count of the given blood sample

4. Determine hemoglobin count of the given blood sample

5. Determine clotting time count of the given blood sample

6. Determine platelets of the given blood sample.

7. Determine erythrocyte sedimentation rate of the given blood sample

8. Osmotic fragility of the blood.

9. Determine blood group.

10. Record of blood pressure.

11. Study human skeletal system with the help of chart, model and histological slides.

12. Study of epithelial, connective, muscular and nervous tissue using slide.

13. Study of human cardiovascular system with the help of chart, model and histological slides.

14. To understand ECG, PQRST waves and their signifance.

15. Study of lymphatic system with the help of chart, model and histological slides.

16. Study of human respiratory system with the help of chart, model and histological slides.

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Semester-III

Pharmaceutics –III
(Pharmaceutical Engineering I) BPY-0301

Paper Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d= a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0301	Pharmaceutics-III(Ph.Engineering-I)	4	-	2	6	70	22	20	10	100	30	9	20	50	150	3 Hrs

Unit operations and processes, Material and energy balances, Dimensionless equations: formulas and groups.

UNIT-I (Marks-14)

Fluid Flow-

Fluid statics, Manometers, Types of flow, Reynold's Number and its significance, oncept of boundary layers, Bernoulli's theorem and its applications, Measurement of flow of – fluids,Valves.

UNIT-II (Marks-14)

Material Handling Systems-

Liquid handling: Different types of pumps.

Solid handling:Conveyors

UNIT-III (Marks-14)

Materials of Pharmaceutical Plant Construction-

Factors affecting the material selection for pharmaceutical plants, Physical: Chemical; Mechanical properties and use of the important materials of construction with special reference to Ferrous metals, Copper, Aluminium, Nickel, Glass, Plastics and their alloys, Heat and Corrosion resistant alloys.

Corrosion and its Prevention –

General considerations, Types of Corrosion, Methods of reducing Corrosion, Simple mathematical problems.

UNIT-IV (Marks-14)

Heat Transfer-

Heat transfer mechanisms, Heat transfer by conduction, Fourier's law, Natural and forced convection, Surface and overall heat transfer coefficients, Heat transfer by radiation, Heaters and heat exchangers.

Humidity, Air- Conditioning and Refrigeration-

Basic concepts and definitions of various terms, Psychometric charts, Wet bulb theory, Measurement of humidity, Application of humidity measurement, air-conditioning and refrigeration in Pharmacy.

UNIT-V (Marks-14)

Industrial Hazards and Safety measures-

Mechanical, Chemical, Electrical, Fire and Dust Hazards, Safety requirements, Legal requirements, Industrial dermatitis.

Automated Process Control Systems:

Process variables, Temperature, Pressure, Flow, Level and Vacuum and their measurements. Elements of computer aided manufacturing (CAM).

List of Practicals

1. Calibrate a venturimeter and interpret the energy losses graphically.
2. Determine the rate of heat transfer using different materials.
3. Calculate the humidity at different places using dry bulb and wet bulb temperature method.
4. Determine the corrosion rate of different materials
5. Determine the corrosion rate of the metal in different environments
6. Determine the nature of flow of fluid and Reynolds Number by using Reynolds apparatus.
7. Determine the overall heat transfer coefficient of the given condenser
8. Determine the rate of flow of the given fluid by venturimeter
9. Determine the water vapour permeability across the given packaging material.
10. Determine the rate of flow of the given fluid by orifice meter.
11. Determine the presser different by simple and differential manometers.
12. Correlate falling factors and Reynolds Number using given pipe line assembly.
13. Calculate the coefficient of discharge at orifice using orifice meter.
14. Determine the enlargement losses contraction losses and friction losses in a fluid flowing through a pipe.

Books Recommended:

9. Cooper and Gunn's Tutorial Pharmacy, CBS Publishers, New Delhi

: Tutorial Pharmacy

7. N.D.Bhatt:

1. J.F.Richardson and J.M. Coulron: Chemical Engineering
2. Walter L. Badger and J.T. Banchero: Introduction to Chemical Engineering
3. Perry: Handbook of Chemical Engineering
4. Lauer & Heckmann: Chemical Engineering Techniques
5. Peters: Elementary Chemical Engineering
6. S.J. Carter Elementary Engineering Drawing.
8. McCabe W.L. and Smith J.C. Unit Operation of Chemical Engineering Mc Graw Hill International Book Co., London.

Books Recommended

1.Gerard J. Tortora and Nicholas P. Anagnostakos ; Principles of Anatomy & physiology Harper and Row publishers, New York.

2. Sujit K. Chaudhuri: Concise Medical Physiology.
3. C.C. Chatterjee: Human Physiology.
4. Kathleen J.W., Wilson Ross and Wilson: Anatomy and Physiology in Health and Illness
5. Arthur C. Guyton: Textbook of Medical Physiology.
6. Cyril A. Keele, Erie Neil, Norman Joels and Samson Wrights: Applied Physiology
7. Chatterjee, C.C, Human Physiology, Medical allied agency, Calcutta.
8. Shalya, Subhas, Human Physiology CBS publisher Delhi.
9. Ross and Wilson, Human anatomy and Physiology, Churchill Livingstone London.
10. Chaurasia, B.D, Human anatomy, Regional and applied**.** , CBS publisher New Delhi

UNIT-IV (Marks-14)

Heat Transfer-

Heat transfer mechanisms, Heat transfer by conduction, Fourier's law, Natural and forced convection, Surface and overall heat transfer coefficients, Heat transfer by radiation, Heaters and heat exchangers.

Humidity, Air- Conditioning and Refrigeration-

Basic concepts and definitions of various terms, Psychometric charts, Wet bulb theory, Measurement of humidity, Application of humidity measurement, air-conditioning and refrigeration in Pharmacy.

UNIT-V (Marks-14)

Industrial Hazards and Safety measures-

Mechanical, Chemical, Electrical, Fire and Dust Hazards, Safety requirements, Legal requirements, Industrial dermatitis.

Automated Process Control Systems:

Process variables, Temperature, Pressure, Flow, Level and Vacuum and their measurements. Elements of computer aided manufacturing (CAM).

List of Practicals

1. Calibrate a venturimeter and interpret the energy losses graphically.
2. Determine the rate of heat transfer using different materials.
3. Calculate the humidity at different places using dry bulb and wet bulb temperature method.
4. Determine the corrosion rate of different materials
5. Determine the corrosion rate of the metal in different environments
6. Determine the nature of flow of fluid and Reynolds Number by using Reynolds apparatus.
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11. Determine the presser different by simple and differential manometers.
12. Correlate falling factors and Reynolds Number using given pipe line assembly.
13. Calculate the coefficient of discharge at orifice using orifice meter.
14. Determine the enlargement losses contraction losses and friction losses in a fluid flowing through a pipe.

Books Recommended:

1. J.F.Richardson and J.M. Coulron: Chemical Engineering
2. Walter L. Badger and J.T. Banchero: Introduction to Chemical Engineering
3. Perry: Handbook of Chemical Engineering
4. Lauer & Heckmann: Chemical Engineering Techniques
5. Peters: Elementary Chemical Engineering
6. S.J. Carter: Tutorial Pharmacy
7. N.D.Bhatt: Elementary Engineering Drawing.
8. McCabe W.L. and Smith J.C. Unit Operation of Chemical Engineering Mc Graw Hill International Book Co., London.
9. Cooper and Gunn's Tutorial Pharmacy, CBS Publishers, New Delhi

Swami Vivekanand University, Sagar(M.P.)

Anatomy Physiology & Health Education II (BPY-0302)

Paper Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d= a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0302	Anatomy, Physiology & Health Education (APHE-II)	4	-	2	6	70	22	20	10	100	30	9	20	50	150	3Hrs

UNIT-I (Marks-14)

Sense Organ

Basic anatomy, Physiology of eye (Vision), ear (hearing), taste buds, nose (smell) and skin(superficial receptors).

The sensory, motor and integrative systems.

UNIT-II (Marks-14)

Autonomic Nervous system

Structure and physiology of Autonomic nervous system (Sympathetic and parasympathetic). Visceral autonomic reflexes, control by higher centers

Central Nervous System

Neurohumoral transmission in the CNS Organization of nervous systems. Histology and physiology of neurons. Structure and function of brain and spinal cord, specialized function of cranial and spinal nerves. Reflex action, Neurotransmitter in brain, Electroencephalogram. Overview: CNS Disorder. Parkinsonism, cerebral palsy, poliomyelitis multiple sclerosis, epilepsy, dyslexia, Trigeminal neuralgia, headache, Reyes syndrome, Alzheimer's Disease, Neuritis, Sciatica.

UNIT-III (Marks-14)

Digestive system –

Gross anatomy and histology of the gastrointestinal system, Functions of its different parts Oral cavity, Oesophagus, Stomach, Pancreas, liver, gall bladder, small intestine, large intestine. Various gastrointestinal secretions, its regulation and their role in the absorption and digestion of food.Overview of Disorders of digestive system, dental, caries' disease, periodontal cirrhosis, hepatitis, gallstones, anorexia, peptic ulcers, appendicitis, gastrointestinal tumors.

UNIT-IV (Marks-14)

Urinary System

Structure and functions of the kidney and urinary tract Physiology of urine formation, acid-base balance. Overview of Disorder of urinary system, Gout, cystitis, nephrosis Renal failure, glonerulonephritis , Urinary tract infection.

Endocrime system

Endocrine glands, chemistry of hormones, mechanism of hormonal action, control of hormonal secretion (Feed back mechanism) Anatomy and physiology of Pituitary, thyroid, Parathyroid, Adrenals, Pancreas, ovaries, testes, thymus, Pineal, their hormones and fuctions. Overview of Disorders of endocrine system: Pituitary dwarfism, giantism, acromegaly, diabetes insipidus, cretinism, Myxoedema, exophthalmic goiter, aldosteronism, Addison's disease, Cushing's syndrome, pheochromocytoma , Diabetes mellitus.

UNIT-V (Marks-14)

Reproductive system

Structure and function of male reproductive system testes, ductus epididymis vas deferens, ejaculatory duct, urethra, seminal vesicles, prostate gland, bulbourethral, glands, penis, Hormones of male system and their regulation. Spermatogenesis, semen Structure and function of female reproductive system, ovaries, uterine tubes, Vagina, Vulva, mammary glands, Endocrine relations' Menstrual and ovarian cycles Oogenesis, coitus, Fertilization, pregnancy – its maintenance and parturition. Overview of Disorders of Reproductive systems: - Sexually

transmitted diseases Gonorrhea, Syphilis, Genital herpes, Trichomoniasis, Prostatis impotence, in fertility, Menstrual, abnormalities (Amenorrhea, dysmenorrheal) Ovarian cysts, endometriosis, cervical cancer, prostate cancer, breast cancer.

List of Practicals:

1. To study structure and physiology of special senses
2. To study structure and physiology of Eye
3. To study structure and physiology of Ear
4. To study structure and physiology of Skin
5. To study structure and physiology of Taste buds
6. To study structure and physiology of Nose.
7. To study human digestive system with help of chart and models and study histology of salivary glands, oesophagus, stomach, Pancreas, liver, small intestine, large intestine.
8. To study human urinary system with help of chart and models study histology of nephron, urinary bladder, Ureter.
9. To perform urine analysis for physiological (normal) constituent present in urine sample
10. To study pathological (abnormal) constituent in the urine sample.
11. To perform quantitative test for presence of glucose in urine sample
12. To study made and female reproductive system with help of chart and models and study histology of testes, ductus, epididymis, ovary, uterus, mammary glands.
13. To study brain and spinal cord with help of chart and models and study histology of cerebrum, cerebellum, spinal cord

Books Recommended

1.Gerard J. Tortora and Nicholas P. Anagnostakos ; Principles of Anatomy & physiology Harper and Row publishers, New York.

2. Sujit K. Chaudhuri: Concise Medical Physiology.
3. C.C. Chatterjee: Human Physiology.
4. Kathleen J.W., Wilson Ross and Wilson: Anatomy and Physiology in Health and Illness
5. Arthur C. Guyton: Textbook of Medical Physiology.
6. Cyril A. Keele, Erie Neil, Norman Joels and Samson Wrights: Applied Physiology
7. Chatterjee, C.C, Human Physiology, Medical allied agency, Calcutta.
8. Shalya, Subhas, Human Physiology CBS publisher Delhi.
9. Ross and Wilson, Human anatomy and Physiology, Churchill Livingstone London.
10. Chaurasia, B.D, Human anatomy, Regional and applied**.** , CBS publisher New Delhi

Swami Vivekanand University, Sagar(M.P.)

Pharmaceutical Chemistry IV (Organic Chemistry II) BPY-0303

Paper Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d= a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0303	Pharmaceutical Chemistry-IV(Organic-II)	4	-	2	6	70	22	20	10	100	30	9	20	50	150	3 Hrs

UNIT-I (Marks-14)

Photochemistry and Pericyclic reaction

Theory-energy transfer-characteristics of photoreactions – typical photoreaction. Electrocyclic reaction–sigmatropic rearrangement cycloaddition reactions. Neighboring group effect, Catalysis by transition metal complexes.

UNIT-II (Marks-14)

Organic Compounds with functional group containing nitrogen

Structure, nomenclature of nitro and cyano compounds.

Nitro compounds: Important methods of preparation, physical properties and chemical reactions.

Cyanides and isocyanides: preparation, physical properties and chemical reactions.

UNIT-III (Marks-14)

Structure, Nomenclature and reactivity of Sulphur containing compounds

UNIT-IV (Marks-14)

Heterocyclic Chemistry

Nomenclature of Heterocycles

Nomenclature (Hantzsch-Widman system) for monocyclic (three, four, five, six and large membered), fused and bridged heterocycles.

Aromatic and Non-aromatic Heterocycles

General chemical behaviour of aromatic heterocycles, classification (structural type), Heteroaromatic reactivity and tautomerism in aromatic heterocycles, Strain–bond angle and torsional strains and their consequences in small ring heterocycles

UNIT-V **(Marks-14)**

Synthesis, chemical reactivity and medicinal application of the following heterocyclesThree and four-membered heterocycles: aziridines and azetidines**Five membered hetero cycles:** Furan, thiophen, pyrrole, pyrazole, oxazole, imidazole, triazole.**Benzo-Fused Five-Membered Heterocycles:** Benzimidazole, benzthiazole and benztriazole.**Six-Membered Heterocycles with One, Two or More Heteroatoms:** Pyridine and Pyrimidine.

Fused heterocycles: Quinoline, isoquinoline, acridine, coumarins.

List of Practicals:

1. Synthesis and Characterization of – Benzthiazole.
2. Synthesis and Characterization of Quinoline.
3. Synthesis and Characterization of Benzimidazole.
4. Synthesis and Characterization of triazoles.
5. Synthesis and Characterization of pyrimidines.
6. Synthesis and Characterization of acridines.
7. Synthesis and Characterization of cuomarins.
8. Synthesis and Characterization of azipine.
9. Synthesis and Characterization of oxazole.
10. Synthesis and Characterization of picric acid.
11. Synthesis and Characterization of 3- nitro benzaldyhyde.
12. Synthesis and Characterization of 2 – mercapto oxadiazole.
13. Synthesis and Characterization of thiazolidinedione.
14. To perform the reduction of aromatic nitro group 2- amino group (Nitro benzene to aniline, nitrobenzoic acid to amino benzoic acid, etc)

Books Recommended:

1. The Chemistry of Heterocycles, T. Eicher and S. Hauptmann, Thieme.
2. Heterocyclic Chemistry, J.A. Joule, K. Mills and G.F. Smith, Chapman and Hall.
3. Heterocyclic Chemistry, T.L. Gilchrist, Longman Scietific Technical
4. Contemporay Heterocyclic Chemistry, G.R. Newkome and W.W. Paudler, Wiley-Inter Science.
5. Heterocyclic Chemistry Vol. 1-3, R.R. Gupta, M. Kumar and V. Gupta, Springer Verlag
6. An introduction to the Heterocyclic Compounds, R.M. Acheson, John Wiley
7. Comprehensive Heterocyclic Chemistry, A.R. Katritzky and C.W. Rees, eds. Pergamon

8. Natural Products: Chemistry and Biological Significance, J.Mann, R.S. Davidson, J.B.
9. Hobbs, D.V. Banthrope and J.B. Harborne, Longman, Essex.
10. Organic Chemistry, Vol 2, I.L. Finar, ELBS.
11. Stereoselective Synthesis: A Practical Approach, M. Nogradi, VCH
12. Name Reactions in Heterocyclic Chemistry by J. J. Li. Wiley, 2005.
13. Molecular Photochemistry, N.J. Turro, W.A. Benjamin
14. Introductory Photochemistry, A. Cox and T. Camp, McGraw Hill
15. Photochemistry, R.P. Kundall and A. Gilbert, Thomson Nelson

Swami Vivekanand University, Sagar(M.P.)

Pharmaceutical Microbiology - BPY- 0304

Paper Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d= a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0304	Pharmaceutical Microbiology	4	-	2	6	70	22	20	10	100	30	9	20	50	150	3 Hrs

UNIT-I (Marks-14)

Introduction to the Science of Microbiology: Historical development, contribution of great scientists and scope of microbiology.

Microbiology Taxonomy- Classification of Bacteria and Viruses

UNIT-II (Marks-14)

Microbial diseases: Brief outline of communicable diseases. Their causative agents, Mode of transmission and prevention – Chicken pox, Measles, influenza, Diphtheria, Whooping, cough, Tulberculosis, Poliomyelitis, Hepatitis, Cholera, Typhoid, Food poisoning, Helminthiasis, Malaria, Filariasis, Rabies, Trachoma, Tetanus, Syphilis, Syphilis, Gonorrhoea and AIDS.

UNIT-III (Marks-14)

Identification of Microbes:

Structure and Morphology of bacteria and viruses.

Nutritional requirements, Cultivation and isolation of bacteria and viruses.

Working of different types of microscopes, electron microscopy, stains and types of staining techniques.

Control of microbes by physical and chemical methods

a. Disinfection: factors influencing disinfection, dynamics of disinfection.
b. Disinfectants and antiseptics, and their evaluation
c. Sterilization: Different methods, Validation of sterilization methods and equipments.

UNIT-IV **(Marks-14)**

Sterility testing of pharmaceutical products.

Infection and factors influencing infection, immunity, Primary and Secondary defensive mechanism of body, Microbial resistance, Interferon.Microbial genetics and variation.

UNIT-V **(Marks-14)**

Microbial assay of antibiotics and vitamins.Food spoilage and Preservation of food.

Sewage and Sewage disposal: Industrial Sewage, Sewage treatment methods, BOD, COD etc.

List of Practicals

1. Identify the given sample of organism by simple staining technique.
2. Identify the given sample of organism by Gram staining technique.
3. Identify the given sample of organism by negative staining.
4. Study the motility of the given sample of microorganism by hanging drop technique.
5. Identify the bacteria by performing IMViC test.
6. Evaluate the given sample of disinfectant by R.W. Coefficient test.
7. Prepare various types of culture media (Nutrient broth, nutrient agar, fluid thioglycolate media etc).
8. Prepare subculture of the given sample of microorganism by aseptic transfer technique.
9. Evaluate the given sample of an antibiotic microbiologically by filter paper disc method.
10. Evaluate the given sample of an antibiotic microbiologically by cup plate method.
11. Assay the given sample of vitamin microbiologically.
12. Determine the sterility of the given sample by filtration method.
13. Determine the sterility of the given sample by direct inoculation method.

Books Recommended

1. W.B. Hugo and A.D. Russel: Pharmaceutical Microbiology, Blackwell Scientific publications, Oxford London.
2. Malcolm Harris, Balliere Tindall and Cox: Pharmaceutical Microbiology.
3. Gilbert S.Banker and Christopher T. Rhodes: Modern Pharmaceutics.
4. Remington's Pharmaceutical Sciences.
5. Pelczar and Reid: Microbiology.
6. Dawson and Mirne: Immunological and Blood products.
7. Rose: Industrial Microbiology.

Swami Vivekanand University, Sagar(M.P.)

Pharmacognosy-II BPY-0305

Paper Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d= a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0305	Pharmacognosy -II	4	-	2	6	70	22	20	10	100	30	9	20	50	150	3 Hrs

UNIT-I **(Marks-14)**

General methods of, isolations classification chemical properties and chemical tests and systematic pharmacognostical studies of

a) Volatile oils and drugs belongs to this class: Clove,Dill, Fennel, Coriander, Caraway, Nutmeg,Cassia bark, Cinnamon bark, Cardamom, Henna,Musk, Palmrosa, Gaultheria, Valerian, Lemon grass, Sandal wood Orange peel, Black Pepper.

b) Glycosides, and drugs belongs to this class: Liquorice, Ginseng, Dioscorea, Sarasaparilla, Senega, Digitalis, Squill, Senna, Gentian, Saffron, Chirata, Quassia, Thevetia, Mustard, Cascara, Picrorrhiza, Rhubarb, Psorelea, Aloe.

UNIT-II **(Marks-14)**

Plant bitters and Sweetners.

UNIT-III **(Marks-14)**

Enzymes, Biological sources, preparation, properties, identification tests and uses of Papain, Pepsin, Trypsin ,Diastase, and Pancreatin.

UNIT-IV **(Marks-14)**

Biological Source, identification characters chemical constituents and therapeutics uses o f traditional drugs like: Garlic Satavari, Chitrak, Gokhru, Shankhpushpi, Brahmi, Methi Nagarmotha, Neem, Shilajit Kapur kachari, Acorus Kantkari, Adusa, Punarnava, Apamarga, Guduchi.

UNIT-V **(Marks-14)**

The holistic concept of drug administration in Ayurvedic and Traditional system of medicine. Introduction to preparations like Asava, Arishta, Tailas, Churnas, Lepas, Lehyas and Bhasmas and their evaluation schemes.

List of Practicals:

1. Morphological and Microscopical identification of Senna leaf.
2. Morphological and Microscopical identification of Liquorice.
3. Morphological and Microscopical identification of Rhubarb.
4. Morphological and Microscopical identification of Dill & Fennel.
5. Morphological and Microscopical identification of Caraway & Coriander.
6. Morphological and Microscopical identification of Cinnamon bark & clove.
7. Morphological identification of Senna pod, Squill Aloe, Senega
8. Morphological identification of Satavari, Guduchi, Apamarga Gokharu
9. Morphological identification of Nagarmotha, Neem, Garlic, Methi seed
10. Morphological identification of Nutmeg, Cardamom fruits and seeds.
11. General studies of marketed formulations.
12. Identify the given mixture/sample of powder drug by morphological, microscopical & chemical evaluation of senna cinnamon Rhubarb Coriander.

Books Recommended:

1. C.K. Kokate, Gokhale and Purohit, A Text Book of Phamacognosy, Nirali Prakashan, Pune
2. S.S. Handa and V.K. Kapoor, Pharmacognosy, Vallabh Prakash, Delhi
3. G.E.Trease and W.C.Evans, Pharmacognosy (India Reprint J. P. Publication, Delhi)
4. T.E.Wallis, Text Book of Pharmacognosy, C.B.S. Publication, Delhi
5. V.E. Tylor, L.R.Brady & J.E. Robbers, Lea & Febiger Philadelphia, U.S.A.
6. C.K.Atal and B.M. Kapoor, Cultivation & Utilization of Aromatic Plants, Council of Scientific Industrial Research (CSIR) New Delhi
7. Medicinal Plant Glycosides – Sim, Toranto
8. C.S.Shah & J.S.Quadry, A Text Book of Pharmacognosy

Swami Vivekanand University, Sagar(M.P.)

Semester-IV

Pharmaceutics- IV (Pharmaceutical Engineering– II)
BPY-0401

Paper Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d= a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0401	Pharmaceutics-IV (Pharmaceutical Engineering II)	4	-	2	6	70	22	20	10	100	30	9	20	50	150	3 Hrs

UNIT-I MARKS-14

Evaporation-Basic concepts, Factors affecting evaporation, Types of evaporators, Study of short tubs evaporators, Forced circulation evaporators and Film evaporators, Single and multiple effect evaporation, Evaporation under reduced pressure, Evaporation capacity, Heat and material balance, Scale formation, Foam and entrainment.

Drying- Introduction, Theory of drying Rate of drying curves, Classification of dryers, Study of dryers used in pharmaceutical industries, Special drying methods.

UNIT -II MARKS-14

Distillation- General theory applied to binary mixtures, Boiling point and equilibrium diagrams, Raout's Law and Henry's Law, Constant boiling mixtures, Simple, steam and Equilibrium distillations, Rectification, Constructions of rectifying columns. Analysis of rectifying column: McCabe Thiel method and Lewis Sorel method for calculation of number of theoretical plates, Azeotropic and extractive distillations.

UNIT -III MARKS-14

Size Reduction and Size Separation- Definition objectives and significance of size reduction, Factors affecting size reduction, Standard of powders, Sieves and their usage in grading of powders, Laws governing energy and power requirements of a mill, Classification of size reduction machines, Study of various types of mill including ball mill, haMarkser mill fluid energy mill energy mill etc. Fluid classification methods.

Extraction- Principles of solid-liquid and liquid- liquid extraction, Theories of extraction of drugs, Diffusion battery, Podbielnaik extractor, Continuous counter- current extraction system.

UNIT -IV **MARKS-14**

Crystallization-Importance of crystal purity, size, shape, geometry habit forms and types, Solubility curves and calculation of yields, Mier,s supersaturation theory and its limitations, Nucleation and crystal growth, Classification of crystallizers, Principles underlying the design and operation of Tank, Swenson-walker, Krystal and Vacuum crystallizer, Crystallizer employed for producing large crystals, Caking of crystals and its prevention

Mixing-Theory of mixing, Solid-solid; solid-liquid and liquid-liquid mixers used in pharmaceutical industries

UNIT -V **MARKS-14**

Compaction and Compression- Adhesion and Cohesion of particles, Strength of granules, Factors affecting strength of tablets, Physics of tablet compression.

Pilot Plant Scale Up Techniques- Concepts of pilot plant, scale up techniques in pharmaceutical industries.

Filtration and Centrifugation- Theory of filtration, Factors affecting filtration, Filter media, Filter aids, Classification of filters, Industrial filters including Filter press, Rotary filter, Membrane filter etc. Principles of centrifugation, Industrial filters and centrifugation sedimenters.

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List of Practicals

1. Study the effect of diameter of balls, No. of balls volume of balls or feed amount on the particle size reduction wing ball mill.
2. Study the particle size distribution the given sample using standard sieve method.
3. Study the effect of suspending agents on the rate of sedimentation of the given sample.
4. Compare the efficiency of different suspending agents on the rate of sedimentation of the given sample.
5. Determine the particle size distribution of a given sample using microscopy.
6. Study the rate of sedimentation of the given sample.
7. Construct the boiling point diagram for the given mixture of alcohol and water.
8. Study the rate of drying and determine EMC, CMC and FMC.
9. Study the effect of surface area, material bed thickness, temperature and moisture content on the rate of drying.
10. Determine the mixing index for the mixing of give powders.
11. Determine the effect of surface area, thickness of filter medium, viscosity of liquid, temperature and filter aid on the rate of filtration.
12. Study the effect of temperature, surface area and viscosity of the liquid on the rate of evaporation.
13. Separate the constituents of the given a zeotropic mixture by the addition of third agent.
14. Compare the efficiency of single stage extraction with multiple stage extraction.
15. Determine the percentage of acetic acid extracted from the mixture of benzene and acetic acid using water as our extracting agent.
16. Prepare mier's super solubility curve for the given samples.
17. Determine the percentage purity of the given sample using crystallization technique.
18. Calculate the energy requirement (as per Riltinger's law) for the powder milling.

Books recommended

1 Elementary Chemical Engineering - Max S. Peters, Published by McGraw Hill Book Company, New York, 1954.

2 Perry's Chemical Engineer's Handbook - Robert H Perry, Green D.W., Malone O.7th Edition, 1998, McGraw – Hill Inc., New York.

3 Tutorial Pharmacy by Cooper & Gunn, ed. S.J.Carter, CBS Publishers & Distributors, Delhi, 6th Edition, 2000.

4. Unit Operations of Chemical Engineering, 5th edition – McCabe, Smith & Harriott, McGraw – Hill Inc., New York.

5 Pharmaceutical Engineering – K.Sambamurthy, 2002 NAI (P) Ltd., Delhi.

6 Pharmaceutics : The Science of Dosage Form Design - M.E. Aulton.

7 The Theory & Practice of Industrial Pharmacy – Lachman L., Lieberman H.A. & Kanjig J.L., 3rd edition, 1990 Varghese Publishing House, Bombay.

8 Alfonso G. Remington: The Science & Practice of Pharmacy. Vol.I & II. Lippincott, Williams & Wilkins Philadelphia.

9 Jani G. K., Pharmaceutics II (Unit Operations), B. S. Shah Prakashan, Ahmedabad.

10 Subramanyam C.V.S., ThiMarksa J, Suresh S.S. et. al., Pharmaceutical Engineering : Principles and Practice, 2002, Vallabh Prakashan, Delhi.

11 Introduction to Chemical Engineering by Walter L. Badger & Julius T. Banchero,Mcgraw Hill International edition, New Delhi, 1955.

12 Filtration in Pharma. Industry by Theodore H. Meltzer, Marcel Dekker Inc., New York, 1987.

13. A. R. Paradkar, Introduction to Pharmaceutical Engineering, Nirali Prakashan, 10 Ed. 2007.

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Pharmaceutics –V (Dosage Form Design) BPY0402

Paper Code	Title of the Paper	Periods Per week				Distribution of Marks										Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d= a+c)	Practical		LW (g)	Total (h= e+g)			
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)					
BPY-0402	Pharmaceutics V (Dosage form Design)	4	-	2	6	70	22	20	10	100	30	9	20	50	150	3 Hrs	

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UNIT -I **MARKS-14**

Pharmaceutical Preformulation: Definition and scope, Establishment and importance of following physicochemical parameters Solubility, pKa and selection of suitable salt, partition coefficient, dissolution, polymorphism, microscopy and powder properties, stability and drug-excipient compatibility Pharmaceutical factors influencing drug formulation.

Drug product design:

Stages of drug discovery and development process, Importance of product design, considerations.

UNIT -II **MARKS-14**

Study of different types of formulation additives:

Diluents, Binders, Disintegrating agents, Lubricants, Solvents, Co-solvents and Vehicles, Preservatives, Suspending agents, Emulsifying agents, Antioxidants, Preservatives, colouring, flavoring and sweetning agents, Viscosity enhancers, ointment and suppositories bases

UNIT -III **MARKS-14**

Dissolution technology:

Theories of dissolution, factors affecting dissolution, design of various dissolution apparatus, dissolution media, dissolution testing of different types of dosage formulations, data interpretation, mathematical models for predication of dissolution of profile.

UNIT -IV **MARKS-14**

Dissolution stability and degradation study:

Chemical stability, pathways of degradation, physical and phase transformation, stability testing protocols for various pharmaceutical dosage forms, determination of expiry date (shelf life) and overage calculations, stabilization of pharmaceutical formulations.

UNIT -V **MARKS-14**

Polymers and biodegradable polymers:

Classification, Methods of synthesis, Properties, Characterization and evaluation. Brief introduction of biodegradable polymers, pharmaceutical applications of polymers..

List of Practicals:

1. Establish the following preformulation parameters of the given drug sample.

(a) Melting point (b) solubility (c) intrinsic solubility (d) pKa (e) Partition coefficient

2. Establish the following preformulation parameters of the given drug sample.

(a) Particle size distribution (b) Flow proportion (c) Bulk deurity (d) Carr's index

(e) Compression preparation.

3. Estimate the self life of the given drug.
4. Study the drug excipient compatibility of given drug with coMarksonly used excipent by TLC technique.
5. Determine the molecular Mass of given polymer by viscometer.
6. Study the effect of temperation on stability of given photosensitive drug.
7. Study the effect of solvent / co-solvent hydrotropic agents on solubility of given drug
8. Study the effect of moisture content on chemical stability of aspirin.
9. Perform the in-vitro dissolution study of given the sample of tablet.
10. Study the effect of presence of surfactant in dissolution of tablet cantoning poorly soluble drug.
11. Study the effect of pH of dissolution on *in-vitro* dissuasion study.
12. Compare the dissolution profile of two marketed tablet products.

Books Recommended:

1. Swarbrick J., Boylan J.C., Encydopedia of Pharmaceutical Technology, Second edition, Volume-1,2,3, Marcel Dekker, Inc. Newyork.
2. Qice yihong, ChenY, Zhang G.G.Z., Developing solid Oral dosage forms-Pharmaceutical Theory and Practice charon Tech Ltd.
3. Allen L.V., Popovich N.G., Ansel H.C., Ansel's Pharmaceutics design and drug delivery systems, Eight edition, B.I. Publication Pvt. Ltd.
4. Aulton M.E. Pharmaceutics- The science of dosage form design" second edition., Churchill Livingstone Pvt. Ltd.

5. Banker G.S., Rhodes C.T., Modern Pharmaceutics" second edition, Marcel Dekker, Inc., Newyork.

6. Kanig J.J., Liebermen H.A., Lachman L. "The theory and Practics of Industrial Pharmacy, Varghese Publishing House, Bombay.

7. Rowe RC, Sheskey P.J., Owen S.C., Handbook of Pharmaceutical Excipents, Fifth edition, Pharmaceutical Pr.

8. Bugay D.E., Findlay W.P., Pharmaceutical Excipents, Marcel Dekker, Inc. Newyork.

9. Kim C.J., Advanced Pharmaceutics- Physiochemical Principle CRC Press, Florida.

10. Jain N.K., Pharmaceutical Product Development, CBS Publishers and distributors, New Delhi.

11. Shah D.H., "SOP Guidelines", Business Horizons Publishers, New Delhi.

12. Wachter A.H., Nash R.A., "Pharmaceutical Process validation, Marcel Dekker, Inc. Newyork.

13. Mazzo D.J., "International stability Testing" Interpha Press, Inc. Illinois.

14. Gibaldi M., Perriner D., "Pharmacokinetics:, Marcel Dekker Newyork.

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Pharmaceutical Analysis-I BPY-0403

Paper Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d= a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0403	Pharmaceutical Analysis I	4	-	2	6	70	22	20	10	100	30	9	20	50	150	3 Hrs

UNIT -I **MARKS-14**

Fundamentals, Significance of quantitative analysis in quality control, Different techniques of analysis. Theoretical considerations and harmaceutical applications; with special reference to Indian pharmacopoeia; of the following analytical techniques.

Acid-Base titrations: Theoretical principles. Classification, Direct titration of strong acids, Strong bases, and weak bases, Back titrations, Acid –Base indicators, Choice of indicators and mixed indicators. Methods for determination of organically combined Nitrogen and in pharmaceutical applications.

UNIT -II **MARKS-14**

Non-aqueous titrations: Scopes and limitations, Solvents used in non aqueous titrations.Acid-base equilibria in non-aqueous media, Titration of weak acids and weak bases with specific examples given in Indian Pharmacopoeia.

Precipitation titrations: Detection of End Points in Precipitation reactions. Indicators used in Precipitation titrations, Preparation & standardization of titrants like silver nitrate, aMarksonium thiocyanate; titrations according to Mohr's and Volhard's methods; aMarksonium and potassium thiocyanate titrations; indicators; applications in pharmaceutical analysis

UNIT -III **MARKS-14**

Oxidation-Reduction titrations: Concepts of oxidation and reduction,redoxreactions, strengths & equivalent weighs of oxidizing and reducing agents, redox indicators, potassium permanganate titrations, iodometry & iodometry, aMarksonium sulphate titrations, potassium iodate titrations. Pharmaceutical applications, preparation and standardization of redox titrants e.g. sodium thiosulphate etc.

Complexometric titrations: Theory of Complexometric analysis. Factor in

influencing stability of complexes. pH indicators. Types of Disodium edetate titrations with suitable examples.

UNIT -IV **MARKS-14**

Gravimetric analysis: Fundamentals of gravimetry, Precipitation reagents precipitation techniques, Specific examples of gravimetric estimation like Aluminum as hydroxy quinolate, Barium on Barium Sulfate, Lead as Chromate and Magnesium as Magnesium Pyrophosphate.

Polarography & Amperometry: Introduction, theoretical principles, organic polarography, dropping mercury electrode, basic principles of polarographic instruments, methods of analysis, experiments including amperometric titrations.

UNIT -V **MARKS-14**

Conductometry: Ohm's law and ionic conductivities, Apparatus used for conductimetric titrations. Application of conductimetry in acid-base, Precipitation and complexometric titrations with suitable examples.

Potentiometry: Theory and principles, Reference electrodes, Indicators electrodes and Ion selective electrodes. Instrumentation for potentiometric titrations. Application of potentiometry for end point determination in acid-base titration, redox titrations, precipitation titrations with suitable examples

Miscellaneous methods of analysis like diazotization titrations and Karl-fisher titration

List of Practicals:

1. Acid base titrations: Preparation and standardization of acids and bases, some exercises related to the determination of acids and bases separately and in mixture form. Some official assay procedures of boric acid, ascorbic acid shall also be covered.

2. Non-aqueous titrations: preparation and standardization of some non aqueous titrants, e.g., Perchloric acid, tetrabutyl aMarksonium hydroxide. Any two official assay given in Pharmacopoeia of India.

3. Precipitation titrations: Preparation and standardization of titrants like silver nitrate and aMarksonium thiocyanate, titrations according to Mohr's and Volhard's methods.

4. Oxidation-reduction titration: Preparation and standardization of some redox titrants, e.g., potassium permanganate, potassium dichromate, iodine, sodium thiosulphate etc. Some exercises related to the determination of oxidizing and reducing agents in the sample shall be covered. Exercises involving use of potassium

iodate, potassium bromate, ceric aMarksonium sulphate shall be performed.

5. Gravimetric analysis: Determination of water of hydration, some exercises related to Gravimetric estimation of metal ions such as barium, magnesium and calcium shall he covered.

6.Diazotization reaction: Assay of sulphonamides.

7. Complexometric titration: Any two official assays done by this method.

Books Recommended

1. A.H. Beckett and J.B. Stenlake: Practical Pharmaceutical Chemistry, Vol I and II, CBS Publishers and Distributors, New Delhi, India
2. H. H. Willard, L. L. Merritt and J. A. Dean: Instrumental Methods of Analysis, Van Nostrand Reinbold, New York.
3. L.M. Atherden: Bentley and Driver's Text book of Pharmaceutical Chemistry, Oxford UniversityPress, Delhi.
4. G.L. Jenldns, J.E. Christian, G.P. Hager: Quantitative Pharmaceutical Chemistry, McGrawHill, Company, New York.
5. Pharmacopoeia of India, Govt. of India, Ministry of Health, Delhi.
6. Bassett, R.C. Denney, G.H. Jeffery, J. Mendham: Vogel's Textbook of quantitative Inorganic Analysis, The ELBS and Longman, London.

Pharmaceutical Chemistry-V(Biochemistry) BPY 0404

Paper Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d= a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0404	Pharmaceutical Chemistry - V(Biochemistry)	4	-	2	6	70	22	20	10	100	30	9	20	50	150	3 Hrs

UNIT -I MARKS-14

Enzymes:

Nomenclature, Kinetics ans its Mechanism of action, echanism of Inhibition,Isoenzymes, enzymes in technical diagnosis.

Co-enzymes:

Metals as coenzymes and their significance and Vitamins as coenzymes nd their significance.

Biochemical organization of the cell & transport processes across cell membrane.

The concept of free energy, determination of charges in free energy system from Equilibrium constant and reduction potential, bioenergetics, production of ATP and its biological significance.

UNIT -II MARKS-14

Carbohydrate Metabolism:

Conversion of Polysaccharide to Glucose 1-Phosphate, Glycolysis and Fermentation and their regulation, Gluconeogenesis and Glycogenolysis, metabolism of galactose and galactosemia, role of sugar nucleotide in biosynthesis, pentosephosphate pathway.

The Citric acid cycle:

The significance, reaction and energetics of cycle, amphibolic role of cycle, Glyoxalic Acid Cycle.

Genetic code and Protein synthesis:

Genetic code, Components of protein synthesis and inhibition of protein synthesis. Brief account of genetic engineering and polymerase chain reactions. Regulation of gene expression.

UNIT -III **MARKS-14**

Structure and Functions of Proteins:

Amino acids and Peptides, Determination of Primary structure and higher orders of structure.

Lipid Metabolism:

Oxidation of fatty acids, Beta Oxidation and energetic, alpha oxidation,omega oxidation, Biosynthesis of Ketone bodies and their utilisation, Biosynthesis of saturated and unsaturated fatty acids and eicosanoids, phospholipids, sphingolipids.

Disorders of Carbohydrate, Lipid and Protein Metabolism:

Biomedical Importance and Implications in Clinical Biochemistry. Diagnostic tests for detection of metabolic disorders.

UNIT -IV **MARKS-14**

Nitrogen & Sulphur Cycle:

Nitrogen fixation, aMarksonia assimilation, sulphur activation, sulphate reduction, incorporation of sulphur in organic compounds, release of sulphur from organic compounds

Metabolism of AMarksonia and Nitrogen Containing monomers:

Nitrogen balance, biosynthesis of amino acids, catabolism of amino acids, conversion of amino acids to specialized products, assimilation of aMarksonia , urea cycle, metabolic disorders of urea cycle, metabolism biosynthesis, formation of bile pigme nt, hyperbilirubinemia, purine biosynthesis, purine nucleotide interconversion, pyrimidine biosynthesis, and formation of deoxyribonucleotides.

UNIT -V **MARKS-14**

Biological oxidation:

Redox Potential, enzymes and co-enzymes involved in oxidation reduction and its control. The respiratory chain, its role in energy capture and its control, energetic of oxidative phosphorylation, inhibitors of respiratory chain and oxidative phosphyrlation, mechanism of oxidative phosphorylation.

Biosynthesis of nucleic Acids:

Brief introduction to genetic organisation, organisation of maMarksalian genome, alteration and rearrangement of genetic material, biosynthesis of DNA and its replication, mutation, physical and chemical mutagenesis/ carcinogenesis, DNA repair mechanism, biosynthesis of RNA.

List of Practicals

1. Systemic analysis of water for pharmaceutical purpose.
2. Qualitative and Quantitative chemical examination of Urine & Blood .
3. Food Analysis – Analysis of Milk ,Butter, Flour, Honey and Starch.
4. Separation of lipids by TLC.
5. Separation of amino acids by two dimensional paper chromatography and gel electrophoresis.
6. Determination of glucose.
7. Isolation and determination of RNA and DNA.
8. Separation of Serum proteins by electrophoresis on cellulose acetate.
9. Quantitative estimation of amino acids and proteins

Books Recommended:

1. Martin, D.W., Mays, P.A. and Redwell, V.M., Harper's Review of Biochemistry, Lange medical Publication.
2. Horrow, B. and Mazur, A., Text book of biochemistry, W.B. Saunders Co. Philadelphia.
3. Lehninger, A.L., Principles of Biochemistry, CBS Publishers and Distributors.
4. Lehninger, A.L., Biochemistry, Worth Publishers Inc.
5. Stryer, L., Biochemistry, W.H. Freeman and Co. San Franscisco.
6. Plumer, D.T., An Introduction to Practical Biochemistry, Tata McGraw Hill,
   New Delhi.
7. Jayaraman, J., Laboratory manual in Biochemistry, Wiley eastern Ltd., New Delhi

Pharmacology-I BPY - 0405

Paper Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d= a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0405	Pharmacology -I	4	-	2	6	70	22	20	10	100	30	9	20	50	150	3 Hrs

UNIT -I MARKS-14

General Pharmacology

a. Introduction to pharmacology, sources of drugs, dosage forms and routes of administration, mechanism of action, combined effects of drugs, factors modifying drug action, tolerance and dependence, pharmacogenetics.

b. Absorption, distribution and excretion of drugs, principle of basic and clinical pharmacokinetics adverse drug reactions and treatment of poisoning, ADME drug interaction, bioassay of drugs and biological standardization, discovery and development of new drugs. Introduction to clinical trials

UNIT -II MARKS-14

Analgesic, Antipyretic, Anti-inflaMarksatory and Anti-Gout Drugs

UNIT -III MARKS-14

Autocoids

Prostaglandins, leukotrienes and platelet activating factors.

Histamine, bradykinin 5- HT and their antagonists.

UNIT -IV MARKS-14

Pharmacology of Peripheral Nervous System

a. Neurohumoral transmission (autonomous and somatic)

b.Parasympathomimetic, parasympatholytic, sympathomimetics, sympatholytics, neuron blocking agents.

c. Neuromuscular blocking agents

d. Local anaesthetic agents

UNIT -V **MARKS-14**

Drugs acting on Respiratory System and Pathophysiology of respiratory system:

a. Anti-tussives and expectorants

b. Anti-asthmatic drugs including bronchodilators

List of Practicals:

1. Introduction to Experimental Pharmacology and various regulatory authorities.
2. Study of coMarkson laboratory animals and anesthetics used in animal studies.
3. Study of various routes of drug administration in experimental animals.
4. Study the effects of various agonists and antagonists on isolated rat ileum preparation.
5. Preparation of various physiological salt solution and set up of isolated rat ileum preparation.
6. Plot dose response curve of histamine using isolated guinea pig ileum preparation.
7. Plot dose response curve of choline using isolated gunea pig ileum preparation.
8. Study the peripheral analgesic activity of indomethacin using writhing test on mice.
9. Study the effect of autonomic drugs mydriatic and miotic on rabbit eye.
10. Study the effect of local anesthetics on rabbit eye.
11. Study the neuromuscular effect of d-tubocurarine/ succinyl choline using rotarod apparatus.
12. Study anti- inflammatory activity of indomethacin using rat paw edema paradigm.

Books Recommended:

1. Satoskar, R.S. and Bhandarkar, S.D., Pharmacology and Pharmacotherapeutics.
2. Tripathi, K.D., Essentials of Medical Pharmcology.
3. Kulkarni, S.K., Handbook of Experimental Pharmacology, Vallabh Prakashan, Delhi.
4. Crossland, J and Thomson, J.H., Essential of Pharmacology, Harper and Publishers, New York.
5. Craig, C.R. and Stitzel, R.R., Modern Pharmacology, Little Brown and Company.
6. Rang, M.P. , Dale, M.M. and Riter, J.M., Pharmacology, Churchill Livingstone.
7. Paul, L., Principles of Pharmacology, ChaMarksan and Hall.
8. Herfindal, E.T. and Hirschman, J.L., Clinical Pharmacy and Therapeutics, William and Wilkins.
9. Katzung, B.G., Basic and Clinical Pharmacology, Prentice Hall International.
10. Hardmen, J.G., Limbired, L.E., Molinoss, P.B., Ruddon, R.W. and Gil, A.G., Goodman and Gillman's The Pharmacological basis of Therapeutics, Pergamon Press.
11. Satoskar, R.S. and Bhandarkar, S.D., Pharmacology and Pharmacotherapeutics.
12. Tripathi, K.D., Essentials of Medical Pharmcology.
13. Kulkarni, S.K., Handbook of Experimental Pharmacology, Vallabh Prakashan, Delhi.
14. Crossland, J and Thomson, J.H., Essential of Pharmacology, Harper and Row, Publishers, New York.
15. Craig, C.R. and Stitzel, R.R., Modern Pharmacology, Little Brown and Company.
16. Rang, M.P. , Dale, M.M. and Riter, J.M., Pharmacology, Churchill Livingstone.
17. Paul, L., Principles of Pharmacology, ChaMarksan and Hall.
18. Herfindal, E.T. and Hirschman, J.L., Clinical Pharmacy and Therapeutics, William and Wilkins. Katzung, B.G., Basic and Clinical Pharmacology, Prentice .

Swami Vivekanand University, Sagar(M.P.)

Semester-V

Pharmaceutics- VI (Cosmetic Technology) BPY-0501

Paper Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d= a+c)	Practical		L W (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0501	Pharmaceutics-VI (Cosmetic Tech.)	4	-	2	6	70	22	20	10	100	30	9	20	50	150	3 Hrs

UNIT I - **(MARKS -14)**

Fundamental of cosmetic science. Structure and functions of skin and hair. Formulation considerations, preparation, packaging and evaluation of the following categories of cosmetics-

Skin Preparation:, Anti-wrinkle preparations, Barrier materials, Protective creams and gels,Skin creams ,Cold creams, Cleansing creams ,Vanishing creams, all purpose creams, emollient, Moisturising and foundation formulation ,Anti-perspirant,/ deodorant, Hand creams, Bleaching creams, Night and Massage creams, , Protective skin tonics, Skin moisturizers, Sun-screen, Suntan, and anti-sun burn preparation.

UNIT II - **(MARKS -14)**

Face Preparation: Talcum powder, Compact powder, Face powder, Face packs and Masks.

Dentrifice: Tooth pastes, Tooth powders, Denture cleansers.

Shaving Preparation: Lather shaving creams, Lather shaving stick, Shaving gels, Shaving foams, Pre-and After shave lotions.

UNIT III - **(MARKS -14)**

Hair Preparations: Hair setting lotions and creams, Hair conditioners, Hair tonics, Hair lotions, Hair sprays, Hair dyes, Bleaches, Hair dressings, Hair waiving, Hair straightners and Hair strengthners.

Shampoo and Bath preparations: Clear liquid shampoos, Aerosol shampoos, dry shampoos, Acid-balanced shampoos, Egg shampoos, Anti-dandruff Shampoos, Bath oils, Foam baths.

UNIT -IV **(MARKS -14)**

Manicure Preparation: Nail polish, Nail lacquers and Nail bleaches.

Foot Preparation: Foot creams, Foot powders, Foot sprays, Corn preparations and Athelete's foot preparation.

UNIT -V **(MARKS -14)**

Herbal Cosmetics: Cosmetics containing Aloe, Babul, Brahmi, Chandan, Cucumber, Haldi, Jatamansi, Khus, Mehandi, Neem, Reetha, Shikakai, Tulsi, Arnica, Bhringraj and Volatile oils .

Colored make-up preparations: Mascara, Eye make-up, Eye-liner, Eyebrow Pencils, Lipsticks, Rouge.

Cosmetic for babies.

List of Practicals:

1. Prepare and Evaluate Vanishing Cream.
2. Prepare and Evaluate Cold Cream.
3. Prepare and Evaluate Cleansing Cream.
4. Prepare and Evaluate Emollient Cream.
5. Prepare and Evaluate Sunscreen preparation.
6. Prepare, Pack and Evaluate Compact Powder.
7. Prepare and Pack Face Mask.
8. Prepare and Evaluate Talcum Powder.
9. Prepare and Evaluate After shave lotion.
10. Prepare and Evaluate Lather shaving cream.
11. Prepare and Evaluate Tooth Powder.
12. Prepare and Evaluate Tooth Paste.
13. Prepare, Pack and Evaluate Lipsticks.
14. Prepare, Pack and Evaluate Nail lacquer.
15. Prepare and Evaluate Simple shampoo (Soap based).
16. Prepare and Evaluate Acid balanced shampoo.
17. Prepare and Evaluate Egg shampoo.
18. Prepare and Evaluate Anti-dandruff Shampoo.
19. Prepare and Evaluate Hair conditioner.
20. Prepare and submit Herbal preparations. (Atleast 5 different types)

Books Recommended:

1. M. S. Balsam & Edward Sagarin (Eds.), Cosmetic Science and Technology, Vol. 1-3, Krieger Publishing company. Florida.
2. Mac Chesney, J. C., Packaging of Cosmetic an Toiletries, Newness- Butterworth, London.
3. E.G., Thomssen, Modern Cosmetics, Universal Publishing Corporation, Bombay.
4. Jellinek, J.S. Formulation and Functions of Cosmetics, John Willey & Sons, New York.
5. R. K . Nema, K. S. Rathode, B.K. Dubey, Text Book of Cosmetics, CBS- Publishers & distributors, New Delhi.
6. Sunil Nanda, Arun Nanda & R.K. Khar, Cosmetic Technology, Birla publications Pvt. Ltd., Delhi.
7. B. M. Mithal and R.N. Saha, A handbook of cosmetics, Vallabh Prakashan, Delhi.
8. P.P. Sharma, Cosmetics- Formulation, Manufacturing & Quality control,Vandana Publications Pvt. Ltd, Delhi.
9. Hildo Butler (Ed.), Poucher's Perfumes, Cosmetics & Soaps, Kluwer Academic Publishers, The Netherland.
10. S.C. Bhata, Perfumes, soaps, Detergents and Cosmetics Vol. 1 & 2, CBS Publishers and Distributors, New Delhi.
11. Drug and Cosmetics Act & Rules.

Pharmaceutics- VII
(Dispensing, Community and Hospital Pharmacy) BPY-0502

Paper Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d= a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0502	Pharmaceutics-VII (Dispensing Community and Hospital and clinical Pharmacy)	4	-	2	6	70	22	20	10	100	30	9	20	50	150	3 Hrs

UNIT-I (MARKS-14)

Dispensing Pharmacy:

Brief introduction of commonly used Latin terms in prescription. Prescription, Handling of prescription, Sources of errors in prescription, Care required in dispensing prescriptions. General Dispensing Procedures including labeling of dispensed products.

UNIT II- (MARKS-14)

Incompatibility of common occurrence and their correction, Physical, Chemical and Therapeutic incompatibilities. Basis of posology, Detection of over doses in prescription, knowledge of prophylactic and therapeutic doses with route of administration. Principles involved and procedures adopted in dispensing of typical prescriptions Solutions, Powders, Mixtures, Emulsions, Liniments & Lotions .

UNIT-III (MARKS-14)

Community Pharmacy:

Dispensing of proprietary products, Maintenance of records of retail and wholesaler, Patient counseling, Role of Pharmacist in community health care and education, Hazards of medication.

UNIT-IV (MARKS-14)

Organisation and structure of retail and wholesale drug stores, Legal requirements for establishment and maintenance brief study of propritory products available in the market belonging to Anti-histaminics, Chemotherapeutics, expectorants ,Vitamins and NSAID'S category.

UNIT-V (MARKS-14)

Hospital Pharmacy:

Hospital Formulary: Contents, preparation and revision of hospital formulary. Organization and structure: Organization of a hospital pharmacy, responsibilities of a hospital pharmacist, pharmacy and therapeutic committee.

List of Practicals:

1. Prepare and Dispense Simple Powder.
2. Prepare and Dispense Compound Powder.
3. Prepare and Dispense Powder containing small doses.
4. Prepare and Dispense Powder containing liquids.
5. Prepare and Dispense Powder containing liquefiable substances.
6. Prepare and Dispense Powder containing hygroscopic and deliquescent substances.
7. Prepare and Dispense Powder containing efflorescent materials.
8. Prepare and Dispense effervescent granules.
9. Prepare and Dispense Dusting Powder.
10. Prepare and Dispense Simple Mixture containing Soluble substances only.
11. Prepare and Dispense Mixture containing Indiffusible solids.
12. Prepare and Dispense Mixture containing Diffusible solids.
13. Prepare and Dispense Mixture containing Slightly soluble liquids.
14. Prepare and Dispense Mixture containing Precipitate forming liquids.
15. Prepare and Dispense Mixture containing Small doses of potent medicaments.
16. Prepare and Dispense prescription possessing Physical Incompability(Precipitation).
17. Prepare and Dispense prescription possessing Physical Incompability (IncompleteSolution).
18. Prepare and Dispense prescription possessing Physical Incompability (Separation of immiscible liquids).
19. Prepare and Dispense prescription possessing Chemical Incompability (Alkaloidal salts with alkaline substances).
20. Prepare and Dispense prescription possessing Chemical Incompability (Alkaloidal salts with salicylates).
21. Prepare and Dispense prescription possessing Chemical Incompability (Alkaloidal salts with soluble iodides).
22. Prepare and Dispense prescription possessing Chemical Incompability (Alkaloidal salts with benzoates).
23. Prepare and Dispense prescription possessing Chemical Incompability (Soluble

salicylates with acids-Tolerated Incompatability).

24. Prepare and Dispense prescription possessing Chemical Incompability(Soluble salicylates with acids-Adjust Incompatability).
25. Prepare and Dispense prescription possessing Chemical Incompability (Soluble benzoates with acids-Tolerated Incompatability).
26. Prepare and Dispense prescription possessing Chemical Incompability (Soluble benzoates with acids-Adjusted Incompatability).
27. Prepare and Dispense prescription possessing Chemical Incompability(Soluble salicylates with ferric salts).
28. Prepare and Dispense prescription possessing Chemical Incompability (Soluble benzoates with ferric salts).
29. Prepare and Dispense prescription possessing Chemical Incompability (Evolution of carbon dioxide).
30. Prepare and Dispense prescription possessing Chemical Incompability of emulsifying agents.
31. Prepare and Dispense Emulsion containing Volatile oils.
32. Prepare and Dispense Emulsion containing Fixed oils.
33. Prepare and Dispense Emulsion containing Oleoresins.
34. Prepare and Dispense Calamine lotion.
35. Prepare and Dispense turpentine liniment.

Books Recommended:

1. Allwodd M. C. and Fell J. T., Text book of Hospital Pharmacy, Blackwell Scientific Publication, Oxford.
2. Hassan W. E., Lea and Febiger, Philadelphia Hospital Pharmacy.
3. J.S. Qadry, R.K. Goyal & R.K. Parika, Merchant & Qadry's a text book of Hospital Pharmacy, B.S. Shah Prakashan, Ahmedabad.
4. Pratibha Nand & R.K. Khar, Text Book of Hospital & Clinical Pharmacy, Birla Publications Pvt Ltd., Delhi.
5. S.J. Carter (Ed.), Cooper & Gunn's Dispensing for Pharmaceutical Students, CBS Publishers & Distributors, New Delhi.
6. R.M. Mehta, Dispensing Pharmacy, Vallabh Prakashan, Delhi.
7. S.N. Sharma & N.K. Jain, the Concise Pharmaceutical Dispensing, Prakash B. Printers, Baroda.
8. N.K. Jain & G.D. Gupta, Modern Dispensing Pharmacy, PharmaMed Press, Hyderabad.
9. E.W. Martin, Dispensing of Medications (Formerly Husa's Pharmaceutical Dispensing) Mack Publishing Company, Easte

Pharmaceutical Chemistry-VI
(Medicinal ChemistryI) BPY-0503

Paper Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d= a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0503	Pharmaceutical Chemistry VI (Medicinal Chemistry)	4	-	2	6	70	22	20	10	100	30	9	20	50	150	3 Hrs

UNIT- I (MARKS-14)

Introduction to medicinal chemistry

Principles of drug discovery: Basic principles of medicinal chemistry, physicochemical and steric aspects (optical, geometric and bioisosterism) of drug molecules and biological actions. Drug metabolism: Phase I (biotransformation reactions), phase II (conjugation reactions), factor affecting drug metabolism

UNIT-II (MARKS-14)

Receptors and drug action: Receptor theories, affinity, receptor and biologic response. Prodrugs and drug latentiation: Basic concepts, prodrug of functional groups, bioprecursor prodrugs, chemical delivery system.

UNIT-III (MARKS-14)

Classification and mode of action, uses, structure activity relationship including physicochemical, steric aspects and resents advances in research of the following categories of drugs:

Drugs affecting neurotransmission

Drugs affecting adrenergic neurotransmission: Neurochemistry and stereochemistry of norepinephrine, sympathomimetic agents, sympatholytic agents, drugs affecting catecholamine biosynthesis, drugs affecting catecholamine storage and release, ergot alkaloids, xanthine bronchodilators

UNIT-IV **(MARKS-14)**

Drugs affecting cholinergic neurotransmission: Neurochemistry and stereochemistry of acetylcholine, acetylcholine mimetics-muscarinic agonists, acetlycholinesterase inhibitors, acetylcholine antagonists-muscarinic anatagonists, nicotinc antagonists-neuromuscular blocking agents, ganglionic blocking agents.

Local anesthetics: Molecular mechanism of action, chemical aspects.

Drugs affecting serotonergic neurotransmission: Neurochemistry and stereochemistry of serotonin, 5-HT agonists, 5-HT antagonists.

UNIT-V **(MARKS-14)**

Drugs affecting immune systems

Non-steroidal anti-inflammatory agents: Chemistry of chemical mediators of inflammation (prostaglandins, thromboxanes, prostacyclin and leukotrienes), antipyretic analgesics. Antihistaminics and related antiallergics: Neurochemistry and stereochemistry of histamine, inhibitor of histamine release (mast cell stabilizers), inhibitors of released histamine, dual acting antihistaminics; H_2 antagonists, H_3 antagonists.

List of Practicals:

1. Synthesis and characterization of Clemastine.
2. Synthesis and characterization of Tripelennamine.
3. Synthesis and characteriazation of Scopolamine from Tropenol.
4. Synthesis and characteriazation of Tropenone from Maleyde aldehyde.
5. Synthesis and characterization of chlorzoxazone from 2-amino-4-chlorphenol.
6. Synthesis and characterization of trihexyl phenylidine.
7. Synthesis and characterization of Oxyphenbutazone.
8. Synthesis and characterization of Aspirin from salicylic acid.
9. Synthesis and characterization of Sulphonilamide from Aniline.
10. Synthesis and characterization of Benzimadazole from benzyl chloride.
11. Synthesis and characterization of Paracetamol from Para amino phenol.
12. Synthesis and characterization of Ibuprofen from isobutyl benzene.
13. Synthesis and characterization of Antipyrine
14. Synthesis and characterization of Phenindione.
15. Synthesis and characterization of Phenyl benzoate.
16. Synthesis and characterization of Benzenilide.
17. Synthesis and characterization of Methyl pyrazolone.

Books Recommended:

1. Foye, W.C., Principles of Medicinal Chemistry, Lea and Febiger, Philadelphia.
2. Wolff , M.E. Ed., Burger's Medicinal Chemistry, John Wiley and Sons, New York.
3. Hansch, C., Comprehensive Medicinal Chemistry, Pergarnon Press, Oxford.
4. Delagado, J.N. and Remers, W.A.R, Wilson and Giswold's Text Book of Organic,Medicinal and Pharmaceutical Chemistry, J.Lippincott Co., Philadelphia.
5. Nogrady, T., Medicinal Chemistry-A Biochemical Approach, Oxford University Press, New York, Oxford.
6. Kar, A., Medicinal Chemistry, Willey Eastern Ltd., New Delhi.
7. Patrick, G., An Introduction to Medicinal Chemistry, Scientific Distributors, Mumbai.
8. Malone, Dyson and Purey, May's Chemistry of Synthetic Drugs.
9. Parimoo, P., Text Book of Medicinal Chemistry, CBS Publishers and Distributors, New Delhi.
10. Thomas, G., Introduction to Medicinal Chemistry, CBS Publishers and Distributors, New Delhi.

Swami Vivekanand University, Sagar(M.P.)

Pharmacognosy -III BPY-0504

Paper Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d= a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0504	Pharmacognosy-III	4	-	2	6	70	22	20	10	100	30	9	20	50	150	3 Hrs

UNIT-I **(MARKS-14)**

General techniques of biosynthetic studies and basic metabolic pathways. Introduction to biosynthesis of secondary metabolites of pharmaceutical importance. A brief introduction of chemical nature of phytoconstituents.

UNIT-II **(MARK-14)**

Concepts of stereoisomerisms Nature, distribution, classification, general methods of isolation and properties of alkaloids and terpenoids.

UNIT-III **(MARKS-14)**

Phytochemical Screening: Preparation of extracts and different tests performed for screening of extracts for the presence of alkaloids, saponins, steroidal compounds, flavanoids, anthraquinones, phenolics, amino acids, carbohydrates, fats etc.

UNIT-IV **(MARKS-14)**

Radio – tracer techniques and utilization in biogenetic studies.

Systematic pharmacognostical study of alkoloidal drugs like; Belladona, Coca, Cinchona, Datura, Ephedra, Hyoscyamus, Withania, Ipecac, Opium, Ergot, Rauwolfia, Nuxvomica, Physostigma, Pilocarpus, Veretrum, Kurchi, Solanam, Tea, Colchicum, coffea, aconite ,Tobacco Vinca.etc**…**

UNIT-V **(MARKS-14)**

Chemistry, biogenesis and pharmacological activity of atropine, ephedrine, ergometrine, quinine, morphine, menthol,digitoxin, sennosides, diosgenin, reserpine,sarsapogenin, strychnine, citral, taxol, rutin and artemisine.

List of Practicals:

1. Identify Aconite, Hyoscyamus and Withania leaves morphologically.
2. Identify Colchicum, Ipecac and Vinca leaves morphologically.
3. Perform morphological, microscopic and chemical evaluation of Withania.
4. Perform morphological, microscopic and chemical evaluation of Tobacco.
5. Perform morphological, microscopic and chemical evaluation of Rauwolfia root.
6. Perform morphological, microscopic and chemical evaluation of Cinchona bark.
7. Perform morphological, microscopic and chemical evaluation of Nux vomica seeds.
8. Perform morphological, microscopic and chemical evaluation of Kurchi bark.
9. Perform morphological, microscopic and chemical evaluation of Ephedra.
10. Perform morphological characterization like type of stomata and calculate the stomatal index, vein islets, vein termination numbers, microscopic and chemical evaluation of Datura leaves.
11. To identify and evaluate the given sample of Colchicum corm by morphological, microscopical and chemical evaluation.
12. To identify the given sample of powdered crude drug by various phytochemical tests. (Cinchona/Rauwolfia/Senna/Ephedra)
13. Isolate Nicotine from tobacco.
14. Isolate Caffeine from tea leaves.
15. Isolate Quinine from cinchona.
16. Isolate alkaloids from nux vomica seeds.
17. Isolate starch from potatoes.

Books Recommended

1. Trease, G.E. and Evans, W.C., Pharmacognosy, Bailliere Tindall, Eastbourne, U.K.
2. Tayler, V.C., Brady, L.R. and Robers, J.E., Pharmacognosy, Lea and Febiger, Philadelphia.
3. Shah, C.S. and Quadry, J.S., A text book of Pharmacognosy, B.S. Shah Publishers, Ahmedabad.
4. Kokate, C.K., Purohit, A.P. and Gokhale, S.B., Pharmacognosy, Nirali Prakashan, Pune.
5. Indian Pharmacopoeia, Ministry of Health and Family Welfare, Govt. of India, New Delhi.
6. Wallis, T.E., Text Book of Pharmacognosy, Jand A Churchill Limited, London

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Pharmacology-II BPY-0505

Paper Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d= a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0505	Pharmacology-II	4	-	2	6	70	22	20	10	100	30	9	20	50	150	3 Hrs

UNIT-I (MARKS14)

Pharmacology of drugs acting on gastrointestinal tract

1) Antacids, antisecretory and antiulcer drugs
2) Emetics and antiemetics

UNIT-II (MARKS14)

Pathophysiology of CNS diseases and pharmacology of drugs used to treat them

1) General anesthetics
2) Hypnotics, sedatives, antianxiety agents, and centrally acting muscle relaxants.
3) Neurohumoral transmission in CNS
   a. Dopaminergic pathway
   b.Cholinergic pathways
   c. Noradrenergic pathways
   d. Serotonergic pathways

UNIT-III (MARKS14)

Psychopharmacological agents

a. Antipsychotics
b. Antidepressants
c. Antimaniacs
d. Hallucinogens

Drugs used in neurodegenerative diseases

a. Parkinson's Disease
b.Alzheimer's Disease

UNIT-IV (MARKS-14)

Drug addiction and drug abuse

a. Alcohol
b. Nicotine
c. Cannabis

UNIT-V (MARKS14)

CNS stimulant

Anti-epileptic drugs

Narcotic analgesics and antagonist**.**

List of Practicals

1) Study the CNS depressants using cornea and pinna reflex test.
2) Study CNS stimulants by evaluation of locomotor activity (Actophotometer)
3) Bioassay for acetylcholine/histamine using isolated organ preparations (rat ileum/rat duodenum/rat colon/rat fundus/guinea pig ileum/guinea pig tracheal chain preparation/goat ileum)

a) Matching bioassay or Bracketing bioassay b) Interpolation bioassay or graphical bioassay

4) Study anticonvulant effect of some drugs using maximum electroshock method and chemical-induced convulsion method.
5) Study Central muscle relaxants using Rota rod apparatus
6) Study lenticular opacity produced by opioid analgesics in rodents.
7) Evaluate hypnotic activity of a drug by employing potentiation of thiopental induced sleeping time paradigm.
8) Study antianxiety effect of some drugs using elevated plus maze test or social interaction test

or novelty suppressed feeding test in rodents.

9) Study intravenous anesthetics using righting reflex test.
10) Study antipsychotic effect of some drugs using catalepsy test or inhibition of amphetamine stereotypy in rodents.

Books Recommended:

1) Herfindal, E.T., Gourley, D.R., (eds.) (2000) Textbook of therapeutics Drug and disease management. 7th ed. Baltimore: Lippincott Williams and Wilkins
2) Hardmen, J.G., Limbird, L.E., Gilman A.,G., (eds.) (2001) Goodman and Gilman's The pharmacological basis of therapeutics. 10th ed. USA: The McGraw Hill Companies
3) Kumar, V., Abbas, A.K., Fausto, N., (eds.) (2004) Robbins and Cotran Pathologic basis of disease. 7th ed. Pennsylvania: Saunders
4) Barar, F.S.K., (2000) Essentials of therapeutics. New Delhi: S. Chand and Company (P) Ltd.
5) Satoskar, R.S., Bhandarkar, S.D., Rege, N.N., (2007) Pharmacology and Pharmacotherapeutics. 12th ed. Mumbai: Popular Prakashan
6) Seth, S.D., (ed.) (2005) Textbook of Pharmacology. 2nd ed. New Delhi. Elsevier
7) Tripathi, K.D. (1999) Essentials of medical pharmacology. 4th ed. New Delhi: Jaypee Brothers Medical Publishers (P) Ltd.
8) Mycek M.J., Haney, R.A., Champe, P.C. (2000) Lippincott's illustrated reviews: Pharmacology. 2nd ed. Baltimore: Lippincott Williams and Wilkins.
9) Rang, H.P., et al. (eds.) (2003) Pharmacology. 5th ed. Philadelphia: Elsevier
10) Katzung, B.G., (2004) Basic and clinical pharmacology. 9th ed. USA: The McGraw Hil Companies.
11) McKim, W.A., (2006) Drugs and Behavior: An Introduction to Behavioral

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Semester-VI

Pharmaceutical Industrial Management BPY-0601

Paper Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d= a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0601	Pharmaceuical Indusrial Management	4	-	-	4	70	22	20	10	100	-	-	-	-	100	3 Hrs

UNIT-I (Marks-14)

Status of pharmaceutical industries in India.

Project formulation, evaluation and implementation. Pharmaceutical Factory Planning and layouts, preparation of flow diagrams, technical data sheets. Pharmaceutical Salesmanship:Principles of sales promotion, advertising, and ethics of Sales, merchandising, Window display and literature detailing.

UNIT-II (Mark-14)

Pharmaceutical Economics: Principles of economics with special reference to the laws of demands and supply, demand schedule, demand curves, general principles of insurance and inland and foreign trade, procedure of exporting and importing goods.Pharmaceutical Marketing: Functions, wholesale, retail, and mail order business ,market research.

UNIT-III (Marks-14)

Pharmaceutical Production Management : Different aspects of Production Management , Performance Evaluation Technique, flow-process, know how process and maintainence.Concepts on Management, Principles of Management, Administrative and Operative Management Enterpreneurship Development.Material management: Basic principles of Material Management, Purchase, Store and Inventory control.

UNIT-IV (Marks-14)

Accountancy: Principles of accountancy, Journal entries and ledger posting, preparation of trial balance, cash book, bank reconciliation statement,

rectification of errors, profits and loss account, balance sheet, purchase, keeping and pricing of stocks, treatment of cheques, bill of exchange, promissory notes and hundies, documentary bills.

UNIT-V (Marks-14)

Pharmaceutical Management : Concepts on Management, Principles of Management, Administrative and Operative Management Enterpreneurship Development.Material management: Basic principles of Material Management, Purchase, Store and Inventory control.Pharmaceutical Salesmanship:Principles of sales promotion, advertising, and ethics of Sales, merchandising, Window display and literature detailing

2. Gupta, R. L., Advanced Accountancy, Vol. I and II, Sultanchand & Company, New Delhi.
3. Kotler, P., Marketing Management, Prentice Hall of India Limited.
4. Stanton, W. J., Fundamentals of Marketing Tata McGraw Hill Limited, New Delhi.
5. Buskir K. and Richard H., Principles of Marketing – The Management View, Hold Rinehard and Winston Incorporated, New York.
6. Sherlekar, S. R., Marketing Management, Himalaya Publishing House, New Delhi.
7. Mote,V. L., Paul, S. and Gupta, G. S., Managerial Economics Concepts and Cases, Tata McGraw Hill Limited, New Delhi.

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Pharmaceutical Analysis II - BPY -0602

Paper Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d= a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0602	Pharmaceutical Analysis II	4	-	2	06	70	22	20	10	100	30	9	20	50	150	3 Hrs

The theoretical aspects, basic instrumentation, elements of interpretation of spectra and pharmaceutical application of the following analytical techniques –

UNIT-I (Marks-14)

Ultraviolet and visible spectrophotometry: Beer-lambart law, electronic transitions, instrumentation, methods, chemical derivatisation, structural analysis, applications.Infra red spectrophotometry & FT-IR: Introduction, Theory, instrumentation, interpretation of spectra, its advantages and applications in structure elucidation.

UNIT-II (Marks-14)

Mass Spectroscopy: Introduction, ionization techniques, mass analyzers, fragmentation rules, instrumentation, the mass spectrum & its applications.

UNIT-III (Marks-14)

NMR Spectroscopy: Introduction, continous-wave (CW) NMR spectrometry, pulsed fourier transform spectrometry, chemical shift, spin coupling, spin decoupling & its applications.

UNIT-IV (Marks-14)

Atomic Absorption. X- Ray Diffraction, Fluorimetrtry, Flame Photometry

UNIT-V (Marks-14)

Chromatography: Paper Chromatography TLC, GLC, HPTLC and HPLC. Immunoassay techniques: Enzymes & radioimmunoassay techniques, theory, methods & its applications.

Books Recommended:

1.Svehla, G. Vogel's Text Book of Micro and Semi Micro Qualitative Inorganic Analysis, Orient Longman, Hyderabad.

2. Beckett, A.H. and Stenlake, J.B., Practical Pharmaceutical Chemistry, The Athlone Press of the University of London.

3. Chatten, L.G., Text Book of Pharmaceutical Chemistry, Marcel Dekker, New York.

4. Connors, K,.A., A Text Book of Pharmaceutical Analysis, Wiley Interscience, New York.

5. Higuchi, J. and Hansen E.B., Pharmaceutical Analysis, Interscience Publisher John Willey and Sons, New York, Sydney.

6. Silverstein,R.M., Bassier, G.C., and Morril,T.C., Spectrophotometric Identification of Organic Compounds, John Wiley and Sons Inc.

7. Willard, Merritt and Settle, Instrumental Methods of Chemical Analysis,CBS Publisher and Distributors, New Delhi.

Books Recommended:

1. Shukla, S. M., Advanced Accountancy, Mahershwari Sahitya Bhawan, Agra.

2. Ewing, G.W., Instrumental Methods of Chemical Analysis,.

List of Practicals :

1. Study of effect of various solvents on spectral features of any drug.
2. Determination of solvent cut off value of different solvents.
3. Perform the quantitative spectrophotometric estimation of drug by standard absorptivity method.
4. Perform the quantitative spectrophotometric estimation of drug by calibration curve method.
5. Perform the quantitative spectrophotometric estimation of drug by single point method.
6. Simultaneous quantitative spectrophotometric estimation of two drugs by dual wavelength method.
7. Simultaneous quantitative spectrophotometric estimation of two drugs by simultaneous equation method.
8. Simultaneous quantitative spectrophotometric estimation of two drugs by derivative spectroscopy.
9. Interpretation of given IR spectra.

10. To determine the tablet content of norfloxacin by hydrotrophy.
11. Simultaneous quantitative estimation of torsemide and spironolactone(Combination of two drugs) by RP-HPLC.
12. Quantitative estimation of alprazolam (Any drug) by RP-HPLC.
13. Oxidative stress degradation study of any drug.
14. Acid and alkaline stress degradation study of any drug.
15. Photo and thermal stress degradation study of any drug.

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Pharmaceutical Chemistry–VII (Medicinal Chemistry-II) BPY-0603

Paper Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d= a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0603	Pharmaceutical ChemistryVII(Medicinal Chemisry-II)	4	-	2	6	70	22	20	10	100	30	9	20	50	150	3 Hrs

UNIT-I (Marks14)

Principles of Drug Design (Theoretical Aspects). Scientific Aspects of Drug Discovery, Preclinical Development, Mechanism based Approaches (Computer Aided Drug Design and Molecular Modeling)

UNIT-II (Marks-14)

Classification and mode of action, uses, structure activity relationship including physicochemical, steric aspects and recent advances in research of the following categories of drugs:

(A) Vitamins

(B) **Drug Acting on GIT :** Laxative Antidiarrho eal Anti spasmodic Antiulcers Drugs

UNIT-III (Marks-14)

Drug Acting on Hormonal System:

Insulin and oral Hypoglycemic agents: Etiology of Diabetes, Biochemistry and Pathogenesis of Diabetes, Production of Insulin. Adrenocorticoids: Mechanism of steroid Hormone action, Development of Adrenocorticoid drugs.Sex Hormones: Male sex Hormones, Female sex Hormones.

Thyroid and Antithyroid agents : Biochemistry and Physiology of Thyroid Hormones, Biosynthesis of Thyroid Hormones.

UNIT-IV (Marks-14)

Drug Acting on CNS

General Anesthetics: Stages of Anesthesia , Pharmacokinetic Principles, Theories of the mechanisms.Hypnotics and Sedatives : Testing and developments of new Hypnotics. Antiseizure agents: Drugs effective against partial and generalized tonic- clonic seizure.

UNIT-V (Marks-14)

Opiod Analgesics : Endogenous opioid peptides and their physiologic functions, Neurobiology of drug abuse and addiction.

Antiparkinsonian and Spasmolytic agents : Pharmacotherpy of Parkinsons disease. Hallucinogens, Stimulants, and related drugs of Abuse. Psychopharmacological Agents: Antipsychotic agents, Antidepressants, Anxiolytics.

List of Practicals :

1. Synthesis and Characterization of Barbital from Urea.
2. Synthesis and Characterization of Methylphenobarbital from Urea.
3. Synthesis and Characterization of Diclofenamide.
4. Synthesis and Characterization of Pantaprazol.
5. Synthesis and Characterization of Nikethamide from Nicotinic acid.
6. Synthesis and Characterization of Phenothiazine.
7. Synthesis and Characterization of Phenobarbitone.
8. Synthesis and Characterization of Thioridazine.
9. Synthesis and Characterization of Levodopa from Vanillin.
10. Synthesis and Characterization of Chlorpromazine.
11. Synthesis and Characterization of Furosemide from 2,4 dichloro-benzoic acid.
12. Synthesis and Characterization of Sulfalene from p-aminobenzene sulphonyl chloride.

Books Recommended:

1. Foye, W.C., Principles of Medicinal Chemistry, Lea and Febiger, Philadelphia.
2. Wolff , M.E. Ed., Burger's Medicinal Chemistry, John Wiley & Sons, New York.
3. Hansch, C., Comprehensive Medicinal Chemistry, Pergarnon Press, Oxford.
4. Delagado, J.N. and Remers, W.A.R, Wilson and Giswold's Text Book of Organic,Medicinal and Pharmaceutical Chemistry, J.Lippincott Co., Philadelphia.
5. Nogrady, T., Medicinal Chemistry-A Biochemical Approach, Oxford University Press, New York, Oxford.
6. Kar, A., Medicinal Chemistry, Willey Eastern Ltd., New Delhi.
7. Patrick, G., An Introduction to Medicinal Chemistry, Scientific Distributors, Mumbai.
8. Malone, Dyson and Purey, May's Chemistry of Synthetic Drugs.
9. Parimoo, P., Text Book of Medicinal Chemistry, CBS Publishers and Distributors, New Delhi.
10. Thomas, G., Introduction to Medicinal Chemistry, CBS Publishers and Distributors, New Delhi.

11. To determine the correlation between physiochemical properties and biological activity for a series by using Hansch analysis.
12. To determine the regression coefficients for a series by using Hanschand Free Wilson Approach.
13. Synthesis and Characterization of Benorilate.
14. Synthesis and Characterization of Parbanic acid.
15. Estimation of Na^+, K^+, Ca^{++} ions using flame photometry.
16. To perform the QSAR Analysis by Free Wilson Approach.

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Pharmacognosy– IV (BPY- 0604)

Paper Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d= a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0604	Pharmacognosy – IV	4	-	2	6	70	22	20	10	100	30	9	20	50	150	3 Hrs

UNIT-I **(Marks14)**

General introduction classification and brief description of different chromatographic techniques with detailed emphasis on application of TLC, HPLC, HPTLC , paper chromatography & column chromatography in the evaluation of herbal drugs.

UNIT-II **(Marks14)**

Historical development of plant tissue culture technique, types of culture, nutritional requirements, surface sterilization of explants, growth and maintenance. Application of PTC in development of phytoconstituents.

UNIT-III **(Marks-14)**

An introduction to cultivation and utilization of aromatic plants with special reference to sandalwood oil, mentha oil, eucalyptus oil, lemon grass oil, clove oil.Herbs as health food, cosmeceuticals.

UNIT-IV **(Marks14)**

An introduction of marine pharmacognosy and novel agents from marine sources like cardiovascular active substances, cytotoxic, antimicrobial, antibiotic, anti-inflammatory, antispasmodic agents, marine toxin etc.Natural dyes, Immunomodulators and Adaptogens.

UNIT-V **(Marks-14)**

Production and analysis of phytoconstituents of pharmaceutical importance like quinine, strychnine, atropine, morphine podophyllotoxin, papain, vincristine, ephedrine and Tannic acid, Spectral analysis of herbal drugs with emphasis on application of UV, IR, NMR, mass.

List of Practicals:

1. To perform TLC of alkaloids.
2. To perform TLC of volatile oils i.e. eucalyptus oil, menthe oil.
3. To perform TLC of extract of rauwolfia, datura.
4. To perform chromatography of amino acids.
5. To perform paper chromatography of sugars.
6. To isolate ammonium glycyrrhizinate from glycyrrhiza.
7. To extract aloin from aloe.
8. To identify the presence of eugenol in clove oil by TLC.
9. To determine volatile oil content of eucalyptus leaf.
10. To determine volatile oil content of fennel fruits.
11. To extract tannic acid from myrobalan.
12. To perform column chromatography a natural dye.

Books Recommended:

1. Trease, G.E.and Evans, W.C., Pharmacognosy, Baillierc, indall, Eastbourne, U.K.
2. Tayler, V.E., Brady, L.R. and Robers, J.E., Pharmacognosy Lea and Febiger, Philadelphia
3. Kokate, C.K., Purohit, A.P. and Gokhale, S.B., Pharmacognosy Nirali Prakashan, Pune
4. C.R Atal and B.M. Kapoor, Cultivation & Utilization of Aromatic Plants, Council of Scientific Industrial Research (CSIR) New Delhi.

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Pharmacology-III B PY -0605

Paper Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d= a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0605	Pharmacology III	4	-	2	6	70	22	20	10	100	30	9	20	50	150	3 Hrs

UNIT-I **(Marks14)**

Pharmacology of drugs acting on hematopoietic system

a) Hematinics
b) Drugs affecting coagulation, bleeding and thrombosis
c) Plasma expanders
d) Hypolipidaemic drugs

UNIT-II **(Marks14)**

Pharmacology of drugs acting on urinary system

UNIT-III **(Marks-14)**

Pathophysiology of diseases of cardiovascular system and pharmacology of drugs used for their treatment

a) Antihypertensive drugs
b) Antiarrythmic drugs
c) Antianginal drugs
d) Cardiac Glycosides

UNIT-IV **(Marks14)**

Pathophysiology of diseases of endocrine system and pharmacology of drugs used for their treatment

a) Thyroid hormones and antithyroid drugs
b) Insulin, oral hypoglycemic agents and glucagons
c) Hypothalamic and pituitary hormones
d) Corticosteroids

UNIT-V **(Marks-14)**

a) Androgens and drugs for erectile dysfunction
b) Estrogens, progestins and contraceptives
c) Oxytocin and drugs acting on uterus
d) Drugs affecting calcium balance

List of Practicals

1. Determine the sympatholytic activity of given drug sample using isolated guinea pig ileum preparation.
2. Determine the strength of given sample (acetyl choline/ histamine) by three point bioassay method using isolated organ preparation (rat ileum/ rat duodenum/ rat colon/ rat fundus/ guinea pig ileum).
3. Determine the strength of given sample (acetyl choline/ histamine) by four point bioassay method using isolated organ preparation (rat ileum/ rat duodenum/ rat colon/ rat fundus/ guinea pig ileum).
4. Compare the diuretic/saluretic activity of different drugs in rats.
5. Record the concentration response curve of oxytocin using rat uterus preparation.
6. Study the effect of oral hypoglycemic agents in diabetic rodents.
7. Study the effect of thyroid hormones on the tensile strength of connective tissues in rats.
8. Study the effect of growth hormone on the weight gain in female rats.
9. Determine the effect of anticoagulants by subaqueous tail bleeding time method in rodents.

Books Recommended:

1) Herfindal, E.T., Gourley, D.R., (eds.) (2000) Textbook of therapeutics Drug and disease management. 7th ed. Baltimore: Lippincott Williams and Wilkins

2) Hardmen, J.G., Limbird, L.E., Gilman A.,G., (eds.) (2001) Goodman and Gilman's The pharmacological basis of therapeutics. 10th ed. USA: The McGraw Hill Companies

3) Kumar, V., Abbas, A.K., Fausto, N., (eds.) (2004) Robbins and Cotran Pathologic basis of disease. 7th ed. Pennsylvania: Saunders

4) Barar, F.S.K., (2000) Essentials of therapeutics. New Delhi: S. Chand and Company(P) Ltd.

5) Satoskar, R.S., Bhandarkar, S.D., Rege, N.N., (2007) Pharmacology and Pharmacotherapeutics. 12th ed. Mumbai: Popular Prakashan

6) Seth, S.D., (ed.) (2005) Textbook of Pharmacology. 2nd ed. New Delhi. Elsevier

7) Tripathi, K.D. (1999) Essentials of medical pharmacology. 4th ed. New Delhi: Jaypee Brothers Medical Publishers (P) Ltd.

8) Rang, H.P., et al. (eds.) (2003) Pharmacology. 5th ed. Philadelphia: Elsevier

9) Katzung, B.G., (2004) Basic and clinical pharmacology. 9th ed. USA: The McGraw Hill Companies.

10) Pillai, K.K., (2009) Experimental Pharmacology. New Delhi, CBS Publishers and Distributers.

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Semester-VII

Pharmaceutics VIII(Pharmaceutical Technology I)
BPY-0701

Paper Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d= a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0701	Pharmaceutics-VIII (Pharm.Tech.I)	4	-	2	6	70	22	20	10	100	30	9	20	50	150	3Hrs

Formulation considerations, technology involved, equipment (machine) emplo yed, problems to be encountered, packaging evaluation and CMP (India, WHO & USFDA) requirements of the following dosage forms.

UNIT-I **(Marks-14)**

Liquid Dosage Forms- Liquid Orals, Dry Syrups.

Solid Dosage Forms- Tablets, Tablet coatings and Capsules.

UNIT-II **(Marks-14)**

Semisolid Dosage FormsCreams, Gels, ointments, Suppositories.

Sterile Dosage Forms- Parenteral (Small Volume Parenterals & Large Volume Parenterals) and ophthalmic Preparations.

UNIT-III **(Marks-14)**

Pharmaceutical Aerosols

UNIT-IV **(Marks-14)**

Surgical products:

Definition, surgical cotton, surgical gauzes, bandages, adhesive tapes, absorbable and non absorbable sutures, ligatures and catguts, Medical prosthetics and organ replacement materials.

UNIT-V **(Marks-14)**

Blood Products and Plasma Substitutes:

Collection, processing and storage of whole human blood, concentrated human RBC, dried human plasma, human normal immunoglobulin, plasma substitutes, ideal requirements, PVP, Dextran, etc. for control of blood pressure,

Books Recommended

1. Rawlins, E.A., Text Book Of Pharmaceutics, Bailliere Tindall.
2. Lachman, L. , Liberman, H.A. and Kanig, J.L., The Theory and Practice of Industrial Pharmacy, Lea and Febiger, Philadelphia.
3. Liberman, H.A., lachman, L. and Ker Inc. New York.
4. Pharmacopoeia Of India, Ministry of Health and family Welfare, Govt. of India, New Delhi.
5. Avis, K.E., Lachman, L. and Liberman, H.A., Pharmaceutical Dosage Forms-Parenteral Medication Vol.1-2, Marcel Decker Inc., New York.
6. Banker G.S. and Rhode C.T., Modern Pharmaceutics, Marcell Decker Inc., New York.
7. Bean, H.S., Beckett, A.H. and Carless, A.H., Advances in Pharmaceutical Sciences, Vol.1-4, Academic Press, London

List of Practicals

1. Prepare and evaluate Effervescent Tablets of Aspirin.
2. Prepare and evaluate Paracetamol Compressed Tablets.
3. Prepare and evaluate Film Coating on the given sample of Tablets.
4. Perform the Sugar Coating on the given sample of Tablets.
5. Perform the Enteric Coating on the given sample of Tablets.
6. Perform the Dispersible tablets of Diclofenac Sodium.
7. Prepare and evaluate Antacid Suspension.
8. Prepare and evaluate Tetracycline HCL Capsules.
9. Prepare and evaluate Amoxicillin Dry Syrup.
10. Prepare and evaluate B-Complex Syrup.
11. Prepare and evaluate Castor Oil Emulsion.
12. Prepare and evaluate Diclofenac Sodium Suppositories.
13. Prepare and evaluate Antiseptic Cream.
14. Prepare and evaluate Non-Staining Iodine Ointment containing Methyl Salicylate.
15. Prepare and evaluate Vaporizing Ointment.
16. Prepare and evaluate Ciprofloxacin Eye Drop.
17. Prepare and evaluate Diclofenac Gel.
18. Prepare and evaluate Water for Injection.
19. Prepare and evaluate Oxytetracycline Injection.
20. Perform the Sability Studies of given sample of Paracetamol Tablets.
21. Prepare and evaluate an aqueous injection of a poorly water – soluble drug using hydrotropic solubilization technique.

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Pharmaceutics-X
(Biopharmaceutics and Pharmacokinetics) BPY -0702

Paper Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d= a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0702	Pharmaceutics-IX (Biopharmaceutic & Pharmacokinetic)	4	-	2	6	70	22	20	10	100	30	9	20	50	150	3 Hrs

UNIT-I (Marks-14)

Introduction to biopharmaceutics and pharmacokinetics development and their role in drug formulation.

Biopharmaceutics

Definition , passage of drugs across biological barrier , Physiochemical , Biological and Pharmacaceutical factors influencing biopharmaceutical performance of drugs.Gastrointestinal absorption of drugs: Passage of drugs across biological membranes, nature of biological membranes, gastrointestinal absorption mechanisms.Factors affecting drug absorption : Physiological factors, dietary factors,physiochemical factors, pH partition hypothesis, dosage form factors.Methods of studying gastrointestinal absorption: In vitro and in vivo methods. Drug disposition: Distribution in blood, cellular distribution, plasma protein binding, tissue protein binding.Drug Excretion: Routes of drug excretion, renal excretion of drugs, factors affecting renal excretion, biliary and salivary excretion of drugs.Drug biotransformation: Pathways of drug metabolism, drug metabolizing enzymes, factors affecting drug metabolism and drug response, inhibition and stimulation of drug metabolism.

UNIT-II (Marks-14)

Biovailability and Bioequivalance

Biovailability and Bio-equivalance, Federal requirements, Methods of determination of bioavailability using blood level and urinary excretion data, design and evaluations, bioavailability assessment.

UNIT-III (Marks-14)

Compartment Models

Model selection criteria, alaika information criterian, one – compartment and two compartment models, Wagner- Nelson and loo Riegelman methods for estimation of absorption constants. Curve fittings,regression procedure and area under blood level curves.

UNIT-IV (Marks-14)

Pharmacokinetics

Absorbtion, distribution metabolism and excretion of drugs, fluid compartment and circulatory system, protein binding, significance of plasma drug concentration measurement.

UNIT-V (Marks-14)

Clinical Pharmacokinetics

Urinary excretions, computation of pharmacokinetic parameters from urine data, haepetic clearance,biliary excretion,excretion ratio,dosage regimen adjustment in patients with and without renal failure, pharmacokinetic drug interaction and their significance in combination therapy.

Books recommended

1. Gibaldi, M.and Perrier d, Pharmacokinetics, 4th edn. Pharma mid press, Hydrabad
2. Notari, R.E., Biopharmaceutics and pharmacokinetics-An Introduction, marcel Decker New York.
3. Jaiswal , Brahmankar Biopharmaquality and pharmacokinetics.
4. Leepeter I.D., Pharmacokinetic analysis
5. Niazi Textbook of Biopharmacokinetics and clinical pharmacokinetics.
6. Venkaateshwaru v , Biopharmaceutics and pharmacokinetics, phared puss, Hydrabad.
7. Wagner-pharmacokinetics for the pharmastudies.
8. Dhachinamoorthi D: Biopharmaceutics and pharmacokinetics : A practical mannd
9. Shargel : pharmacokinetics & Biopharmacokinetics & Biopharmaceutic

List of Practicals

1. Determine oral bioavailability of the given drug/formulation by urinary excretion method using animal model.
2. Perform bioequivalence study of two different brands of the marketed tablets of the given drug using animal model.
3. Determine the percentage protein binding of the given drug.
4. Determine the effect of different pH condition on solubility of a weekly acidic or basic drug and study p^H partition hypothesis.
5. Determine the rate of in-vitro absorption of the given drug using everted intestinal sac.
6. Establish IVIVC for the given sample of drug.
7. Calculate elimination rate constant and elimination half life of the given drug data administered by i.v. bolus injection represented by one compartment model.
8. Calculate elimination rate constant and elimination half life of given excretion data by sigma minus method.
9. Calculate various pharmacokinetic parameters from the given data obtained by using two compartment open model.
10. Calculate various pharmacokinetic parameters from the given data generated after single extra vascular administration of drug represented by one compartment model.

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Pharmaceutical Chemistry VIII (Medicinal Chemistry-III)
BPY - 0703

Paper Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d= a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0703	Pharmaceutical ChemistryVIII (Med.Chem.-III)	4	-	-	4	70	22	20	10	100	-	-	-	-	100	3Hrs

The synthesis of the selected drugs, mode of action, classification, uses, SAR of the following category of drugs:

UNIT-I (Marks-14)

Drugs acting on Cardiovascular system :

Antihypertensive drugs Antihyperlipidimic drugs
Antiarrythmic drugs
Antianginal drugs
Cardiac Glycosides

UNIT-II (Marks-14)

Drugs affecting uterine motility

Oxytocins (including prostaglandins and Ergot alkaloids).

Drugs acting on Urinary system : Diuretics

UNIT-III (Marks-14)

Chemotherapeutic Agents-I

Anti neoplastic,
Anti metabolites(Including Sulpha durgs)
B-lactum antibiotics
Aminoglycoside

UNIT-IV (Marks-14)

Chemotherapeutic Agents-II
Anti malarials
AntiProtozoal
Anti tubercular
Anthelmintics

UNIT-V (Marks-14)

Chemotherapeutic Agents-III
Antifungals
Anti viral & Anti HIV,
Protein synthesis inhibitors (Tetracyclins,chloramphenicol,Macrolides) Immuno- suppressive
Miscellaneous antibiotics (Bacitracin, Glycopeptides, Polymyxins)

Books Recommended:

1. Foye, W.C., Principles of Medicinal Chemistry, Lea and Febiger, Philadelphia.
2. Wolff , M.E. Ed., Burger's Medicinal Chemistry, John Wiley and Sons, New York.
3. Hansch, C., Comprehensive Medicinal Chemistry, Pergarnon Press, Oxford
4. Delagado, J.N. and Remers, W.A.R, Wilson and Giswold's Text Book of Organic,Medicianl and Pharmaceutical Chemistry, J.Lippincott Co., Philadelphia.
5. Nogrady, T., Medicinal Chemistry-A Biochemical Approach, Oxford University Press, New York, Oxford.
6. Kar, A., Medicinal Chemistry, Willey Eastern Ltd., New Delhi.
7. Patrick, G., An Introduction to Medicinal Chemistry, Scientific Distributors, Mumbai.
8. Malone, Dyson and Purey, May's Chemistry of Synthetic Drugs.
9. Parimoo, P., Text Book of Medicinal Chemistry, CBS Publishers and Distributors, New Delhi.
10. Thomas, G., Introduction to medicinal Chemistry, CBS Publishers and Distributors, New Delhi.
11. Sten lake B.J. medicinal and pharm. Chemistry pharma mid press, Hyderabad

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Pharmaceutical Biotechnology BPY 0704

Paper Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d= a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0704	Pharmaceutical Biotechnology	4	-	2	6	70	22	20	10	100	30	9	20	50	150	3 Hrs

UNIT-I (Marks-14)

Historical Development Genetic Recombination :

Transformation, Conjugation, Transduction, Protoplast fusion, Gene cloning and their applications, Monoclonal antibodies and hybridoma technology, Recombinant DNA technology: Concepts, Methodology and Pharmaceutical applications. Study of drugs produced by biotechnology such as Activase, Humulin, Humatrope, Introne A, Monoclate, Orthoclone OKT3, Referon-A, Recombivax HB etc.Drug delivery systems in Gene therapy.

UNIT-II (Marks-14)

Enzyme Immobilization –

Techniques of Immobilization of enzymes, Kinetics and factors affecting enzymes kinetics, Enzymes based sensors, Study of enzymes such as Hyaluronidase, Penicillinase, Strepto- Kinase, Amylases etc. Immobilization of bacteria and plant cells, Applications of Immobilization.

UNIT-III (Marks-14)

Immunology and Immunological Preparations :

Principles, Antigens and antibodies, Antigen-antibody reactions and their applications,Immune system.Cellular humoral immunity, Immunological tolerance, Hypersensitivity, Immunological and diagnostic preparations: Methods of their preparation, standardization and storage.

UNIT-IV (Marks-14)

Microbiological Transformation –

Intoduction, Types of reactions mediated by micro organisms. Design of biotransformation processes, Selection of organism, Biotransformation processes and its improvements with special refrence to steroids.

UNIT-V (Marks-14)

Industrial Biotechnology –

Historical development, Isolation of mutants, Use of mutagenic agents, Factors in influencing rate of mutation. Fermenter and its design, Control of different parameters in fermentation process, Design of fermentation process, Fermentative, production of Alcohol, Acetic acid, Penicillin, Streptomycin, Riboflavin, Vitamin B12.

List of Practicals

1. Isolate the DNA from cauliflower.
2. Isolate the phospholipid from egg yolk .
3. Detect the presence of the amylase enzyme in saliva.
4. Perform VDRL test for the given sample of blood.
5. Perform WIDAL test for the given sample of blood.
6. Perform DOT ELISA test of the given sample of blood.
7. Isolate the total RNA from yeast tablet.
8. Immobilize the given enzyme by adsorption method using calcium alginate beads.
9. Perform titre value of antibody in given blood sample.

Books Recommended

1. Lehninger ., Principles of Biochemistry
2. Karp, G.,Cell & Molecular Biology.
3. Crommelin, D.J., A., and Sindelar R.D.,Pharmaceutical Biotechnology.
4. Templeton N.S., and Lasic. D.D., Gene Therapy.
5. Benjamin Lewin, Genes.
6. Watson and Trooze, Recombinant DNA Techniques
7. Watson, Molecular Biology of cell.
8. Old and Primrose, Principles of Gene Manipulations.
9. Watson, J.D., Gilman, M., Recombinant DNA Technology
10. Alberts, B., Johnson, A., Lewin, J., Raff, M., Roberts, K., Walter, P.,molecular biology of the cell
11. Paul, W.E, Fundamentals of Immunology
12. Klug, W.S., Cummings, M.R., Essentials of Genetics
13. Glick, B.R., Pasternak, J.J., Molecular Biotechnology
14. Walker, J.M., Ripley, R., Molecular biology and Biotechnology

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Pharmacology – IV BP0705

Paper Code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d= a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0705	Pharmacology-IV (Clinical & Drug Interactions)	4	-	-	4	70	22	20	10	100	-	-	-	-	100	3 Hrs

UNIT-I (Marks-14)

Basic concepts of Pharmacotherapy

Individualization of drug therapy : Clinical pharmacokinetic and pharmacodynamics. Drug use during pregnancy, Pediatrics and Geriatrics Adverse drug reactions and drug induced diseases Drug interactions. Therapeutic drug monitoring.

UNIT-II (Marks-14)

Clinical Toxicology

Definition of poison. General principles of treatment of poisoning.Treatment of opioid,barbiturate, organophosphorous, and atropine poisoning.Heavy metals and heavy metal antagonists

UNIT-III (Marks-14)

Chemotherapy of Microbial Diseases-I

General principles Synthetic organic antimicrobials (Sulphonamides, quinolones etc.)

B-lactum Antibiotics Aminoglycosides

UNIT-IV (Marks-14)

Chemotherapy of Microbial Diseases-II

Protein synthesis inhibitors (Tetracyclins,chloramphenicol,Macrolides)Antitubercular drugs, antileprotic drugs,antiprotozoals, anthelmintics, antifungals Antiretroviral and antiviral drugs

Miscellaneous antibiotics (Bacitracin, Glycopeptides, Polymyxins)

UNIT-V (Marks-14)

Chemotherapy of cancer and immunosuppressive agents

Books Recommended:

1) Herfindal, E.T., Gourley, D.R., (eds.) (2000) Textbook of therapeutics Drug and disease management.7th ed.Baltimore : Lippincott Williams and Wilkins.

2) Hardmen, J.G.Limbird, L.E. Gilman A., G., (eds.) (2001) Goodman and Gilman'sThe pharmacological basis of therapeutics. 10th ed. USA : The McGraw Hill Companies

3) Barar, F.S.K., (2000) Essential of therapeutics. New Delhi: S. Chand and Company (P) Ltd.

4) Satoskar, R.S. Bhandarkar, S.D., Rege, N.N., (2007) Pharmacology and Pharmacotherapeutics. 12th ed. Mumbai: Popular Prakashan

5) Seth, S.D., (ed.) (2005) Textbook of Pharmacology. 2nd ed. New Delhi. Elsevier.

6) Tripathi, K.D. (1999) Essentials of Medical pharmacology. 4th ed. New Delhi : Jaypee Brothers Medical Publishers (P) Ltd.

7) Rang, H.P., et. (eds.) (2003) Pharmacology. 5th ed. Philadelphia Elsevier.

8) Katzung , B.G., (2004) Basic and clinical pharmacology. 9th ed. USA : The Mcgraw Hill Companies.

9) Dipiro, J.T., et al. (eds.) (1997) Pharmacotherapy. A pathophysiologic approach. 3rd ed. Stanford, Connecticut: Appleton and Longe.

10)Craig, C.R., Stitzel, R.E. (1999) Modern pharmacology with clinical applications. 5th ed. USA.

11) Guideliness for poison control. (1999) WHO, Geneva: AITBS Publisher, Delhi

12) Curry – Drug disposition and pharmacokinetics with a consideration of pharmacokinetics with a consideration of pharmacological and elinical relationships, 3rd edn., pharmumed pre

13) Kenakin Terry P: A pharmacological Primer – theory applications & methods, pharma med

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Semester-VIII

Pharmaceutics –X (Pharmaceutical Technology –II)
BPY-0801

Paper code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d = a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0801	Pharmaceutics –X (PharmaceuticalTechnology –II)	4	-	2	6	70	22	20	10	100	30	9	20	50	150	3 Hrs

Unit I **Marks: 14**

Microencapsulation techniques: Coating of particles. Phase separation co-acervation, Fluidized bed and air suspension coating. multiorifice centrifugal, spray drying, spray congealing, polymerization complex emulsion techniques. Top bottom and tangential spray coating machines. Evaluation of microcapsules.

Unit II **Marks: 14**

Granulation technology: production of granules on large scale by various techniques, evaluation of granules. Compression and consolidation of powdered solids. Heckel plots. Force displacement (F-D) Curves.

Unit III **Marks: 14**

Novel drug delivery systems: Liposomes and implants, Transdermal drug delivery systems. Osmotic drug delivery systems.

Sustained and controlled drug delivery systems: concept of sustained release, designing of sustained release products, zero order and first order approximation concept. Matrix and reservoir based techniques. Product evaluation and testing.

Unit IV **Marks: 14**

Pilot plant scale-up techniques: General considerations, space requirements, personnel requirements, review of formula and raw materials, Processing equipments. Process evaluation. GMP considerations.

Unit V **Marks: 14**

Packaging of Pharmaceutical Products: Objective of packaging, packaging components, types, functions, containers and closures, foil and blister packaging. Packaging equipment, legal and official requirements for containers and closures. Package testing.

Other Instructions:

1.Practical should be designed by the Concerned Teacher.
2.Atleast 10 Practical should be performed .

Recommended Books:

1. Leon Lachman, Herbert A. Liebermann and Joseph L.Kanig., The Theory and Practice of Industrial Pharmacy.
2. Banker G.S. and Rhodes C.D., Modern Pharmaceutics.
3. Remington's Pharmaceutical Sciences.
4. Aulton M. E., The Science of Dosage Form Design.

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Pharmaceutics –XI (Pharmaceutical Jurisprudence) BPY-0802

Paper code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d = a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0802	Pharmaceutics- XI (Pharmaceutical Jurisprudence)	4	-	-	4	70	22	20	10	100	30	9	20	50	150	3 Hrs

Unit I — Marks: 14

Review of Indian regulatory legislations for drug and pharmaceutical industries, and pharmaceutical education.

Unit II — Marks: 14

An elaborated study of the following:

a. Drugs and Cosmetics Acts 1940 and Rules 1945 b.
Pharmacy Act 1948
c. Drugs and Magic Remedies Act (Objectionable Advertisement Act 1954)
d. Medicinal and Toilet Preparations (Excise Duties) Act 1955 e.
Patent Act 1970 and Rules
f. Essential Commodities and Drug Price Control Order
g. Narcotic Drugs and Psychotropic Substances Act 1985

Unit III — Marks: 14

brief study of the following:

a. . Factories Act 1948
b. Minimum Wages Act 1948
c.State Shops and Establishment Act and Rules

Unit IV — Marks: 14

a. d. Poison Act and rules
b. MRTP Act
c. Insecticides Act 1968
d. Prevention of Cruelty to Animal Act 1960
e. Medical Termination of Pregnancy Act 1970 and Rules 1975
f.AICTE Act 1987

Unit V **Marks: 14**

Brief Study of various prescription and non-prescription products, medical and surgical accessories, diagnostic aids and appliances marketed in India.

Recommended Books

1. Jain N. K., A Textbook of Forensic Pharmacy.
2. Mittal, B.M., A Textbook of Forensic Pharmacy.
3. Malik V., Drug & Cosmetic Act.
4. The Gazette of India. The Drugs and Cosmetics act and rules.
5. The Gazette of India. The Patent act 1970 and its latest amendments.

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Pharmaceutical Analysis – III BPY-0803

Paper code	Title of the Paper	Periods Per week				Distribution of Marks										Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d = a+c)	Practical		L W (g)	Total (h= e+g)			
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)					
BPY - 0803	Pharmaceutical analysis-III	4	-	2	6	70	22	20	10	100	30	9	20	50	150	3 Hrs	

Unit I — Marks: 14

Validation of analytical methods: Parameters of validation, pharmacopoeial requirements of analytical method validation.

Unit II — Marks: 14

Validation of analytical instruments: UV/visible spectrophotometer and HPLC as per Indian Pharmacopoeia.

Unit III — Marks: 14

Analytical method development: Development of new analytical methods for bulk drugs and dosage forms using titrimetry, UV/visible spectrophotometry and HPLC. Development of analytical methods for combination drug products, derivative spectrophotometric methods. Development of stability indicating assay procedures. Drug analysis in biological fluids like blood plasma and urine. Good laboratory practices.

Unit IV — Marks: 14

ICH guidelines for impurities in drug substances and drug products, Residual solvents. Quality control testing: Dosage form evaluation as per monograph with special reference to Indian Pharmacopoeia. Drug identification test, drug content and assay, content uniformity. Sampling considerations.

Unit V — Marks: 14

Water analysis: Validation and qualification of water purification systems. Total organic carbon, pH, and conductivity test. Moisture content analysis in drug and dosage forms.

Other Instructions:

1.Practical should be designed by the Concerned Teacher.
2.Atleast 10 Practical should be performed .

Recommended Books

1. Indian Pharmacopoeia, 2007.
2. Current ICH guidelines.
3. Vogel's, Quantitative Inorganic Analysis.
4. Beckett, Pharmaceutical Analysis.

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Packaging Technology (Elective –I) BPY-0804 (A)

Paper code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d = a+c)	Practical		L W (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0804	Elective-I	4	-	2	6	70	22	20	10	100	30	9	20	50	150	3 Hrs

Unit I **Marks: 14**

Packaging material science: Basic materials used in packaging, their properties, method of manufacturing and applications- Glass, Metal, Paper, Plastics, and Elastomers.

Unit II **Marks: 14**

Containers and closures: Introduction and applications of Glass containers, Plastic containers, Collapsible tubes, Plastic tubes, Aerosol containers, Closures, Liners, and Rubber stoppers.

Introduction and applications of Form-Fill-Seal (FFS) technology.

Unit III **Marks: 14**

Tamper resistant and child resistant packages: Introduction, method of preparation, and applications of Blister and Strip packs, Bubble packs, Film Wrappers, Shrink seals, Pouches,Sachet and Tape seals, Sealed tubes, Breakable caps, Aerosol containers, etc.

Unit IV **Marks: 14**

Quality control and quality assurance of packaging materials: Quality control tests for containers and closures as per Indian Pharmacopoeia. Detection of defects in packaging materials, Quality testing of formed packs, Quality testing of containers and closures, Testing of child resistance and temper evidence property of packaging materials.

Unit V **Marks: 14**

Legal and regulatory requirements: Regulatory aspects of storage, handling and distribution of packaging materials with special emphasis on cGMP and cGLP requirements. Requirements of labels and labeling as per Drug & Cosmetics act and rules. Product / patient information literatures.

Recommonded Books

1. Dean, D.A.; Evans, E.R.; and Hall I.H., Pharmaceutical Packaging Technology.
2. Leon Lachman, Herbert A. Lieberman, Joseph L. Kanig, The Theory and Practice of Industrial Pharmacy.
3. Drug and cosmetic Act and Rules.

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Food and Nutraceutical Technology (Elective –I)
BPY-0804 (B)

Unit I **Marks: 14**

Functional foods and nutraceuticals:

(a) Properties, structure and functions of various Nutraceuticals: Glucosamine, Octacosanol, Lycopene, Carnitine, Melatonin and Ornithine alpha ketoglutarate. Use of proanthocyanidins, grape products, flaxseed oil as Nutraceuticals.

(b) Sources and role of Tocotrienols, polyunsaturated fatty acids, sphingolipids, lecithin, choline, terpenoids. Vegetables, Cereals, milk and dairy products as Functional foods.

Unit II **Marks: 14**

Nutritive and Non-nutritive food components with potential health effects. Effect of processing on Nutrients. Soy proteins and soy isoflavones in human health; Functional foods from wheat and rice and their health effects. Role of Dietary fibers and nuts in disease prevention. General ideas about role of Probiotics and Prebiotics as nutraceuticals.

Unit III **Marks: 14**

Food processing and preservation:

(a) General principles and techniques of food processing and food preservation, shelf life of food and nutraceutical products. Food stability: methods to enhance stability- freezing, lyophilization, and air drying techniques.

(b) Contamination and microbial spoilage of food products: Milk and milk products, eggs and poultry, fish, breads and cereals, meat, canned foods, vegetables and fruits. Food borne infections and intoxications.

Unit IV **Marks: 14**

Methods of food preservation, approved preservatives, Radiation and food preservation: Role of radiation in food preservation. Principles underlying destruction of micro- organisms by irradiation. Effect of irradiation on food constituents. Legal status of food irradiation. Contamination and microbial spoilage of food products: Milk and milk products, eggs and poultry, fish, breads and cereals, meat, canned foods, vegetables and fruits. Food borne infections and intoxications.

Unit V **Marks: 14**

Regulatory affairs:

(a) Regulatory certifications: FPO regulations, Manufacturing guidelines, Manufacturing and marketing licenses, AGMARK, Green Label certification, Organic food certifications.

(b). Regulatory aspects of food and nutraceutical products. The prevention of Food Adulteration Act 1954, The Food Safety & Standards Act, 2006.

Recommended Books

1. Essentials of Food and Nutrition by Swaminathan M., Ganesh and Co, 1985
2. Handbook of Nutraceuticals and Functional Foods Edited by Robert E.C. Wildman, Routledge Publishers.
3. Nutraceuticals by L. Rapport and B. Lockwood, Pharmaceutical Press.
4. Dietary Supplements of Plant Origin, M. Maffei (Ed.), Taylor & Francis, 2003.
5. Food packaging principals and practice, Gordon L. Robertson, Marcel and Dekker Inc. New York. 1993.

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Perfumes and colours (Elective –II) BPY-0805 (A)

Paper code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d = a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0805	Elective-II	4	-	2	6	70	22	20	10	100	30	9	20	50	150	3 Hrs

Unit I — Marks: 14

Colours:

Definition of colour, lake, dye, pigment. Theory of color formation at molecules level including Hund's Rule of multiplicity volume band approach & molecular orbital approach to colour.Detailed classification of colour obtained from natural sources like plant & animal sources, colours obtained from mineral sources, synthesis colours, dyes & pigments. FDA classification of colours. Various physiochemical properties of dyes & colours.

Unit II — Marks: 14

Manufacturing of colors: manufacturing methods of colours, dyes, lakes, and pigments.Regulatory aspects of use of colours in drug and cosmetics as per schedule Q of Drug and Cosmetic Act. Analysis of colours using instrumental methods & chromatographic methods. Applications of colours in various cosmetics like skin, nail, and hair cosmetics, etc.

Unit III — Marks: 14

Perfumes:

Historical background & present scenario of perfumery industry. Definition of odour, its classification. Definition of perfumes, attars, cologne, deodorants, aromatic waters. Chemical classification of perfumes obtained from plant and animal sources. Essential oils: Introduction, study of various physical and chemical properties of essential oils. Study of various isolation methods of essential oils.

Unit IV — Marks: 14

Formulation of perfumes, formulation excipients, manufacturing methods of perfumes, deodorants, colognes, and aromatic waters.

Unit V Marks: 14

Regulatory considerations: Analysis & standardization of perfumes. Toxicological aspects of use of perfumes, safety study of perfumes on naked skin including various dermatological tests.Application of perfumes in various cosmetic products like skin cosmetics, hair cosmetics, men's toiletries etc.

Recommoned Books:

1. Sagarine, Cosmetic Science and Technology, Vol. 1-4.
2. Harry's Cosmetology.
3. The Chemistry and Manufacture & Cosmetics, Vol. IV - Mainson G. De. Nawarre.
4. Colour and Cosmetic colour material - New Cosmetic Science - Mitsui.
5. The Cosmetic Industry - edited by Norman Scientific & Regulatory foundation - F. Estrin.

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Clinical Research (Elective –II) BPY-0805 (B)

Paper code	Title of the Paper	Periods Per week				Distribution of Marks									Grand Total (i= d+h)	Duration of Exam
						Theory		MST (c)		Total (d = a+c)	Practical		LW (g)	Total (h= e+g)		
		L	T	P	C	Max (a)	Min (b)	S	A		Max (e)	Min (f)				
BPY-0805(B)	Elective-II	4	-	2	6	70	22	20	10	100	30	9	20	50	150	3 Hrs

Unit I — Marks: 14

Introduction: Clinical pharmacy, duties and activities of a clinical pharmacist in hospital, monitoring of pharmacotherapy (patient chart review, medication counseling, clinical output review), ward round participation, patient relevant history (diseases and medication), prescriptions, drug prescribing guidelines, therapeutic drug monitoring.

Unit II — Marks: 14

Clinical pharmacokinetic: Individualization of drug therapy, introduction to clinical pharmacokinetics models, determination of drug clearance and volume of distribution, renal and non-renal clearance, hepatic clearance.

Clinical trial: Designs of clinical trials, Good clinical practices (ICH & GCP guideline for safety and efficacy), Institutional Ethical Committee and its function.

Various phases of clinical trials, introduction to monitoring and auditing of clinical trials. Basic concepts of biostatistics.

Unit III — Marks: 14

Clinical research organization (CRO): Organizational structure, present status and future prospects of clinical research organizations in India.

Unit IV — Marks: 14

Drug and poison information: Introduction to information resources and institutes, systemic approach in answering drug information queries, preparation of reports. Detection and assessment of adverse drug reactions and their documentation.

Unit V — Marks: 14

Patient data analysis: Introduction to common medical terminologies and abbreviation used in clinical pharmacy. Patient case history & case history formats, use of case history in evaluation of drug therapy.

Clinical laboratory tests: Interpretation of laboratory tests used in evaluation of disease state: Tests for hormones, body organ function, blood, urine, microbial culture, etc.

Recommended Books

1 Hefindal, E. T., Clinical Pharmacy & Therapeutics-. Williams & Wilkins.

2 Katzung, B., Basic and Clinical Pharmacology, Lange Medical Publication, California

3 Laurence D.R. and Bennet, P.N., Clinical Pharmacology, Churchill Livingstone

4 Walker, R. & Edwards, C., Clinical Pharmacy & Therapeutics, Churchill Livingston

5 DiPiro, J.T. et.al., Pharmacotherapy a pathophysiological approach, McGraw-Hill companies, Inc.

6 Green and Harris, Pathology and Therapeutics for Pharmacists: A Basis for Clinical Pharmacy Practice, Chapman and Hall Publications.

Herbal Drug Technology (Elective –II)
BPY-0805 (C)

Unit I — Marks: 14

Introduction: Definition, source of herbal raw materials, identification, authentication, Collection and processing of herbal drugs. Seasonal & geographical variations, natural & artificial drying methods. Packaging & labeling of herbal drugs prior to extraction.

Unit II — Marks: 14

Plant Tissue Culture Techniques & its Application in Pharmacy: Introduction, techniques of initiation and maintenance of various types of cultures for industrial level production of phyto- constituents. Immobilized cell techniques & biotransformation studies including recent developments in production of biological active constituents in static, suspension and hairy root cultures.

Unit III — Marks: 14

Herbal Formulations: Principles of Ayurveda, Ayurvedic dosage forms and their evaluation as per Ayurvedic pharmacopoeia. Formulation considerations of herbal infusion, decoction, lotion, washers, insect repellents, tincture, syrups, compresses, poultice, plasters, ointments, oils and salves, tablets and capsules.

Unit IV — Marks: 14

Brief account of plant based industries of India and world involved in R & D work on medicinal and aromatic plants and manufacturing herbal medicine. Regulatory requirements for herbal medicine industries: Infrastructure, Quality control, safety and stability, import and export of herbal products. Analytical Pharmacognosy – drug adulteration and detection.

Unit V — Marks: 14

Standardization techniques: WHO guidelines for assessing quality of herbal medicine. Analysis of raw herbal extracts and their formulation using TLC, HPTLC, GC, HPLC, UV& IR techniques.

Recommended Books

1. S.S. Agrawal & M. Paridhavi, Herbal Drug Technology.
2. Modern Methods of Plant Analysis by Peach & Tracey
3. Biotechnology by S.S. Purohit.
4. Pulok K. Mukherjee Quality control of herbal drugs: an approach to evaluation of botanicals.
5. Pharmacognosy by C.K. Kokate, A.P. Purohit and S.B. Gokhale
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