Faculty of Pharmaceutical Science & Technology

Study and Evaluation Scheme

Of

Bachelor of Pharmacy
(B.Pharm.)

(Applicable w.e.f Academic Session 2013-17 till revised)

AKS UNIVERSITY, SATNA

Study and Evaluation Scheme

**** The University Authorities reserve all the rights to make any additions / deletions or changes / modifications to this syllabus as deemed necessary.**

AKS University, Satna

Sherganj, Panna Road, Satna (MP) 485001

Study & Evaluation Scheme
of
Bachelor of Pharmacy
SUMMARY

Programme :	**B.Pharm**		
Duration :	Four year full time (Eight Semesters)		
Medium :	English		
Minimum Required Attendance :	75 %		
Maximum Credits:	**256**		
Evaluation Assessment :	**Internal**	**External**	**Total**
	50	100	150

Internal Evaluation (Theory/ Practical Papers)

	Sessional-I	**Sessional-II**	**Continuous Assessment & attendance**
	10	10	10+20= 30

Duration of Examination :	**External**	**Internal**
	3 hrs.	2 hrs

To qualify the course a student is required to secure a minimum of 36% marks in aggregate including the semester end examination, internal assessment evaluation (Both theory & Practical Papers)

A candidate who secures less than 36% or Grade **'D**' of marks in a Subject/Paper(s) shall be deemed to have failed in that Subject/Paper(s). In case a student has secured less than 36% or Grade **'R'** in Subject/Paper(s), he/she shall be deemed to re-appear (ATKT Examination) in Subject/Paper(s) to achieve the required percentage (Min. 36%) or grade (Min. D) in the Subject/Paper(s).

Question Paper Structure

1. *The question paper shall consist of 26 questions in three Sections. Out of which Section-A shall be of Objective type 10 questions and will be compulsory. (weightage 2 marks each).*
2. *Section-B shall contain 10 Short answer type questions and students shall have to answer any eight (weightage 5marks each).*
3. *Out of the remaining six question s are long answer type questions, student shall be required to attempt any four questions. The weightage of Questions shall be 10 marks each.*

Faculty of Pharmaceutical Science & Technology

B. Pharm.

I Semester

TEACHING & EXAMINATION SCHEME

Sr. No.	Subject Code	Subject	Periods			Credits
			L	T	P	
1	61PY101	Basic Pharmaceutics	4	0		4
2	61CH102	Pharmaceutical Physical Chemistry	4	0		4
3	61BI103	Pharmaceutical Biology	3	0		3
4	61CH104	Pharmaceutical Inorganic Chemistry	4	0		4
5	61CA105	Fundamentals of Computer Application	3	0		3
6	61EV106	Ecology and Environmental studies	3	0		3
7	61SD107	English Basics – I	3	0		3
8	61PY151	Basic Pharmaceutics (Lab)		0	3	2
9	61CH152	Pharmaceutical Physical Chemistry (Lab)		0	3	2
10	61BI153	Pharmaceutical Biology (Lab)		0	3	2
11	61CH154	Pharmaceutical Inorganic Chemistry (Lab)		0	3	2
12	61CA155	Fundamentals of Computer Application (Lab)		0	3	2
TOTAL			24	0	15	34

Faculty of Pharmaceutical Science & Technology

B.Pharm.

II Semester

TEACHING & EXAMINATION SCHEME

Sr. No.	Subject Code	Subject	Periods			Credits
			L	T	P	
1	61PY201	Physical Pharmacy	4	0	0	4
2	61CH202	Pharmaceutical Organic Chmistry - I	3	0	0	3
3	61PY203	Pharmacognosy - I (General Pharmacognosy)	4	0	0	4
4	61MS204	Mathematics & Statistics	4	0	0	4
5	61PY205	Human Anatomy & Physiology - I	3	0	0	3
6	61SS206-H/I	Spiritual Studies- Hinduism / Islam	3	0	0	3
7	61SD207	SSD-Foundation English - II	3	0	0	3
8	61PY251	Physical Pharmacy (Lab)	0	0	3	2
9	61CH252	Pharmaceutical Organic Chemistry - I (Lab)	0	0	3	2
10	61PY253	Pharmacognosy - I (General Pharmacognosy) (Lab)	0	0	3	2
11	61PY254	Human Anatomy & Physiology - I (Lab)	0	0	3	2
TOTAL			24	0	12	32

Faculty of Pharmaceutical Science & Technology

B.Pharm.

III Semester

TEACHING & EXAMINATION SCHEME

Sr.No.	Subject Code	Subject	Periods			Credits
			L	T	P	
1	61PY301	Unit Operation-I	4	0	0	4
2	61PY302	Pharmaceutical Organic Chemistry-II	4	0	0	4
3	61CH303	Pharmacognosy-II (Pharmacognosy & Phytochemistry-I)	4	0	0	4
4	61PY304	Pharmaceutical Microbiology	4	0	0	4
5	61PY305	Human Anatomy & Physiology - II	4	0	0	4
6	61SD306	SSD/PSD	0	0	2	1
7	61PY351	Unit Operation-I (Lab)	0	0	3	2
8	61PY352	Pharmaceutical Organic Chemistry-II (Lab)	0	0	3	2
9	61CH353	Pharmacognosy-II (Pharmacognosy & Phytochemistry-I (Lab)	0	0	3	2
10	61PY354	Pharmaceutical Microbiology (Lab)	0	0	3	2
11	61PY355	Human Anatomy & Physiology - II (Lab)	0	0	3	2
TOTAL			20	0	17	31

Faculty of Pharmaceutical Science & Technology

B.Pharm.

IV Semester

TEACHING & EXAMINATION SCHEME

Sr. No.	Subject Code	Subject	Periods			Credits
			L	T	P	
1	61PY401	Unit Operation-II	4	0	0	4
2	61PY402	Pharmaceutical Biochemistry	4	0	0	4
3	61PY403	Dispensing and Community Pharmacy	4	0	0	4
4	61PY404	Pharmaceutical Analysis-I	4	0	0	4
5	61PY405	Pathophysiology & Toxicology	4	0	0	4
6	61SD406	SSD	0	0	2	1
7	61PY451	Unit Operation-II (Lab)	0	0	3	2
8	61PY452	Pharmaceutical Biochemistry (Lab)	0	0	3	2
9	61PY453	Dispensing and Community Pharmacy (Lab)	0	0	3	2
10	61PY454	Pharmaceutical Analysis-I (Lab)	0	0	3	2
11	61PY455	Pathophysiology & Toxicology (Lab)	0	0	3	2
TOTAL			20	0	17	31

Faculty of Pharmaceutical Science & Technology

B.Pharm.

V Semester

TEACHING & EXAMINATION SCHEME

Sr. No.	Subject Code	Subject	Periods			Credits
			L	T	P	
1	61PY501	Pharmaceutical Technology-I (Pharmaceutical Formulation & Cosmetology)	4	0	0	4
2	61PY502	Medicinal Chemistry-I	4	0	0	4
3	61PY503	Pharmacognosy-III (Pharmacognosy & Phytochemistry-II)	4	0	0	4
4	61PY504	Hospital Pharmacy & Health Education	4	0	0	4
5	61PY505	Pharmacology-I	4	0	0	4
6	61SD506	SSD		0	2	2
7	61PY551	Pharmaceutical Technology-I (Pharmaceutical Formulation & Cosmetology) (Lab)	0	0	3	2
8	61PY552	Medicinal Chemistry-I (Lab)	0	0	3	2
9	61PY553	Pharmacognosy-III (Pharmacognosy & Phytochemistry-II) (Lab)	0	0	3	2
10	61PY554	Pharmacology-I (Lab)	0	0	3	2
TOTAL			20	0	14	30

Faculty of Pharmaceutical Science & Technology

B.Pharm.

VII Semester

TEACHING & EXAMINATION SCHEME

Sr. No.	Subject Code	Subject	Periods			Credits
			L	T	P	
1	61PY701	Biopharmaceutics & Pharmacokinetics	4	0	0	4
2	61PY702	Medicinal Chemistry-III	4	0	0	4
3	61PY703	Pharmacognosy-IV (Industrial Pharmacognosy)	4	0	0	4
4	61PY704	Pharmaceutical Analysis-III	4	0	0	4
5	61PY705	Pharmacology-III	4	0	0	4
6	61PY751	Biopharmaceutics & Pharmacokinetics (Lab)	0	0	3	2
8	61PY752	Pharmacognosy-IV (Industrial Pharmacognosy) (Lab)	0	0	3	2
9	61PY753	Pharmaceutical Analysis-III (Lab)	0	0	3	2
11	61PY755	Professional Training 4 Weeks	0	0	3	2
TOTAL			22	0	12	30

Faculty of Pharmaceutical Science & Technology

B. Pharm.

VI Semester

TEACHING & EXAMINATION SCHEME

Sr. No.	Subject Code	Subject	Periods			Credits
			L	T	P	
1	61PY601	Pharmaceutical Technology-II (Pharmaceutical formulation & NDDS)	4	0	0	4
2	61PY602	Medicinal Chemistry-II	4	0	0	4
3	61PY603	Pharmacy Law & Ethics	4	0	0	4
4	61PY604	Pharmaceutical Analysis-II	4	0	0	4
5	61PY605	Pharmacology-II	4	0	0	4
6	61PY651	Pharmaceutical Technology-II (Pharmaceutical formulation & NDDS) (Lab)	0	0	3	2
7	61PY652	Medicinal Chemistry-II (Lab)	0	0	3	2
8	61PY653	Pharmaceutical Analysis-II (Lab)	0	0	3	2
9	61PY654	Pharmacology-II (Lab)	0	0	3	2
10	61PY655	Educational Tour Report	0	0	3	2
		TOTAL	20	0	15	30

Faculty of Pharmaceutical Science & Technology

B.Pharm.

VIII Semester

TEACHING & EXAMINATION SCHEME

Sr.No.	Subject Code	Subject	Periods			Credits
			L	T	P	
1	61PY801	Pharmaceutical Management	4	0		4
2	61PY802	Pharmaceutical Biotechnology	4	0		4
3	61PY803	Chemistry of Natural Products	4	0		4
4		Elective-I	4	0		4
5		Elective-II	4	0		4
6	61PY851	Pharmaceutical Biotechnology (Lab)		0	3	2
8	61PY852	Chemistry of Natural Products (Lab)		0	3	2
9	61PY853	Project Work		0	3	2
TOTAL			22	0	9	28

Elective-I (Group-A)

61PY804	Pharmaceutical Marketing
61PY805	Packaging Technology
61PY806	Cosmetic Technology
61PY807	Pharmaceutical Enterprise

Elective-II (Group-B)

61PY808	Drug design & Lead Identification
61PY809	Quality Assurance, Good Manufacturing & Validation
61PY810	Standardization of Herbal Drugs
61PY811	Clinical Pharmacy & Drug Interaction

Note: Student can choose only one subject in each group.

***For any elective subject to be applicable in the batch, it is necessary that atleast 10 students should opt the particular subject.**

B. Pharm.
I Semester
Pharmaceutical Biology

COURSE OBJECTIVE The subject of Pharmaceutical Biology will be treated in its modern prospective of the course contents keeping for the sake of convenience.

UNIT: I

a) Plant and Animal cell & Tissue (Structure and Function), Mitosis and Meiosis. Basic Concept of Molecular Biology (DNA, RNA).

b) Biomolecules including Lipids, Polysaccharides, Proteins, and Nucleic acids. Enzymes and Co-factors, their Classification, Chemistry, Mechanism of Action and Factors Affecting Enzyme Activity.

UNIT: II

Plant Anatomy and Physiology

a) Morphological And Microscopical Characteristics of Flowering Plant and Its Parts Like Root, Stem, Bark, Wood, Leaf, Flower, Fruit and Seed. Modification of Root and Stem.

b) Transportation, Photosynthesis and Respiration in Plants. Plant Growth and Development.

UNIT: III

Living systems

a) Biological Classification: Five Kingdoms Monera, Protista, Fungi, Plantae and Animalia. Viruses, Viroids and Lichens.

b) Animal Kingdom: Classification and Its Basis.

c) Plant Kingdom: Algae, Bryophytes, Pteridophytes, Gymnosperms, Angiosperms. Plant Life Cycles and Alteration of Generations.

UNIT: IV

Genetics and Evolution

a) Principles of Inheritance and Variation: Mendals Laws, Inheritance of One Gene and Two Gene, Sex Determination, Mutation and Genetic Disorders.

b) Molecular Basis of Inheritance: DNA & RNA Replication, Transcription, Genetic Code, Translation, Regulation of Gene Expression, DNA Fingerprinting, Human Genome Project.

UNIT: V

a) Evolution – Origin of Life, Theory of Evolution of Life Forms, Evidences For Evolution, Adaptive Radiation, Biological Evolution, Hardy - Weinberg Principle.

b) General Morphology & Life History of The Following Internal Parasites:

a) Trypanosoma
b) Schistosoma
c) Taenia
d) Ascaris
e) Ancylostoma
f) Plasmodium

LIST OF PRACTICALS

1. To study the simple and compound microscope.
2. To study the care, use and type of microscopes.
3. To study the structure of human parasites and insects mentioned in theory with the help of specimens.
4. To perform gross identification of slides of structures and life cycle of lower plants/animals mentioned in theory.
5. To study the Morphological characteristics of plant parts (Dicot & Monocot) indicated in theory.
6. To study the microscopic characteristics of plant parts (Dicot & Monocot) indicated in theory.

RECOMMENDED BOOKS

S. No.	BOOK'S NAME	AUTHOR'S NAME	PUBLISHER'S NAME
1.	Dutta A. C.	Botany for Degree students	Oxford
2.	Marshall &Williams	Text Book of Zoology	CBS Publishers & Distributers, Delhi

REFERENCE BOOKS

S. No.	BOOK'S NAME	AUTHOR'S NAME	PUBLISHER'S NAME
1.	Fahn	Plant Anatomy	Aditya Books Private Limited
2.	Weiz, Paul B.	Laboratory Manual in Science of Biology	Mc Graw-hill book company

B. Pharm.
I Semester
Fundamentals of Computer Application

UNIT:I

Introduction to computer: Definition of Computer, Characteristics of Computers, Types of computers. Introduction to computer hardware and software, Input and Output devices of computer.
Memory: Primary and Secondary Memory, RAM, ROM, Secondary Storage Devices.

Unit-II

Operating System and Services in O.S.
Windows Operating Environment Features of MS – Windows, Control Panel, Desktop, Windows Applications, Icons, Windows Accessories, Notepad, Paint Brush.

Unit- III

MS Word 2007

Word basics, formatting text and documents, working with header, footer and footnotes, table and table sorting.

Working with graphics, wizards and sample documents, introduction to mail merge and macros.

Unit-IV

MS Power Point 2007: PowerPoint basics, creating presentation the easy way, working with graphics. Inserting various objects (Picture, Organizational Chart, Audio, Video etc) in slide .Adding Animation effects in slide.

Unit-V

MS Excel 2007 Excel basics, rearranging worksheets, excel formatting tips and techniques. Introduction to functions, Excel chart features, working with graphics.using worksheet as a Database.

Text Readings

1. E Balagurusamy **Fundamentals of Computer** Tata McGraw Hills Publication.
2. Deepak Bharihoke **Fundamentals of Information Technology** Excel books.
3. Manish Mahajan **IT Infrastructure & Management Achme** learning.

B. Pharm.
I Semester
Basic Pharmaceutics

UNIT: I

Definition of Pharmacy, origin and development of Pharmacy, Scope of pharmacy, Introduction to pharmacopoeias with special reference to Indian Pharmacopoeia (IP), BP, USP and International pharmacopoeia & formularies.

Metrology: Weight and measures, System of weights and measures, imperial system, metric system, SI System and Inter-conversions.

UNIT: II

Posology- Definition of posology, calculation of doses for various age's patients (Infants, adults & elderly peoples). Enlarging and Recurring recipes, allegation method in calculation, Alcohol dilution, proof spirit.

Introduction to pharmaceutical additives:-Definition, characteristics & application of additives (coloring, flavoring, Sweetening) diluents, Surfactants cosovents & preservatives.

UNIT: III

Size reduction & Size separation:-

1. Definition, principle and objective of size reduction. Factors affecting size reduction, application of size reduction.
2. Method of Size reduction:- Including study of Hammer mill, ball mill, fluid energy mill & disintegrator.
3. Methods of size separation- Study of sieving method, sedimentation method and cyclone separation.

UNIT: IV

Extraction & galenicals : Definition, study of extraction processes like infusion, decoction, digestion, percolation, maceration and their modifications. Application in the preparation of tinctures & extracts. Factors affecting selection of extraction processes.

Mixing:- Definition, theory of mixing, Solid-soli liquid & Liquid-Liquid mixing equipments.

UNIT: V

Introduction to dosage forms:-

1. Importance of dosage forms.
2. Classification of various dosage forms like solids, semisolids, & liquid dosage forms. A brief theory of solution, mixture spirit, aromatic water , paints, elixirs, mouth washes, lotions, liniments, pastes, ointments creams & powders, gargles, emulsions, suspensions tincture.

LIST OF PRACTICALS

1. Preparation of various pharmaceutical dosage forms (involving the use of calculation in metrology) as official in IP, BP, USP/NF.

Aromatic water:- Chloroform water BP, Camphor water BP, Rose water NF

Solutions:- Lysol solution, Strong ammonium acetate Solution BP.

Syrups:- Simple syrups BP/USP. IP.

Elixirs:- Aromatic elixirs USP/NF.

Spirits:- Aromatic spirits of ammonia BP.

Powers:- ORS Powder IP, Absorbable dusting powder USP/NF.

Lotions:- Calamine lotion IP.

Liniments:- Methyl salicyate liniments BP, Turpentine liniment BP.

Tinctures:- Infusion of tea, compound benzoic tincture BP. Strong ginger tincture liquorice liquid extract BP.

2. Study of one monograph from the latest edition of IP.

3. To perform size reduction of drug using ball mill effect of size of ball, number of balls & time on efficiency of ball mill.

4. Experiments to illustrate mixing efficiency. Solid-solid mixing.

Text Books:

1. Lachman L., Liberman H.A., Theory and practice of pharmacy, Lea and Febizger.
2. R.M. Mehta, pharmaceutics-I Vallabh Prakashan, Delhi.
3. Pratibha Nand & Roop K. Khar, pharmaceutical dispensing, CBS publisher and distributers, New Delhi.
4. R.M. Mehta, dispensing pharmacy, Vallabh prkashan, Delhi.
5. Pharmacopoeia of India, The controller of publications, Delhi.
6. Cooper and Gunn's Dispensing for Pharmaceutical students, CBS publishers, New Delhi.
7. British Pharmacopoeia, Her Majesty's Stationary Office, University Press, Cambridge
8. United States Pharmacopoeia (National Formulary).

Reference Books:

1. Carter S.J., "Cooper and Gunn's Tutorial Pharmacy", CBS Publishers, Delhi
2. Rawlins E.A., "Bentley's Text Book of Pharmaceutics", ELBS Bailliere Tyndall
3. Aulton, M.E, Text Book of Pharmaceutics, Vol., I & II. Churchill Livingstone
4. Remington – "The science and practice of pharmacy" Vol. I & II. Mack Publishing Co., Pennsylvania.

B. Pharm.

I Semester

Pharmaceutical Physical Chemistry

UNIT I

Behaviour of Gases: Gaseous state and general characteristics, Kinetic theory of gases, deviation from behaviour and explanation.

The Liquid State: Physical properties of Drug molecules: Density, Surface Tension, Parachor, Viscosity, Specific Gravity, Refractive Index, Optical Rotation, Dipole Moments.

UNIT II

Solutions: Colligative properties (Lowering of vapour pressure and Raoult's Law, osmosis and osmotic pressure, measurement of osmotic pressure, pharmaceutical applications of osmosis, theories of semi permeable membranes, Elevation of boiling point and its experimental determination. Melting point and its determination.

UNIT III

Thermodynamics: First, Second and Third laws of thermodynamics. Absolute temperature scale, Application of thermodynamic principles in pharmacy.

UNIT IV

Adsorption: Definition and Mechanism, Adsorption versus Absorption. Physisorption Chemisorption and their characteristics. Adsorption isotherms, Freundlich and Langmuir theory of adsorption. Application of adsorption including water softening and deionization of water through ion exchange adsorption.

Catalysis:

Catalyst positive and negative. Homogeneous and heterogeneous type of catalyst with example. Characteristics of catalytic reaction. Catalytic poisoning. Activation energy and catalysis. Theories of catalysis. Acid base catalysis. Enzyme catalysis.

UNIT V

Chemical Kinetics: Definition, Reaction rate, Zero, first and second order reactions, Half life of Reaction. Theories of reaction kinetics- Collision theory and limitations, Transition state theory.

Practicals

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

11. To study the effect of surfactant on surface tension.

BOOKS RECOMMENDED:

Text 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.

Reference Books

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.

B. Pharm.

I Semester

Pharmaceutical Inorganic Chemistry

Unit-I

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 therapy, physiological acids-base balance, electrolytes used in acid-base therapy, electrolyte combination therapy.

Unit-II

Radiopharmaceuticals

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

Unit-III

Sources and effects of impurities in pharmacopoeial substances, importance of limit test, general principles and procedures for limit tests for chloride, sulphate, iron, arsenic, lead and heavy metals. Special procedures for limit tests.

Unit-IV

Topical Agents: Protectives, Astringents and Anti infectives.

Unit-V

Dental Products: Dentifrices, anti-caries agents.

Unit-VI

Miscellaneous Agents: Sclerosing agents, expectorants, emetics, poisons and. antidotes, sedatives etc., pharmaceutical aids used in pharmaceutical industry antioxidants, preservatives, diluents, excipients, suspending agents, colorants, filter aids, adsorbents etc.

List of Practical

1) Limit test for Lead.
2) Limit test for Arsenic.
3) Limit test for Chloride.
4) Limit test for Sulfate.
5) Limit test for Heavy metals.
6) Standardization of hydrochloric acid.
7) Standardization of sodium hydroxide.
8) Standardization of potassium permanganate.
9) Standardization of sodium thiosulphate.
10) Determination of strength of solution of ammonia.
11) Quantitative determination of boric acid.
12) Assay of sodium carbonate.
13) Assay of ferrous sulphate.
14) Assay of iodine solutions.
15) Preparation of Alum (potassium and ammonium).
16) Preparation of Ferrous sulfate.
17) Preparation of dibasic calcium phosphate.
18) Preparation of ferric ammonium citrate.

19) Preparation of light and heavy magnesium oxide and
20) Preparation of magnesium carbonate.
21) Preparation of calcium carbonate.
22) Preparation of magnesium trisilicate.
23) Preparation of zinc sulphate.
24) Purification of Copper sulfate.

BOOKS RECOMMENDED:
Text Books

1. N.C.Chaudhary and N.K.Gurbani, Pharmaceutical Chemistry-I, Vallabh Prakashan
2. G.R.Chatwal, Pharmaceutical Chemistry-Inorganic, Himalaya Publishing House.

Reference 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.

ECOLOGY & ENVIRONMENTAL STUDIES
(Compulsory For all Undergraduate Courses)

Unit I
Definition, scope and importance, need for public awareness. Natural resources and associated problems. Forest resources: Use and over-exploitation, deforestation, mining, dams and their effects on forest. Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. Land resources : Land as a resource, land degradation, soil erosion and desertification.

Unit II
Food resources : World food problems, effects of modern agriculture, fertilizer-pesticide problems, Mineral resources : Use and exploitation, environmental effects of extracting and using mineral resources, Energy resources : Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

Unit III
Concept of an ecosystem, Structure and function of an ecosystem. Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids. introduction, types, characteristic features, structure and function of the terrestrial ecosystem and Aquatic ecosystems.
Diversity, Definition & types, Biogeographical classification of India, Value of biodiversity, Biodiversity at global, National and local levels. Inida as a mega-diversity nation, Hot-sports of biodiversity, Threats to biodiversity, Endangered and endemic species of India, Conservation of biodiversity.

Unit IV
Definition: Cause, effects and control measures of :- Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards, Solid waste Management : Causes, effects and control measures of urban and industrial wastes. Role of an individual in prevention of pollution. Pollution case studies, Disaster management: floods, earthquake, cyclone and landslides.

Unit V
Sustainable development, urban problems related to energy Water conservation, rain water harvesting, watershed management, Resettlement and rehabilitation of people; its problems and concerns, Environmental ethics: Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Environmental legislation, Public awareness. Population growth, Population explosion - Family Welfare Programme. Environment and human health. HIV/AIDS.. Role of Information Technology in Environment and human health.

Text Books:

A text book of Environmental science: Purohit Shami & Agrawal, Agrobios Student edition Jaipur
Paryavaran Addhyan : KL Tiwari and Jadhav

Suggested Readings:
Ecology and Environment: PD Saharma, Rastogi publication Meerut UP
Introduction to Environmental Science : Y. Anjaneyulu BS Publication Hyderabad

SSD - FUNCTIONAL ENGLISH-1
1st Semester

B.Tech (Engg.)/B.Tech (Ag.)/B.Tech (BT)/B.Sc.(Hons) Ag./B.Sc (BT)/B.Pharm/BBA/B.Com/B.com(Hons)/BCA(Hons)/Diploma (Engg.)

INTRODUCTION: Grammar is vital for the efficient use of language in academic as well as social environment. You already know that our speech is made up of sentences. A sentence is the basic unit of the written and spoken language. In this unit we will learn about various structural and functional parts of the sentence, their types ,subtypes and their usage.

Objectives:

- To enable the students to use verbs in appropriate contexts.
- To improve students' command of spoken English by practicing the functional language needed in different situations
- To familiarize the students with the concept of Functional English as a multi-focal discipline.
- To enable the students to use English correctly and confidently

UNIT-1

a. Articles: Definite, Indefinite and Zero, Noun: numbers (singular and plural) and Personal Pronouns

b. Introduction to verb :Ordinary and Auxiliary verbs, Regular and Irregular verbs

c.**The Present Tense:** Present Continuous, Simple Present (Form and Use)

UNIT-2

The Past and Perfect Tenses: Simple Past, The Past Continuous, The Present Perfect, The Present Perfect Continuous, The Past Perfect and The Past Perfect Continuous. (Form and Use)

UNIT-3

The Future Tense: Future Simple, The future Continuous (Form and Use),Causative Verbs,The Sequence of Tenses.

UNIT-4

Introduction to Modal Auxiliaries (Form and Use)
May and can for Permission and Possibility.
Could for permission in the Past
May ,Might for Possibility.
Can and be able for Ability.
Ought, Should, Must, have to,had to, Need for Obligation.

UNIT-5

The Conditional Sentences, The Passive Voice; Active Tenses and their Passive Equivalents including Modals, Use of Passive Structure.

NOTE: Coverage of 1220 Regular (600) and Irregular Verbs (620) with their meaning and uses.

(Teachers are required to Introduce 25 verbs from the given verb list in every lecture)

B. Pharm.

II Semester

PHYSICAL PHARMACY

COURSE OBJECTIVE: The course describes the physicochemical properties of drug molecule and the phenomena that govern the in vivo and in vitro actions of pharmaceutical products.

Unit I Micromeritics

a. Micromeritics: particle shape and size distribution, methods for determination of particle size; optical microscopy, sieving, sedimentation, shape and surface area.
b. Derived properties of powder and their effects on solid dosage form processing.

Unit II Diffusion & Dissolution

a. Diffusion: concept, steady state diffusion, Ficks law. Diffusion principle in biological system.
b. Dissolution: dissolution rate & factors affecting rate of dissolution, Noyes-Whitney equation.

Unit III Coarse Dispersion

a. Suspension: Settling of Suspensions, preparation, physical stability and evaluation.
b. Emulsion: Theories of Emulsification, instabilities of Emulsion, concept of HLB.
c. Rheology: Newtonian & Non Newtonian system, Thixotrophy & Application.

Unit IV Colloids & Complexation

a. Colloids: Definition, types, and properties of colloids.
b. Complexation: Types of complexes, Metal complexes, Organic molecular complexes, Inclusion compounds, & Theories of Micelle formation.

Unit V pH & Buffers

a. pH definition and pharmaceutical buffer preparation.
b. pH determination, application, buffer equation, buffer capacity and significance.

PRACTICALS

1. To know your physical pharmacy lab.
2. To study the sieving mesh and aperture.
3. To determine particle size by sieving method.
4. To determine particle size by optical method.
5. To determine the surface area of powder by adsorption method.
6. Determination of derived properties of powders, bulk density, tapped density, true density & Carr's index.
7. To determine Porosity & compressibility.
8. To determine angle of repose.
9. To determine the effect of particle size on angle of repose.
10. To study the effect of glidant on angle of repose.
11. To perform the preparation of suspension and evaluation of sedimentation parameter.
12. To perform the preparation of emulsion and evaluation studies pH, viscosity and physical stability.
13. To prepare the colloids of gelatin.
14. To perform the purification of colloids by ultra filtration method.

15. To determine the viscosity of following Newtonian and non Newtonian system of water, diclofenac gel, syrup IP, Toothpaste.
16. To study the working procedure of pH meter.
17. To perform the preparation of pharmaceutical buffers and compare theoretically.
18. To perform the determination of buffer capacity.

TEXTBOOKS (Latest Edition)			
S.No	**Name of the book**	**Author**	**Publisher**
01	Physical Pharmacy,	Alfred. Martin, P. Bustamante, A.H.C.Chun	B.I.Waverly, Pvt.Ltd., New Delhi
02	Bentley's textbook of Pharmaceutics,	E.A.Rawlins	Bailliere Tindall
03	Tutorial pharmacy,	Cooper and Gunn	Carter S.J, CBS Publishers, New Delhi

REFERENCE BOOKS (Latest Edition)			
S.No	**Name of the book**	**Author**	**Publisher**
01	The Science and Practice of Pharmacy,	Alfonso R Gennaro, Remington:	Lippincott Williams and Wilkins, Philadalphia, USA, Vol I, II,
02	Physical Pharmaceutics,	C. V. S. Subrahmanyum	Vallabh Prakashan New Delhi

B. Pharm.

II Semester

MATHEMATICS & STATISTICS

UNIT-I

Determination, Properties of solution of Simultaneous equations by Cramer's rule, Matrices, definition of special kind of matrices, Transpose of matrix, arithmetic operation on matrixes, inverse of matrix Solution of simultaneous equations by Matrixes.

UNIT-II

Differential: Definition of differential, Differentiation of standard function including function of function (Chain rule).Differentiation of implicit functions, logarithmic differentiation. Parametric differentiation, successive differentiation **Integral**: integration as inverse of differentiation, indefinite integrals of standard forms, integration by parts, substitution and partial fraction, formal evaluation of definite integrals

UNIT-III

Measures of central Tendency- Introduction, Calculation of mean, Calculation of Median, Calculation of Mode, Merits and demerits of Mean, Median and Mode.

Measures of Dispersion –Range, Mean deviation ,Standard deviation

UNIT-IV

Correlation and Regression –Introduction, Types of correlation-Positive or Negative Correlation, Correlation coefficient, Linear regression and regression equation.

UNIT-V

Test of significance- Introduction, Procedure of Testing Hypothesis – Null and Alternative Hypothesis.

T-Test for small samples, Properties and Application of t-Test .

Chi-Square test- Properties of chi distribution, chi square test for independence and Homogeneity.

Test Book:

1) Mathematics Part I- Textbook for Class XI,NCERT Publication
2) Mathematics Part II- Textbook for Class XI,NCERT Publication

Reference Books:

1 Biostatistic – Daniel.(Wiley).
2. Statisics by S.C Gupta.
3. Fundamentals of Biostatistics –Khan & Khanum.
4. Fundamentals of Biostatistics by U.B. Rastogi (Ame Books Ltd).

B. Pharm.

II Semester

PHARMACEUTICAL ORGANIC CHEMISTRY – I

Course Objective: The subject of Pharmaceutical Organic Chemistry-I will be treated in its modern prospective including Introduction, Significance, Nomenclature, Classification and Mechanism of organic compounds, keeping for the sake of convenience.

UNIT-I: BASIC PRINCIPLES AND CONCEPTS OF ORGANIC CHEMISTRY

Structures, Property and Activity: Atomic structure & orbitals. Molecular orbital theory, Bonding and Anti-bonding orbitals, Hybridization, Sigma & Pie bonds, Co-valent, Electrovalent and Co-ordinate bonds, Polarity of bonds and bond dissociation energy.

Introduction of modern concept of organic molecule. Inter-molecular and intra-molecular forces. Inductive effect, Electromeric effect and Hyperconjugation.

Concept of Resonance, Nomenclature and classification of organic compounds.

UNIT-II: STEREOCHEMISTRY

Basic concept of Isomerism and associated Physiochemical properties. Geometrical isomerism, Stereoisomerism, optical activity, Distereoisomerism, Enantiomers and Meso structure.

Specification of configuration and conformational analysis. Racemic modification and resolution of racemic mixtures.

UNIT-III: STRUCTURE, NOMENCLATURE, PREPARATION AND REACTIONS / PROPERTIES OF THE FOLLOWING (Including mechanism of reaction wherever necessary)

Aliphatic & Alicyclic Hydrocarbons, Alkyl halides (SN^1, SN^2 and E^1, E^2 mechanism), Aliphatic alcohols, Dienes and Cycloalkanes.

Free Radical Substitution reaction, Mechanism of Diel's – elder reaction, Peroxide effect, Ozonolysis, Markownikoff's rule, Bayer's strain theory.

UNIT-IV: STRUCTURE, NOMENCLATURE, PREPARATION AND REACTIONS / PROPERTIES OF THE FOLLOWING (Including mechanism of reaction wherever necessary)

Aromatic compounds and Concept of aromaticity. Structure of Benzene: Kekule's structure of Benzene, Huckel's rule, Nomenclature and characteristic reaction of Benzene & its derivatives.

Poly aromatic compounds: Naphthalene, Phenanthrene, Diphenyl methane, Triphenyl methane, Diphenyl ethane. Aryl halides, Arenes, Ethers and Phenols.

UNIT-V: STRUCTURE, NOMENCLATURE, PREPARATION AND REACTIONS / PROPERTIES OF THE FOLLOWING (Including mechanism of reaction wherever necessary)

Aldehydes and Ketones (Aliphatic & Aromatic), Carboxylic acid and their derivatives. Di and Tri Carboxylic acid.

Aliphatic amines: Hinsberg method of separation, Acylation reaction and Diazotization of Diazonium salts. Other Nitro compounds (Nitriles & Isonitriles)

Preparation and synthetic applications of: Organometallic compounds (Grignard reagent) and Organolithium compounds.

List of Practicals

1. Identification of various elements present in the given sample of organic compound. (At least three)
2. Identification of various functional groups present in the given sample of organic compound. (At least three)
3. Determination of melting point and boiling point for some important pharmaceutical organic compounds. (At least three)
4. Purification of organic solvent like: Benzene, Chloroform and Acetone.
5. Identification of organic compounds based on their solubility.
6. Synthesis of pharmaceutical organic compound based on the Acetylation reaction.
7. Synthesis of pharmaceutical organic compound based on the Reduction reaction.
8. Synthesis of pharmaceutical organic compound based on the Oxidation reaction.
9. Synthesis of pharmaceutical organic compound based on the Bromination reaction.
10. Synthesis of pharmaceutical organic compound based on the Esterification reaction.
11. Introduction to the use of stereo models:

    a). Methane b). Ethane c). Ethylene d). Acetylene
    e). Ketone f). Benzene

BOOKS RECOMMENDED

S. No.	BOOK'S NAME	AUTHOR'S NAME	PUBLISHER'S NAME
1.	Organic Chemistry	R.T. Morrisson & R.N. Boyd	Prentice India Pvt. Ltd. New Delhi
2.	Text Book of Organic Chemistry	B.S. Bhal & Arun Bhal	S. Chand Publisher
3.	Practical Organic Chemistry (4^{th} Edition 1986)	F.G. Mann & B.C. Sauders	Orient Longman

REFERENCE BOOKS

S. NO.	BOOK'S NAME	AUTHOR'S NAME	PUBLISHER'S NAME
1.	Organic Reactions Stereochemistry & Mechanism	Kalsi	New Age International
2.	A Text Book of Pharmaceutical Chemistry	L.M. Antherden	Bentley & Drivers, Oxford University Press, New Delhi
3.	A Guide Book To Mechanism in Organic Chemistry	P. Sykes	Orient Longman, New Delhi
4.	Organic Chemistry (Vol. I & II)	I.L. Finar	ELBS London
5.	Vogel's Text Book of Practical Organic Chemistry (5^{th} Edition)	Furniss *et al.*	ELBS London
6.	Practical Organic Chemistry (Vol. I, II, III)	Vogel's	--------
7.	Practical Pharmaceutical Chemistry	A.A. Siddiqui & Mohd. Ali	CBS Publishers & Distributors Pvt. Ltd.

B. Pharm.
II Semester
Pharmacognosy - I (General Pharmacognosy)

COURSE OBJECTIVE: The subject deals with the general study of the important medicinal plants which includes their origin, morphology, histology, constituents and uses. The drugs are classified into groups according to their main therapeutic indications, or the morphology of these medical herbs.

Unit-I

a) Definition, history, scope and development of Pharmacognosy.

b) Crude drug: Scheme for pharmacognostic study of crude drug.

Unit-II

a) Cultivation collection, drying, natural drying, artificial drying, processing and storage of crude drugs.

b) Factors affecting cultivation of medicinal plants like climate, altitude, temperature, humidity, rainfall, soils, fertilizers and manures.

Unit-III

a) Plant taxonomy**:** Study of following families with special reference to medicinally important plants – Apocynacae, Solanaceae, Rutaceae, Umbelliferae, Leguminosae, Rubiaceae, Liliaceae, Labitae.

b) Pest control & natural pest control agents.

Unit-IV

a) Quality control of crude drugs: adulteration of crude drugs and their detection by Organolaptic, microscopic, physical, chemical and biological methods of evaluation.

b) WHO guidelines for standardization of medicinal plants.

Unit-V

Systematic pharmacognostic study of following:

a) Carbohydrates & derived products: Agar, Guar gum, acacia, Honey, Isabgol, pectin, starch, & tragacanth.

b) Lipids – Beeswax, castor oil, shark liver oil, wool fat

PRACTICALS

1. To Study techniques in microscopy & various tools used in microscopy (microscope, camara lucida)
2. Morphological identification of following drugs Bael, Capsicum, Catechu , guggul.
3. Morphological identification of following drugs Arjuna bark, ashoka bark, Amla 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,and chemical evaluation of "Isapgol".
10. Perform morphological, microscopic and chemical evaluation of "Starches obtain from potato,rice,and wheat".
11. Perform morphological and chemical evaluation of "Asafoetida".
12. Perform morphological and chemical evaluation of "Castor oil, linseed oil, olive oil".
13. Perform morphological and chemical evaluation of "neem oil, coca butter and wool fat".
15. Perform morphological and chemical evaluation of "Bees wax".
16. Perform morphological and chemical evaluation of "Benzoin".
17. Perform morphological and chemical evaluation of "nylon, Silk and Cotton".
18. Perform morphologic and chemical evaluation of "Talc and Podophyllum".
19. Perform morphologic 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:

TEXT BOOKS (Latest Edition)			
S.No	**Name of the book**	**Author**	**Publisher**
01	Pharmacognosy,	Trease G.E. and Evans, W.C.,	Bailliere Tindall, Eastbourne, U.K
02	Pharmacognosy	Kokate C.K., Purohit A.P. and Gokhale S.B	Nirali Prakashan,
03	Text Book of Pharmacognosy	C.S.Shah & J.S.Quadry.,	BS Shah Prakashan

REFERENCE BOOKS(Latest Edition)			
S.No	**Name of the book**	**Author**	**Publisher**
01	Medicinal plants of India	Govt. of India	Indian Council of Medical Research, and New Delhi.
02	Indian Materia Media	Nadkarni, A.K.,	1-2 Popular Prakashan Pvt., Ltd., Bombay
03	Phytochemical methods	Harborne J.B.,	Chapman and Hall, International Edition, London.

B. Pharm.
II Semester
HUMAN ANATOMY & PHYSIOLOGY-I

COURSE OBJECTIVE: The course describes the basic understanding of the gross structure and functions of the human body.

Unit-I Human Body

a. Introduction and scope of Anatomy and physiology, basic terminologies used in this subject.
b. Introduction to human body. The internal environment and homeostasis. Survival needs of body. Introduction to the study of illness.

Unit-II Basic Unit of Life

a. Cell: Structure, its components and functions. Cell cycle. Physiology of transport mechanism across cell membrane.
b. Tissues: epithelial, connective, muscular and Nervous tissues-their sub-types and characteristics.

Unit-III Movement & Locomotion

a. Osseous system: Structure, Classification and Composition of bones. Functions of skeleton.
b. Joints: Classification, types of movements of joints. Definitions of disorders of joints. Daily requirement for healthy bone, precautions.

Unit-IV Circulatory System

Blood vascular system: Composition and functions of blood. Blood groups. Clotting factors and mechanism. Haemopoiesis and definition of disorders of blood components.

a. Heart: Anatomy and physiology. Cardiac cycle. Cardiac output. Pulmonary and systemic circulation. Fetal circulation.
b. Lymphatic system: Composition and formation of lymph. Spleen. Definition of disorders of lymph.

Unit-V Sense Organs

a. Basic anatomy and physiology of the eye (vision) and ear (hearing),
b. Basic anatomy and physiology of the taste buds, nose (smell) and skin (superficial receptors).

Practicals

1. Determination of blood groups.
2. Determination of hemoglobin content of blood.

3. Determination of R.B.C. content of blood.
4. Determination of W.B.C. content of blood.
5. Determination of differential count of blood.
6. Determination of blood pressure.
7. Determination of Bleeding time & clotting time.
8. To perform the recording of body temperature, pulse rate.
9. To study the basic understanding of ECG-PQRST waves and significance.
10. To study circulatory system with the help of charts and models.
11. To study histology slides of different tissues/organs.
12. To study human skeleton.

Books Recommended:

TEXT BOOKS			
S.No	**Name of the book**	**Author**	**Publisher**
01	Ross and Wilson Anatomy and Physiology in Health and Illness	A. Waugh and A.Grant	Churchill Living Stone, Edinburgh,
02	Colors Atlas of Pathophysiology	Silbernag/Lang	Stuttgart-New york
03	Human Physiology" (Vol. I & Vol. II)	C.C. Chatterjee	Medical Allied Agency, Calcutta,

REFERENCE BOOKS			
S.No	**Name of the book**	**Author**	**Publisher**
01	Illustrated Physiology	AB Mc Naught and Callander R	B.I. Churchill Living Stone, New Delhi
02	Text book of Medical Physiology	A. C. Guyton and J.E. Hall,	W.B. Saunders company,
03	Bailey`s TextBook of Microscopic Anatomy	Douglas E., Kelly, Richard Wood and Allen C. Enders	Williams and Wilkins publishers, London,
04	Human Anatomy and Physiology	E.N. Marieb,	Addison Wesley, New York,
05	Principles of Anatomy and Physiology	G. J. Torotora,	John-Wiley & sons New York,
06	Text Book of Human Histology with Colour Atlas	Inderbir Singh,	Jaypee Brothers, New Delhi,
07	Colors Atlas of Physiology	Silbernag/Lang	Stuttgart-New york

SSD- CSEP(COMMUNICATION SKILLS ENHANCEMENT PROGRAM)
FUNCTIONAL ENGLISH-II
2nd Semester
B.Tech (Engg.)/B.Tech (Ag.)/B.Tech (BT)/B.Sc.(Hons) Ag./B.Sc (BT)/B.Pharm/BBA/B.Com/B.com(Hons)/BCA(Hons)/Diploma (Engg.)

Unit-1

Subject verb Agreement, Adjectives and Comparison of Adjectives, Determiners

Unit-2

Introduction to Prepositions (Use and omission), Preposition of travel and movement, Preposition of Date and Time, Relations expressed by Preposition, Words followed by preposition, Finite and Non Finite Clauses& Uses of Let.

Unit-3

Conjunction: Co-ordinating and Subordinating,Sentences :Simple, Compound and Complex

Unit-4

Statement : Direct & Indirect, Phrasal Verb, Antonyms, Synonyms, Letter Writing: Formal (Parts& Layout)

Unit-5

Communication: Definition & Meaning of Communication, Importance &Process,Types: Verbal & Non-Verbal, Barriers, and how to overcome these barriers.

Reference:

Thomson, A.J and A.V. Martinet.*A Practical English Grammar.* Oxford University Press: New York.

Wren and Martin.*High School English Grammar and Composition.*S.Chand& Company Pvt. Ltd. : New Delhi

Greenbaum, Sidney. *Oxford English Grammar.* Oxford University Press: New York.

Rudzka-Ostyn, Brygida.(2003) *Word Power: Phrasal Verbs and Compounds.*Mouton de Gruyter, Berlin: New York

Chambers Dictionary of Antonyms & Synonyms

Hudson, Richard. *English Grammar.* Routledge: New York.

Rodriques, M.V. *Effective Business Communication*. Concept Publishing Company: New Delhi.

Raman,Meenakshi&Sangeeta Sharma.Communication Skills. Oxford University Press

SPIRITUAL STUDIES (HINDUISM)
SRIMADBHAGWADGITA
Compulsory for All Prgramme/ Courses
श्रीमद्भगवद्गीता

UNIT-I

अध्याय–एक

अर्जुन की मोहग्रस्तता,

अध्याय–दो

अर्जुन का नैराश्य, शरीर और आत्मा का विश्लेषण, कर्तव्यपालन, निष्काम कर्मयोग, स्थितप्रज्ञ एवं तापत्रय

अध्याय–तीन

कर्मयोग, षटिवकार

UNIT-II

अध्याय–चार

गीता का इतिहास, भगवान के प्राकट्य का कारण एवं उनकी सर्वज्ञता

अध्याय–पांच

ईश्वरभावनाभावित कर्म

अध्याय–छः

ध्यान योग या सांख्य योग, सिद्धि या समाधियोग

अध्याय–सात

परा और अपरा शक्ति, पुण्यात्मा मनुष्य के लक्षण

UNIT-III

अध्याय–आठ

ब्रह्म, आत्मा, अधिभूत, अधिदैव, अधियक्ष, मुक्तिलाभ की विधि

अध्याय–नौ

परमगुह्माज्ञान

अध्याय–दस

श्रीभगवान का ऐश्वर्य

UNIT-IV

अध्याय–ग्यारह

श्रीभगवान का विराटस्वरूप

अध्याय–बारह

भक्तियोग का वर्णन, अव्यक्त की उपासना में क्लेश, शुद्ध भक्त के लक्षण

अध्याय–तेरह

क्षेत्र, क्षेत्रज्ञ एवं कर्मक्षेत्र की परिभाषा, ज्ञान, ज्ञेय, प्रकृति एवं परमात्मा, चेतना

अध्याय–चौदह

त्रिगुण स्वरूप

अध्याय–पंद्रह

परम पुरुष का स्वरूप, जीव का स्वरूप

UNIT-V

अध्याय–सोलह

दैवीय स्वभाव, आसुरी स्वभाव

अध्याय–सत्रह

श्रद्धा के तीन प्रकार, भोजन के प्रकार, यज्ञ के प्रकार, तप के प्रकार, दान के प्रकार, ऊँ कार का प्रतिपादन, सत्, असत् का प्रतिपादन

अध्याय–अठारह

सन्यास एवं त्याग में अंतर, त्याग के प्रकार, कर्म के कारण, कर्म के प्रेरक तत्व, कर्म के प्रकार, कर्ता के प्रकार, चार वर्णों के स्वाभाविक गुण, प्रभु के प्रति समर्पण भाव

Recommended books

संदर्भ ग्रंथ सूची

1. श्रीमद्भगवद्गीता–गीताप्रेस, गोरखपुर।
2. श्रीमद्भगवद्गीता–मधुसूदनसरस्वती, चौखम्भा संस्कृत संस्थान, वाराणसी, 1994।
3. श्रीमद्भगवद्गीता–एस.राधाकृष्णन् कृत व्याख्या का हिन्दी अनुवाद, राजपाल एण्ड सन्स, दिल्ली, 1969।
4. श्रीमद्भगवद्गीता–श्रीमद् भक्तिवेदांत स्वामी प्रभुपाद, भक्तिदांत बुक ट्रस्ट, मुंबई, 1996।
5. Srimadbhagawadgita-English commentary by Jaydayal Goyandaka, Gita Press, Gorakhpur, 1997.

SULLABUS
SPIRITUAL STUDIES (ISLAM)
Compulsory for All Prgramme/ Courses

UNIT-I

इस्लाम धर्मः– 6वीं शताब्दी में अरब की (राजनैतिक, धार्मिक, सामाजिक, आर्थिक परिस्थितियां व कबीलाई व्यवस्था) मोहम्मद साहब का जीवन परिचय, संघर्ष व शिक्षाएं, इस्लाम का प्रारम्भ,
इस्लाम क्या है और क्या सिखाता है, ईमान–ईमाने मोजम्मल, ईमाने मोफस्सल।

UNIT-II

इस्लाम धर्म की आधारभूत बातेंः–

तोहीद, कल्मा–कल्मा–ऐ–शहादत, कल्मा–ऐ–तैय्यबा, नमाज, रोजा, जकात और,
हज का विस्तारपूर्वक अध्ययन

UNIT-III

खोदा–तआला की किताबें (आसमानी किताबें):–

''वही'' की परिभाषा, तौरेत, जुबूर, इंजील का परिचय, पवित्र कुरान का संकलन, पवित्र कुरान का महत्व, कुरान की मुख्य आयतें, पवित्र कुरान और हाफिजा

UNIT-IV

पवित्र हदीसें और सुन्नतेंः–

हदीस और सुन्नत क्या है, हदीस और सुन्नत का महत्व, कुछ प्रमुख सुन्नतें और हदीसों का अध्ययन,
सोकर उठने की सुन्नतें, लेबास की सुन्नतें, बीमारी और अयादत की सुन्नतें, सफर की सुन्नतें

UNIT-V

इस्लाम धर्म की अन्य प्रमुख बातेंः–

मलाऐका या फरिशते (देवदूत), खुदा के रसूल, खुदा के पैगम्बर, नबी और रसूल में अन्तर,
कयामत, सहाबा, खलीफा, मोजिजा और करामात, एबादत, गुनाह (कुफ्र और शिर्फ), माता–पिता,
रिश्तेदार व पड़ोसी के अधिकार, इस्लाम में औरत के अधिकार, इस्लाम में सब्र और शुक्र,
इस्लाम में समानता और भाईचारा

ADDITIONAL KNOWLEDGE:-

IN THE LIGHT OF 'QURAN' AND 'HADEES', TEN POINTS WILL BE DELIVERED TO THE STUDENTS DAILY, IN A SECULAR COUNTRY THE STUDENTS SHOULD KNOW THE PHILOSOPHY OF OTHER RELIGION ALSO SUCH AS "JAINISM", "BUDHISM" AND "SANATAN DHARMA".

B. Pharm.
III Semester
Unit Operation-I

Course Objective: the subject deals with the importance of unit operation in manufacturing of pharmaceuticals. Focus on principle, theory and mechanism, working and construction of equipments of different unit operations in pharmaceutical plant.

Unit-I

Unit operation- Introduction to unit operation and pharmaceutical engineering (units & dimensions). Basic laws, materials and energy balances.

Fluid flow-

Types of fluids- Newtonian and non Newtonian's fluid. Types of flow, Reynolds's number and its significance.

Viscosity- Definition, concept of boundary layer (distribution of velocities in a pipe). Basic equations of fluid flow, Bernoulli' theorem and its applications.

Measurement of pressure- manometers, friction losses, losses in pipe fittings & joints.

Measurement of fluid flow- Principle, construction and working of venturimeter, orifice meter, pitot tube and rotameter.

Flow control (valves)- Plug cock, globe valves, gate valves & water hammer.

Unit-II

Filtration and centrifugation- Theory of filtration, filter aids, filter media, industrial filters including filter press, rotary filter, edge filter etc. Factors affecting filtration.

Centrifugation- Principle of centrifugation, industrial centrifugal filters and centrifugal sedimenters

Material handling system

Liquid handling system- Different types of pumps.

Solid handling system- Principle, construction and working of belt conveyors, screw conveyors & pneumatic conveyors.

Unit-III

Crystallization- Characteristics of crystals like purity, size, shape, geometry, habit, forms size and factors affecting them, solubility curves.

Theory of crystallization- Nucleation mechanisms, crystal growth, Mier's super saturation theory and its limitations.

Crystallizers- Study of various types of crystallizers-Agitated batch crystallizers, Swenson-Walker crystallizer, Krystal crystallizer, vacuum crystallizer. Caking of crystals & its preparation.

Unit-IV

Refrigeration and air conditioning: Basic concepts and definition, wet bulb and adiabatic saturation temperature, psychometric chart & measurement of humidity, application of humidity measurement in pharmacy.

Refrigeration- Theory and application of refrigeration, refrigeration cycle.

Air conditioning- Theory of air conditioning, application and types.

Principle and application of humidification and dehumidification.

Unit- V

Material of constructions: General study of composition, corrosion, resistance, properties and applications of the materials of construction with special reference to stainless steel & glass.

Practical

1. Measurement of rate of flow of fluid and pressure by-
   i) Simple manometer
   ii) Venturi meter
   iii) Orifice meter
2. To determine Reynold's number.S
3. To study the various factors affecting rate of filtration-
   i) Effect of different filter media
   ii) Effect of viscosity of filtrate
   iii) Effect of pressure
   iv) Effect of thickness of cake
   v) Effect of filter aids
4. To study the principle of centrifugation for
   i) Liquid- liquid separation and stability of emulsion
   ii) Solid-liquid separation and stability of suspension
5. To determine the dry bulb and wet bulb temperature using psychometric charts.
6. To study the characteristic of crystals, study of crystal habit.
7. To study the solubility of crystals.

Text Books:

1. Sambhamurthy, Pharmaceutical Engineering, New Age Publishers.
2. Gavhane, K.A. "Unit Opeation-I", Nirali Prakashan.
3. Badger W.L. and Banchero J.T. Introduction to Chemical Engineering Mc Graw Hill International Book Co., London.
4. C.V.S. Subrahmanyam, Pharmaceutical engineering, Vallabh publications, Delhi., India.

Reference Books:

1. Perry R.H. & Chilton C.H. Chemical Engineers Handbook, Mc Graw Kogakusha Ltd.
2. McCabe W.L. and Smith J.C. Unit Operation of Chemical Engineering Mc Graw Hill International Book Co., London.
3. Cooper and Gunn.s Tutorial Pharmacy, S.J. Carter., Latest edition
4. Bentleys Pharmaceutics.Davis, Latest edition
5. Unit operation of chemical engineering .Mcabe Smith, Latest edition,

B. Pharm.
III Semester

Pharmaceutical Microbiology

Course Objective: this subject may provide fundamental knowledge about pathogenic/non pathogenic microorganism and their management. The students can learn about various sterilization techniques, microbiological assay and pharmaceutical applications of microbiology.

Unit-I:

1. Introduction to the scope of microbiology.
2. Structure of bacterial cell.
3. Classification of microbes and their taxonomy: Bacteria and viruses.

Unit-II:

1. Identification of Microbes: Stains and types of staining techniques, electron microscopy.
2. Nutrition, cultivation & isolation of bacteria & viruses.

Unit-III:

1. Control of microbes by physical and chemical methods.
2. Disinfection, factors influencing disinfectants, dynamics of disinfection, Disinfectants and Antiseptics and their evaluation.
3. Sterilization, different methods, validation of sterilization methods & equipments.

Unit-IV:

1. Sterility testing as per I.P.
2. Immunity, primary and secondary, defensive mechanisms of body, microbial resistance, interferon
3. Preservative efficacy

Unit-V:

1. Microbial assays of antibiotics, vitamin B12.
2. Factory and hospital hygiene- control of microbial contamination during manufacture, Manufacture of sterile products- clean and aseptic area, nosocomial infection, control of Hospital infections.

PRACTICALS

1. Study of sterilization methods & equipments
    - Dry heat
    - Moist heat

2. Preparation of various types of culture media.
3. Isolation of bacteria.
4. Sub-culturing of common bacteria, fungi, yeast.
5. Identification and staining of bacteria.
    - Simple staining
    - Gram staining
    - Acid fast staining
    - Hanging drop preparation.
6. Evaluation of disinfectants and antiseptics
    - Phenol coefficient test, minimum inhibitory concentration.
7. Test for sterility of pharmaceutical products as per IP.
8. Microbial assay of antibiotics as per IP.

Books Recommended:-

Text Books:

1. Pelczar and Reid; Microbiology
2. W. B Hugo and A.o. Russel; pharmaceutical microbiology balackwell scientific publication, Oxford London.
3. Ananthnarayan; text book of microbiology.
4. Rose, industrial Microbiology.

Reference Books:-

1. I.P. B.P., U.S.P. – Latest edition.
2. Malcolm Harris, Balliere Tindall & cox; pharmaceutical Microbiology.

B. Pharm.
III Semester

Pharmaceutical Organic Chemistry-II

Course Objective: The subject of Pharmaceutical Organic Chemistry-II will be treated in its modern prospective including Introduction, Significance, Nomenclature, Classification and Mechanism of organic compounds, keeping for the sake of convenience.

UNIT: I

Nucleophillic Aromatic Substitution Reactions, α, β Unsaturated Carbonyl Compounds, Conservation of Orbital symmetry & Rules. Electrocyclic, Cycloaddition and Sigmatropic reactions. Neighbouring group effect, Catalysis by Transition metal complexes. New Organic Reagents Used in drug Synthesis.

UNIT: II

Chemistry of Heterocyclic Compounds: Definition, Nomenclature, Classification, Nature, Preparations, Physical & Chemical Properties, Acidity & Basicity and important Pharmaceutical Applications of some Important Heterocyclic Compounds.

a) Five Membered Six Membered Ring Systems with One Hetero Atom: Furan, Pyrrol, Thiophene & Pyridine.

b) Five Membered Six Membered Ring Systems with Two Hetero Atoms: Pyrazole, Imidazole, Oxazole, Isoxazole, Thiazole and a Comparative Study of Pyrazine, Pyrimidine & Pyridazine.

c) Five Membered Ring with Three Hetero Atoms: Triazole.

UNIT: III

a) Polymer and Polymerization: Definition, Classification, Reaction mechanism, Preparation, Properties and Uses of Some Important Polymers.

b) Chemistry of Nucleic Acids (nucleotides & Nucleosides) & Amino Acids.

UNIT-IV

a) Chemistry of Carbohydrates: Definition, Nomenclature, Classification, Relative Configuration of Some Important Monosaccharide's, Glucose Structure, Mutarotation, Ring Structure, Epimerization, Glycosidic Linkage, Structure of Disaccharide Sucrose, Structural Components of Starch & Cellulose and Pharmaceutical Importance.

b) Chemistry of Proteins & Poly Peptides: Definition, Classification of Proteins, Denaturation, Isoelectric Point, C-Terminal & N-Terminal Concept and Pharmaceutical Importance.

c) Chemistry of Lipids: Definition, Characterization of Lipids (Saponification Value, Acid Value & Iodine Value), Rancidity & Hydrogenation of Oils and Fats.

UNIT: V

Molecular Rearrangement and Synthetic Applications associated with Following Reactions: Cannizzaro, Perkin, Reimer-Tieman, meerwein-Pondorf verley, Reformatsky, Mannich, Michael, Witting, Beckmann, Claisen, Sandmeyer, Dieckmann, Cyano-addition, Hydroboration-Metal Hydride Reduction and Oxidation with Cr & Mn Compounds.

LIST OF PRACTICALS

1. To synthesize and calculate percentage yield of some important heterocyclic compounds.

(At least 5)

2. To determine the Acid Value of oils & fats.

3. To determine the Saponification Value of oils & fats.

4. To determine the Iodine Value of oils & fats.

5. To determine the melting point, boiling point, solubility of some important heterocyclic compounds. (At least 5)

BOOKS RECOMMENDED

S. No.	BOOK'S NAME	AUTHOR'S NAME	PUBLISHER'S NAME
1.	Organic Chemistry	R.T. Morrisson & R.N. Boyd	Prentice India Pvt. Ltd. New Delhi
2.	Text Book of Organic Chemistry	B.S. Bhal & Arun Bhal	S. Chand Publisher
3.	Practical Organic Chemistry (4^{th} Edition 1986)	F.G. Mann & B.C. Sauders	Orient Longman
4.	Chemistry of carbonyl compounds	Gutschi	Prentice Hall of India, New Delhi

REFERENCE BOOKS

S. NO.	BOOK'S NAME	AUTHOR'S NAME	PUBLISHER'S NAME
1.	An introduction to the organic chemistry of heterocyclic compounds	R. M. Acheson	Interscience Publication, New York
2.	A Text Book of Pharmaceutical Chemistry	L.M. Antherden	Bentley & Drivers, Oxford University Press, New Delhi
3.	A Guide Book To Mechanism in Organic Chemistry	P. Sykes	Orient Longman, New Delhi
4.	Organic Chemistry (Vol. I & II)	I.L. Finar	ELBS London
5.	Vogel's Text Book of Practical Organic Chemistry (5^{th} Edition)	Furniss *et al.*	ELBS London
7.	Practical Pharmaceutical Chemistry	A.A. Siddiqui & Mohd. Ali	CBS Publishers & Distributors Pvt. Ltd.

B. Pharm.
III Semester

Pharmacognosy-II

Course Objective: the study involves traditional and alternative medicines, used and practiced as conventional methods of herbal drug therapy; hence the subject deals with basic understanding of herb and best available option possible for medicinal purpose.

Unit-I: Phytochemical Screening:

a. Preparation of plant extracts .

b. Screening of plant extracts

alkaloids, saponins, , flavonoids and, tannins and, cynogenetic glycosides, amino acids .

Unit-II:

a. Principles and methods of Quantitative microscopical analysis:-

Stomatal index, Stomatal number, Palisade ratio, Vein islet number and vein termination number; Lycopodium Spore method for the evaluation of starches.

b.**Enzymes**,

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

Unit-III:

a.Ayurvedic and Traditional system of medicine:

Brief Introduction and principals of Ayurvedic, Unani , Siddha and Homeopathic systems of medicines. Introduction to Herbal Pharmacopoeia with special reference to Arishtas, Asavas, Gutikas, Tailas, Churnas, Lehyas and Bhasmas.

b.Pharmaceutical aids :-

Study of Pharmaceutical aids like Talc, Diatomite, Kaolin, Bentonite, Fullers earth, Gelatin and Natural colors.

Unit-IV:

a.Resins :

Introduction, classification and properties of resins. pharmacognostical Study of drugs containing Resins and Resin Combination like Podophyllum, Cannabis, Capsicum, Shellac, Asafoetida, Balsam of tolu, Balsam of peru, Benzoin, Turmeric, Ginger.

b.Tannins :

Introduction, classification and properties of tannins. pharmacognostical Study of tannins & tannin containing drugs like Gambier (Pale Catechu),Black Catechu, Gall and Myrobalans (Harde, Baheda,).

Unit-V:

a.Pharmacognostical studies of traditional drugs:

Amla, Kantkari, Satavari, Tylophora, Bhilawa, Kalijiri, Bach, Rasna, Punamava, Chitrack, Apamarg, Gokhru, Shankhapushpi, Brahmi, Adusa, Atjuna, Ashoka, Methi, Lahsun, Palash, Guggal, Gymnema, Shilajit, Nagarmotha and Neem.

b. Plant bitters, plant Sweeteners and plant laxative.

PRACTICALS:

1. To isolate quinine from cinchona.
2. Determination of Vein islet number and Vein-let termination number of two dicot leaf drugs.
3. Determination of Palisade ratio of two dicot leaf drugs.

4.Measurement of Calcium oxalate crystals in powdered crude drug.
5. Determination of Stomatal number and Stomatal index of two dicot leaf drugs.
6.To determine the moisture of crude drug by IR moisture balance.
7. Determination of Stomatal number and Stomatal index of two dicot leaf drugs.
8. Morphological identification of Myrobalans Gambier,Black Catechu, Gall .
9. Morphological identification of Podophyllum, Cannabis, Capsicum, Shellac . Asafoetida, Balsam of tolu, Balsam of peru
10. Morphological and Microscopical identification of, Neem.
11. Morphological and Microscopical identification of Bach.
12. Morphological and Microscopical identification of Methi,
13. Morphological and Microscopical identification of Amla& Lahsun.
14.Identification tests Diastase, Papain, Pepsin, Trypsin and Pancreatin.
15.Chemical identification of Talc, Kaolin, Bentonite.

Text Book:

1. C.K. Kokate, Gokhale and Purohit, A Text Book of Phamacognosy, Nirali Prakashan, Pune
2. C.S.Shah & J.S.Quadry, A Text Book of Pharmacognosy

Reference Books:

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

B. Pharm.
III Semester

Human Anatomy & Physiology-II

Course Objective: the subject involves the study of human anatomy along with activity performed by the organ and role in the formation of complete coordination of human body.

1. **Digestive System:** Gross anatomy of the gastro-intestinal tract, functions of its different parts including those of liver, pancreas and gall bladder, various gastrointestinal secretions and their role in the absorption and digestion of food.

   Overview of Disorders of digestive system, appendicitis, gastrointestinal tumors, dental, caries' disease, periodontal cirrhosis, hepatitis, gallstones, anorexia, peptic ulcers.

2. **Respiratory System:** Anatomy of respiratory organs & its functions, respiration, mechanism and regulation of respiration, respiratory volumes and vital capacity.

3. **Central Nervous System:** Functions of different parts of brain and spinal cord, Neurohumoral transmission in the central nervous system, reflex action electroencephalogram, specialized functions of the brain, Cranial nerves and their functions.

Overview of CNS Disorder: Alzheimer's Disease, Parkinson cerebral palsy, poliomyelitis multiple sclerosis, dyslexia, Trigeminal neuralgia, headache, epilepsy, Reyes syndrome, Neuritis, Sciatica.

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

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

Overview of Disorder of urinary system, cystitis, nephrosis Renal failure, Gout, glomerulonephritis , Urinary tract infection.

6. **Reproductive System:** Male and female reproductive systems and their hormones, physiology of menstruation, coitus and fertilization. Sex differentiation, spermatogenesis & oogenesis. Pregnancy its maintenance and parturition.

Overview of Disorders of Reproductive systems: - Sexually transmitted diseases Gonorrhea, Syphilis, Genital herpes, Prostatis impotence, in fertility, Menstrual, abnormalities (Amenorrhea, dysmenorrheal) Ovarian cysts, endometriosis, cervical cancer, Trichomoniasis, prostate cancer, breast cancer.

7. **Endocrine System:** Basic anatomy and physiology of Pituitary, Thyroid, Parathyroid. Adrenals, Pancreas, Testes and ovary, their hormones and functions.

Overview of Disorders of endocrine system: Pituitary dwarfism, giantism, acromegaly, diabetes, insipidus, cretinism, Myxedema, exophthalmic goiter, aldosteronism, pheochromocytoma , Addison's disease, Cushing's syndrome, Diabetes mellitus

Practical

1. Study of different systems with the help of charts and models.
2. Microscopic studies of different tissues.
3. Simple experiments involved in the analysis of normal and abnormal urine: Collection of specimen, appearance, determination of pH, Sugars, proteins, urea and creatinine.
4. Physiological experiments on nerve-muscle preparations.
5. Determination of vital capacity, experiments on spirometry.
6. To study male and female reproductive system with the help of chart.
7. study structure and physiology of eye with the help of chart
8. study structure and physiology of skin (model)
9. study structure and physiology of ear (model)
10. study structure and physiology of lungs(model)

Text Books:

1. Chatterjee, C.C, **Human Physiology**, Medical allied agency, Calcutta.
2. Ross and Wilson, **Human anatomy and Physiology**, Churchill Livingstone London.
3. C.C. Chatterjee: Human Physiology.

Reference Books:

1. Gerard J. Tortora and Nicholas P. Anagnostakos ; Principles of Anatomy and physiology.Harper and Row publishers, New York.
2. Sujit K. Chaudhuri: Concise Medical Physiology.
3. Kathleen J.W., Wilson Ross and Wilson: Anatomy and Physiology in Health and Illness
4. Arthur C. Guyton: Textbook of Medical Physiology.
5. Cyril A. Keele, Erie Neil, Norman Joels and Samson Wrights: Applied Physiology
6. Shalya, Subhas**, Human Physiology** CBS publisher Delhi.
7. Chaurasia, B.D, **Human anatomy, Regional and applied.** , CBS publisher New Delhi

SSD- CSEP (Communication skills Enhancement Program)
3rd Semester
B.Tech (Engg.)/B.Tech (Ag.)/B.Tech (BT)/B.Sc.(Hons) Ag./B.Sc (BT)/B.Pharm/BBA/B.Com/B.com(Hons)/BCA(Hons)/B.Sc. (IT)/Diploma (Engg.)

CSEP PROGRAM: This programme is devised to give you all an exposure to the language used in various communication activities. The objective of the programme is to enhance our communication skills. Research says that the more you listen and speak a language the faster you learn. In these sessions, we are going to practice to speak sentences and words used in different situations. Once you have the command on the language, you can use it for any context; be it interviews, presentations, business, technology so on and so forth.

Learning through activities is more effective than learning through lectures and books. We are going to provide you with opportunities to make speeches, presentations, interact with various people etc.

Unit-1

Thematic structure: Money, Cricket, A trip to Gizmo world, Culture and Shopping
Assignment: Progress Test-1

Unit-2

Thematic structure: Festivals, Computers, Auto mania, Environment and studying abroad.
Assignment: Progress Test-2

Unit-3

Thematic structure: Internet, Fashion & Style, Globalization, all about jobs and Trends in Technology.
Assignment: Progress Test-3

Unit-4

Conversation Questions: College, Beauty and Physical attractiveness, Food and eating, Entertainment, Advertising, Films in your own language, Books & reading.

Activities: Reading newspaper and news analysis, Role plays, Extempore, JAM, Story creation, Picture description, Group Discussion and celebrity Interview.

Assignment: Post assessment Test

B. Pharm.

IV Semester

UNIT OPERATION– II

Course Objective: After reading this subject, the students can learn about fundamental knowledge of unit process and unit operation. Also this subject will provide knowledge about the principle, construction, working, advantages and disadvantages of various equipments used to carry out unit operations and unit processes.

UNIT-I: STOICHIOMETRY

1. Fundamentals of concept of materials and energy balance, units and dimensions. Simple inter-conversion of units, stoichiometry.
2. Dimensional equations and dimensionless formulae, dimensionless groups, dimensional analysis.
3. Equilibrium states, rate process, steady states and unsteady states
4. Lab scale, pilot scale and industrial scale

UNIT-II: EVAPORATION

1. Basic concept of phase equilibria, factors affecting evaporations. Applications of evaporation.
2. Theory of evaporation, heat and material balances.
3. Types of evaporation- steam jacketed kettle, film evaporators, horizontal tube and vertical evaporator, single effect and multiple effect evaporators. Capacity of multiple effect evaporators.
4. Mathematical problems on evaporation.
5. Recent advances in evaporation.

UNIT-III: DISTILLATION

1. Raoult's law, phase equilibrium, volatility and relative volatility.
2. Applications of distillation.
3. Theory of distillation of mixtures like binary mixtures of miscible liquids and binary mixtures of immiscible liquids.
4. Rectification, rectifying columns, fractionating columns, method for calculation of number of theoretical plates, HETP (**Mc Cabe Thiel method**).
5. Simple distillation, steam distillation, azeotropic and extractive distillation, Vacuum, flash and molecular distillation. Mathematical problems on distillation.
6. Recent Advances in Distillation.

UNIT-IV: DRYING

1. Theory of drying, Application of drying. Drying curve.
2. Mechanism of drying, rate of drying, time of drying, calculation Of LoD. Equilibrium Moisture Content (EMC) and Free Moisture Content (FMC).
3. Types of dryers, dryers used in pharmaceutical industries- Tray dryer, Fluidized bed dryer (FBD), spray dryer and special drying methods. Freeze drying and Freeze dryer.
4. Mathematical problems on drying.

5. Recent Advancement in drying technology.

UNIT-V:

a) AUTOMATED PROCESS CONTROL SYSTEM (APCS):

1. Process variables, temperature and pressure control, flow level etc. and their measurement.
2. Elements of APCS and Computer aided manufacturing (CAM).

b) INDUSTRIAL / INTRODUCTION TO PHARMACEUTICAL ENVIRONMENT-

1. Pollution control, hazards like mechanical, chemicals, electrical fire and dust hazards in Pharmaceutical industries.
2. Industrial dermatitis and safety measure.

LIST OF PRACTICALS RECOMMENDED:

1. To study and determine the effect of surface area on rate of evaporation. Also plot a graph between rate of evaporation and surface area.
2. To study and determine the effect of temperature on rate of evaporation. Also plot a graph between rate of evaporation and temperature.
3. To study and determine the effect of consistency on rate of evaporation.
4. To study and determine the surface area on rate of drying. Also plot a graph between rate of drying and surface area.
5. To study and determine the temperature on rate of drying. Also plot a graph between rate of drying and temperature.
6. To determine the rate of drying and free moisture content and also plot a **FMC** curve.
7. To determine the rate of drying and equilibrium moisture content **(EMC)**
8. To study and separate volatile oil from a simple mixture containing volatile components using simple distillation technique.
9. To study and perform the steam distillation technique.
10. To study and perform extractive distillation technique.
11. To study and determine overall heat transfer coefficient of various colour bodies.

TEXT BOOKS

S. No.	BOOK'S NAME (Latest Edition)	AUTHOR'S NAME	PUBLISHER'S NAME
1.	Pharmaceutical Engineering	Sambhamurthy	New Age Int. Pvt. Ltd
2.	Pharmaceutical Engineering	C.V.S. Subrahmanyam	Vallabh prakashan, New Delhi
3.	Unit Operation-I	Gavhane, K.A.	Nirali Prakashan

REFERENCE BOOKS

S. No.	BOOK'S NAME (Latest Edition)	AUTHOR'S NAME	PUBLISHER'S NAME
1.	Introduction to Chemical Engineering	Badger W.L. and Banchero J.T.	Mc Graw Hill, International Book Co., London.
2.	Unit Operations of Chemical Engineering	MaCabe & Smith	Mc Graw Hill International Book Co., London.
3.	Unit Operation of Chemical Engineering	McCabe W.L. and Smith J.C.	Mc Graw Hill, International Book Co., London.

B. Pharm.

IV Semester

PATHOPHYSIOLOGY & TOXICOLOGY

COURSE OBJECTIVE: The course describes the basic understanding of change from normal physiological functioning of the various systems of the human body. The course is based on illness and disease within a systems framework across the lifespan.

General Pathophysiology:

UNIT I

(a) Cell injury: Cellular response, Genetic and acquired etiology of cell injury. Morphology of cell injury & cellular adaptation.

(b) Pathogenesis of reversible and irreversible cell injury due to various causing factors.

UNIT II

(a) Inflammation: Pathogenesis of acute & chronic inflammation. Chemical mediators in inflammation.

(b) Hypersensitivity: hypersensitivity types I, II, III, IV and biological significance of hypersensitivity. Allergy due to food, chemicals and drugs.

Systemic Pathophysiology:

UNIT III

(a) Disorder of blood cell: Anaemia and malaria etc.

(b) Disorder of blood vessel and heart: Hypertension and Arrthymia etc.

(c) Disorder of Skin diseases.

(d) CANCER & AIDS

UNIT IV

(a) Disorder of respiratory tract: Bronchial Asthma, Cough.

(b) Disorder of digestive tract: Dyspepsia, Peptic ulcer, Jaundice.

(c) Disorder of nervous system: Epilepsy, Migraine, Depression.

UNIT V Toxicology

(a) Toxicity, Mechanism of toxicity.

(b) Teratogenicity.

(c) Toxicity of heavy metals and their antidotes.

PRACTICALS

To Prepare and submit survey report of prevalence of a disease in particular area.

TEXT BOOKS (Latest Edition)			
S.No	**Name of the book**	**Author**	**Publisher**
01	Ross and Wilson Anatomy and Physiology in Health and Illness	A. Waugh and A.Grant	Churchill Living Stone, Edinburgh,
02	Textbook of pathology	Harsh Mohan	Jaypee brothers medical publishers,
03	Human Physiology" (Vol. I & Vol. II)	C.C. Chatterjee	Medical Allied Agency, Calcutta,

REFERENCE BOOKS (Latest Edition)			
S.No	**Name of the book**	**Author**	**Publisher**
01	Text book of Medical Physiology	A. C. Guyton and J.E.	W.B. Saunders

		Hall,	company,
02	Principles of Anatomy and Physiology	G. J. Torotora,	John-Wiley & sons New York,
03	Text Book of Human Histology with Colour Atlas	Inderbir Singh,	Jaypee Brothers, New Delhi,
04	Pathophysiology in medical science	H.E.A. Mentz,	
05	Pathophysiology-principles of disease	Martha J. Miller,	
06	Textbook of practical physiology	Ranade VG,	Pune vidyarthi griha prakashan pune,
07	Atlas of normal histology	Difore S.H.,	Lea and febiger Philadelphia,
08	Atlas of normal histology	Difore S.H.,	Lea and febiger Philadelphia,
09	Pharmacotherapy, Principle and Practice	J.P. Dipiro.,	Tata Mc graw hill publishing company limited,New york
10	Medical laboratory technology	Kanai Mukherjee	Tata Mc graw hill publishing company limited,

B. Pharm.

IV Semester

PHARMACEUTICAL ANALYSIS – I

Course Objective: The subject of Pharmaceutical Analysis-I will be treated in its modern prospective including Introduction, Significance, Various Basic Analytical Techniques and also cover the computation of analytical results, keeping for the sake of convenience.

UNIT-I: INTRODUCTION

1. Significance of quantitative analysis in quality control. Concept of errors and their types. Preliminaries and definitions of precision, accuracy, significant figures, standard deviation.
2. Fundamentals of volumetric and gravimetric analysis. Methods of expressing concentration (primary and secondary standards), calibration of analytical equipments and concept of titration

UNIT-II: ACID BASE TITRATION

1. Acid - Base concept, role of solvent, Relative strength of acid and base, Concept of ionization, Law of Mass Action, Common Ion Effect and Ionic product of water.
2. Concept of pH and hydrolysis of salt, Handerson - Hasselbach equation. Buffer solution, Neutralization curve. Acid base indicator (Theory, type and Choice).
3. Application in the assay of Phosphoric acid, Sodium hydroxide, Calcium carbonate, Sodium carbonate, boric acid etc.

UNIT-III: REDOX TITRATION

1. Concept of Oxidation and Reduction, Redox reaction, Strength, Equivalent weight of oxidizing and reducing agents. Theory of redox titration, redox indicators.
2. Iodimetry and Iodometry. Mesurment of electrode potential, Oxidation Reduction curve
3. Application in assay of Ferrous sulphate, Potassium iodide, Potassium permanganate, and Copper sulphate etc.

UNIT-IV: PRECIPITATION TITRATION

1. Principles of precipitation titration, Effect of acid, temperature and solvent upon the solubility of the precipitatae.
2. Argentomateric titration including GayLussac methods, Mohr's methods, Volhard's methods and Fajan's methods.
3. Concept of adsorption indicators and titration involving Ammonium or Potassium thiocyanate, Mercuric nitrate, Barium sulphate etc.

UNIT-V: GRAVEMATERIC ANALYSIS

1. Principles of gravimetric analysis and typical methods involving precipitation, coagulation, incineration and digestion procedures. Concept of Super-saturation, Co-precipitation, Post-precipitation, filtration.
2. Application of gravimetric estimation of Barium as Barium sulphate, Aluminium as Aluminum oxide, Calcium as Calcium oxalate and other organic precipitance.
3. Recent advances in Titrimetric analysis (Volumetric & Gravimetric).

List of Practicals

1. Standardization of analytical weights and calibration of volumetric apparatus.
2. Preparation and standardization of Boric acid. (Acid & Base Titration)
3. Preparation and standardization of Ascorbic acid. (Acid & Base Titration)
4. Preparation and standardization of Hydrochloric acid. (Acid & Base Titration)

5. Preparation and standardization of Sodium hydroxide (0.1 N). (Acid & Base Titration)
6. Preparation and standardization of Potassium per magnate. (Redox Titration)
7. Perform the assay of Copper sulphate. (Redox Titration)
8. Perform the assay of Ferrous sulphate. (Redox Titration)
9. Perform the assay of Sodium thiosulphate. (Redox Titration).
10. Preparation and standardization of Iodine solution. (Redox Titration)
11. Preparation and standardization of Potassium thiocyanate. (Precipitation Titration)
12. Preparation and standardization of Ammonium thiocyanate. (Precipitation Titration)
13. Preparation and standardization of Silver nitrate. (Precipitation Titration)
14. Preparation and standardization of Barium sulphate. (Precipitation Titration)
15. Preparation of Gooch crucible for filtration and use of Sintered glass crucible. (Gravimetric Analysis)
16. Determination of water of hydration. (Gravimetric Analysis)
17. Standardization of Calcium as Calcium oxalate. (Gravimetric Analysis)
18. Standardization of Aluminium as Aluminium oxide. (Gravimetric Analysis)
19. Perform the assay of Sodium bicarbonate. (Neutralization Reaction)
20. Perform the assay of Potassium bicarbonate. (Neutralization Reaction)**TEXT BOOKS**

S. No.	BOOK'S NAME (Latest Edition)	AUTHOR'S NAME	PUBLISHER'S NAME
1.	Practical Pharmaceutical Chemistry", Part- I & II, 4th Ed., (1st Indian Re-Print)	Beckett & Stenlake	CBS Publishers & Distributors
2.	Analytical Chemistry, Theory & Practice, 3rd Ed.	Verma R.M.	CBS Publishers & Distributors, New Delhi
3.	Pharmaceutical Drug Analysis	Ashutosh Khar	New Age International Publishers

REFERENCE BOOKS

S. No.	BOOK'S NAME (Latest Edition)	AUTHOR'S NAME	PUBLISHER'S NAME
1.	A Text Book of Quantitative Inorganic Analysis (Including Elementary Instrumental Analysis) 3rd Ed.	Vogel's	ELBS-Longman
2.	Vogel's Text Book of Quantitative Chemical Analysis	Mendhanm J., Denny R.C., Barnes J.D., Thomas M., Jeffery G.H.	Pearson Education Asia
3.	Quantitative Chemical Analysis, 2nd Ed	Ayers	(Harper International Ed.), Harper and Raw,
4.	Analytical Chemistry, 4th Ed	Gary D.C.	John Wiley & Sons, New York
5.	Quantitative Analysis	Alexeyev V	CBS Publishers & Distributors
6.	A Text Book of Pharmaceutical Analysis	Cornners K.A.	Wiley Inter-Science

B. Pharm.

IV Semester

DISPENSING AND COMMUNITY PHARMACY

COURSE OBJECTIVE: The course describes the basic clinical and scientific knowledge obtained from their previous didactic coursework in the care of patients in actual institutional practice settings.

UNIT I

a. Prescription: Definition, parts, handling, sources of errors in prescriptions knowledge of latin terms commonly used in prescription writing and their translation into English. Modern concepts of dispensing pharmacy.

b. Posology: Calculation of doses and a general know-how of the doses.

UNIT II

a. Introduction to clinical pharmacy practice: Definition and scope, common daily terminology used in the practice of medicine, functioning and working of clinical pharmacy unit, manpower requirements.

b. Compounding & Dispensing of medication: Definition of dispensing &compounding. Good dispensing & compounding practices, fundamental operations in compounding. Containers & closures for dispensed products, labeling & storage of compounded products. Dispensing of prefabricated dosage forms, patient counseling, and documentation of compounding & dispensing records.

UNIT III

a. Incompatibilities: definition, Physical, chemical and therapeutic incompatibilities. Reasons and correction of incompatibilities, role of pharmacist in overcoming such incompatibilities in prescription.

b. Handling of Incompatibilities: Incompatibility of alkaloidal salts, barbiturates, salicylates, iodides salts, gas production (chemical types), etc.

UNIT-IV

a. Pharmaceutical care: Definition and principles of pharmaceutical care. Emergency treatment in shock, snake-bite, burns, poisoning, heart diseases, fractures, resuscitation methods.

b. Surgical supplies: An account of surgical dressing like primary wound dressing, absorbents, bandage, adhesive tapes, protective, Method of preparation of Ligatures and suture materials.

UNIT-V Pharmacy and Health Education

a. Compliance to treatment and role of pharmacist: Impact of diseases on drug action.

b. Dispensing of proprietary medicines. Future trends in dispensing.

c. Concepts of health and diseases, disease agents and prevention of diseases.

d. Food requirements, balanced diet, nutritional deficiency disorders, their treatment and prevention.
e. Demography and family planning: Demography cycle. Various contraceptive methods. Medical termination of pregnancy.
f. First Aid Emergency treatment of shock, snake bites, burns, poisoning, and fractures.

PRACTICALS:

1. To know your Pharmacy practice lab.
2. Dispensing of prescriptions falling under the categories: Mixtures, solutions, emulsions. creams, ointments, powders, suppositories, ophthalmic, capsules, pastes, jellies, pastille, lozenges, pills, tablet triturates, lotions, liniments, inhalations, paints, etc.
3. Identification of various types of incompatibilities in prescription, correction thereof and dispensing of such prescriptions.
4. Dispensing procedures involving pharmaceuticals calculations, pricing of prescriptions and dosage calculations for pediatric and geriatric patients.
5. Dispensing of prescriptions involving adjustment of tonicity.
6. Categorization and storage of pharmaceutical products based on legal requirements of labeling and storage.
7. Prescription reading (Minimum of three Prescriptions).
8. Study of some marketed preparations (Minimum of three).

Project report

Project report on visit to the nearby Community for counseling on the rational use of drugs and aspects of health care.

Books Recommended

TEXT BOOKS			
S.No	**Name of the book**	**Author**	**Publisher**
01	N.K. Jain and S.N. Sharma	Concise Pharmaceutical Dispensing.	Vallabh Prakashan, Delhi.
02	N.K. Jain	Health Education and Community Pharmacy.	CBS Publishers,
03	P.C. Dandiya, R.K. Khar and N. Gumbani	Hospital Pharmacy.	CBS Publisher.

REFERENCE BOOKS(Latest Edition)			
S.No	**Name of the book**	**Author**	**Publisher**

01	Pharmaceutical Dosage Forms and Drug Delivery Systems	H. C. Ansel,	Lippincott Williams and Wilkins, New Delhi,
02	Remington The Science and Practice of Pharmacy, Vol: I and II	Alfonso R. Gennaro,	Lippincott Williams
03	Cooper and Gunn's Dispensing for Pharmaceutical Students,	Carter S.J,	CBS Publishers, New Delhi,
04	Cooper and Gunn's Tutorial pharmacy	Carter S.J,	CBS Publishers , New Delhi,
05	Pharmaceutics The Science of Dosage Form Design	M.E.Aulton	Churchill Livingstone, Edinburgh,
06	Bentley's textbook of Pharmaceutics	E.A.Rawlins	English language book Society
07	Pharmaceutical Calculations	Herfindal,	B I Waverley Pvt. Ltd., New Delhi,
08	Clinical Pharmacy & Therapeutics.	Alfonso R. Gennaro,	Lippincott Williams
09	Indian Pharmacopoeia 2007,	Govt. of India	Published by The Controller of Publications, Delhi.
10	Pratibha Nand and R.K. Khar	Hospital & Clinical Pharmacy.	

B. Pharm.

IV Semester

PHARMACEUTICAL BIOCHEMISTRY

Course Objective: The subject of Pharmaceutical Chemistry (Biochemistry) gives knowledge of various method required for determination of diseases involves test of organs, blood, urine.

UNIT-I: BIOCHEMISTRY- introduction and scope of biochemistry, Importance of Biochemistry in Medical and Pharmaceutical Science.
Biochemical organization of cell, Production of Cell energy.

UNIT-II: ENZYMES

Definition, nomenclature, mechanism of action, Enzyme Kinetics, factor Affecting enzyme activity, enzyme inhibition, Michael's Menton equation, Importance of Enzymes in Diagnosis.

Co-enzymes- Vitamins as co enzyme and their importance, metals as co enzyme.

Vitamins- Classification and properties of vitamins, Daily requirement, Role of Vitamins as coenzyme and Body Growth and its significance.

UNIT-III: CARBOHYDRATES

Classification of carbohydrates Glycolysis, Citric acid cycle Glycogenesis, Glycogenolysis, HMP shunt, Role of sugar nucleotide in Biosynthesis and pentosephosphate pathway, Blood Sugar and its regulation.

Lipids- Classification of lipids, oxidation of fatty acids (Alpha and Beta), Essential fatty acids Eicosanoids , Biosynthesis of Ketone Bodies, Fatty Acids, Lipoproteins.

UNIT-IV: AMINO ACIDS

Classification of amino acids properties Metabolism of amino acids role of amino acids and proteins.

Nucleic acids- genetic organization of the mammalian genome, Biosynthesis of RNA DNA , Mutation, DNA Replication and their repair mechanism, genetic code.

UNIT-V: HORMONES

Classification of Hormones, mechanism of action (Adrenaline, nor Adrenaline, progesterone, Aldosterone, Testosterone, Insulin) deficiency of Hormones, its nature and various types of functions of hormones.

Nutrition- Daily nutritional Requirement, Test for Liver and kidney, Importance of Carbohydrates, proteins, vitamins, fats.

Deficiency of liver, kidney (Stone formation, Jaundice, Collectomy).

Recent trends in Biochemistry

Types and uses of Biochemistry analyzer CBC (complete blood checkup) various brands of Biochem analyzer in market.

Various types of Reagent Kit available in the Market.

General Study of Blood testing card like malaria, TB (tuberculosis), dengue, HIV, Hemoglobin, Typhoid, Sugar etc.

List of Practicals

1. Identification of carbohydrates.
2. Identification of amino acids.
3. Estimation of uric acid in urine.
4. Estimation of glucose in urine.
5. Estimation of creatinine in urine.
6. Estimation of glucose in blood.
7. Estimation of urea in blood.
8. Estimation of creatinine in blood.
9. Fat determination in milk
10. Identification of Blood Glucose.
11. Determination of Blood cholesterol.
12. Determination of SGOT SGPT
13. Estimation of Alkaline Phosphate in serum

TEXT BOOKS

S. No.	BOOK'S NAME (Latest Edition)	AUTHOR'S NAME	PUBLISHER'S NAME
1.	Review of Biochemistry	Harpers	Langue medical publication
2.	Element of Biochemistry .	OP Agrawal	Goel publishing House Meerut
3.	Principle of Biochemistry	A.L.Lehinger	CBS Publisher and distributor

REFERENCE BOOKS

S. No.	BOOK'S NAME (Latest Edition)	AUTHOR'S NAME	PUBLISHER'S NAME
1.	Text Book of Biochemistry	West and Todd	ELBS-Longman
2.	British Pharmacopeia	HerMajestys stationary office .	Universitypress Cambridge
3.	The pharmacopoeia of India	Ayers	(Harper International Ed.), Harper and Raw,
4.	Text book of Biochemistry	Harrow B &Mazur A	WB Saunders Co. Philadephia
5.	Outline of Biochemistry	Conn EE Stumph P K	John Willery and Sons New York
6.	Text Book of Biochemistry	Raman Rao	
7.	Fundamental of biochemistry	AC Deb	New central Book Agency

SSD- (Soft Skills Development)
4th Semester

B.Tech (Engg.)/ B.Tech (Ag.)/ B.Tech (BT)/ B.Sc.-Ag(Hons)/ B.Sc (BT)/ B.Pharm/ BBA (Hons) / B.Com/B.com(Hons)/ BCA(Hons)/ B.Sc.(IT) Hons./ Diploma (Engg.)

What is soft Skills?

The bundle of Skills which helps a person to perform a task better in a more satisfying way for both the performer and spectator (In personal, Professional and social life).

Why it is required?

To make a person to perform a task with better understanding of who, where, when, what, how and with whom a job can be executed to deliver the best expected result in perfect timing.

Learning Outcome: On completion of the course (SSD), the student should be able:

- Understand the Importance of various skills involved in developing enriching Interpersonal relationship.
- Be more aware of his/her own self- Confidence and values.
- Learn how to go about being a good team player and form an effective team.
- Understand the skills tested and participate effectively in Group discussion.
- Learn the basics of how to make an effective Presentation and have numerous practice Presentation in small groups and larger audiences.

Unit-1

Conceptual Sessions: Soft skills – a general overview, Industry Expectations, SWOT & STAR, Self Discovery, Leap to success- 7 Orientations,

Activity: Castle Plan.
Assignment : Sentence fluency assignment

Unit-2

Conceptual Sessions: Attitude, Time Management, Goal setting, Team building and leadership,

Activity: Early Bird and second mouse and Lost at Sea.

Assignment : Goal setting Assignment (Pre and Post)

Unit-3

Conceptual Sessions: Telephone etiquettes- Preparing for business calls/Making business calls/Telephonic phrases, Dining etiquettes, Email etiquettes, Corporate grooming and dressing
Activity: Role play in different scenarios/ Socialization and networking.
Assignment : Progress test on general etiquettes.

Unit-4

Conceptual Sessions: Group discussion: Introduction and definition of a GD, Purpose of a GD, Types and strategies in a GD, Do's and Don'ts in GD, Speak to Impress (Presentation skill), Anchoring in formal setting, Reading Comprehension
Activity: GD Practise and Presentation on Company profile.
Assignment : Reading Comprehension assignment.

B. Pharm.
V Semester

PHARMACEUTICAL TECHNOLOGY - I
(Pharmaceutical Formulations and Cosmetology)

COURSE OBJECTIVE This subject deal with the study of various pharmaceutical formulations (including selection criteria for additives) and optimization of their quality, purity, safety and stability.

UNIT I PREFORMULATION STUDIES

Objectives, study of physical properties of pharmaceuticals like physical forms, particle size, shape, density, wetting, solubility, pKa, partition coefficient, dissolution and their effect on formulation stability and bioavailability.

UNIT II LIQUID ORAL DOSAGE FORMS

Introduction, various additives used in liquid oral formulations like vehicles, stabilizers, preservatives, suspending agents, emulsifying agents, solubilizers, colours, flavours etc.

Formulation technology and evaluation of:

a) Solutions **b)** Suspensions **c)** Emulsions

UNIT: III SEMISOLID DOSAGE FORMS

Definition, types, mechanism of drug penetration, factors influencing penetration.

Classification of bases and their selection, general formulation of semisolid dosage forms, clear gels. manufacturing procedures, Evaluation and packaging.

UNIT: IV

a) SUPPOSITORIES: Ideal Requirements, Bases, Manufacturing Procedure, Packaging and Evaluation.

b) PHARMACEUTICAL AEROSOLS: Definition, Propellants, General Formulation, Manufacturing and Packaging Methods. Pharmaceutical applications.

UNIT: V COSMETOLOGY AND COSMETIC PREPARATIONS

Fundamentals of Cosmetic Science, Structure and Function of Skin and Hair.

Formulation, Preparation, Evaluation and Packaging of Cosmetics for Skin and Hairs like Cold Cream, Vanishing Cream, Cleansing Cream, All Purpose Cream, Protective Cream, Antiperspirants, Deodorants, Face Powder & Shampoos and Conditioners, Shaving Cream and After Shaving Products.

LIST OF PRACTICALS

1. Preparation, evaluation and packaging of liquid orals like-

i) Solutions: - Strong sodium salicylate oral solution B.P.

- Chloral hydrate oral solution B.P.

ii) Suspensions:

- Magnesium sulphate oral suspension B.P.
- Milk of magnesia I.P.
- Aluminum hydroxide gel

iii) Emulsions:

- Liquid paraffin oral emulsion B. P.

2. Preparation, evaluation and packaging of ointments like-

-Salicylic acid ointment B.P.

- Compound benzoic acid ointment B.P.

3. Preparation, evaluation and packaging of cosmetic preparation of followings:

Cold cream, vanishing cream, cleansing cream, all purpose cream, protective cream, foundation lotion, sunscreen preparation, cream shampoo, clear liquid shampoo, shaving cream, after shave lotion, face powder, face pack, body powder, mouth washes, hair conditioner etc. (at least 10 exp in 5 labs).

RECOMMENDED BOOKS

S. No.	BOOK'S NAME (LATEST EDITION)	AUTHOR'S NAME	PUBLISHER'S NAME
1.	Pharmaceutical Sciences, Vol. I & Vol. – II	Remington	Mack Publishing Co., U.S.A.
2.	Theory and Practice of Industrial Pharmacy	Lachman L., Lieberman H.A, Kanig J.L,	Lea & Febiger, Philadelphia, U.S.A.
3.	Introduction to Pharmaceutical Dosage Forms	H.C. Ansel	Lea & Febiger, Philadelphia, U.S.A.
4.	A handbook of cosmetics	Mittal B.M. & Saha R.N.	Vallabh Prakashan.

REFERENCE BOOKS

S. No.	BOOK'S NAME (LATEST EDITION)	AUTHOR'S NAME	PUBLISHER'S NAME
1.	Tutorial Pharmacy	J.W. Cooper, & G. Gunn	Petman Books Ltd., London.
2.	Drug Delivery Systems	R.L. Juliano	Oxford University Press, Oxford
3.	Cosmetics: Science and Technology	Balsam and Sagarin	Wiley-Interscience, Canada
4.	Modern Cosmetics	Thomssen E.G.	Universal Publishing Corporation

B. Pharm.
V Semester
MEDICINAL CHEMISTRY - I

COURSE OBJECTIVE The subject of Medicinal Chemistry-I will be treated in its modern prospective including Introduction, Synthesis, Classification, Mode of Action and Structure Activity Relationship of Medicinal Agents, keeping for the sake of convenience.

UNIT: I BASIC PRINCIPLE OF MEDICINAL CHEMISTRY

a) Physicochemical Aspect (Optical, Geometric & Bioisosterism of drug molecules & biological action).

b) Receptor Theory (Type of receptors, Drug-Receptor Interaction including transduction mechanism).

Synthetic Procedure of Selected Drugs Only, Classification, Mode of Action, Therapeutic Use, Structure Activity Relationship of the following class of drug:

UNIT: II

Drugs Acting at Synaptic & Neuro Effector Junction Sites

a). Cholinergic, Anti-cholinergic, Anti-cholinesterases: Neostigmine, Physostigmine, Methacholine, Pilocarpine, Atropine, Acetylcolin, Tropicamide

b) Adrenergic & Anti-adrenergic Drugs: Ephedrine, Amphetamine, Salbutamol, Adrenaline, Terbutaline, Epinephrine, Nor- epinephrine, Tolazoline, Phentolamine, Prazosine, Propranolol, Atenolol, Acebutolol.

UNIT: III

a) Drugs Used in the Treatment of Neuro-degenerative Disorder: Anti-alzheimer's agents, Anti-parkinsons agents.

b) Neuromuscular Blockers/Ganglion Blocking Agents: Nicotine, Tubocurarine, Triethiodide, Galamine, Mephenesine, Pancuronium.

UNIT: IV AUTOCOIDS

a) Anti-histaminics: H_1, H_2 & H_3 Receptor Antagonist: Cyproheptadine, Diphenhydramine, Promethazine, Cetrizine, Ranitidine, Famotidine, Lansoprozole, Omeprazole, & Clemastine Fumrate, Pheniramine Maleate

b). Prostaglandins: Mesoprostol

c) Eicosanoids

UNIT: V

a) Diagnostic agents: Metyrapone, Iodine Compounds, Metrizamide, Evans blue, Fluorescine.

b) Pharmaceutical Aids.

LIST OF PRACTICALS

1. Synthesis of drug having Cholinergic, Anti-Cholinergic & Anti-Cholinesterase activity. (At least 3)
2. Synthesis of drug acting as diagnostic agent.
3. Synthesis of drugs having Anti-histaminic activity. (At least 3)
4. Synthesis of drugs used in the treatment of neuro degenerative disorders. (At least 2)
5. Synthesis of drug having neuromuscular blocking activity.
6. Determination of melting point and boiling point of synthesized drugs.
7. Separation and identification of organic mixtures containing not more than two compounds. (At least 5)

BOOKS RECOMMENDED

S. No.	BOOK'S NAME	AUTHOR'S NAME	PUBLISHER'S NAME
1.	A Text Book of Medicinal Chemistry (Synthetic & Biochemical Approach)	S. N. Pandey	S.G. Publishers, Varanasi
2.	Medicinal & Pharmaceutical Chemistry	Harkishan Singh & V. K. Kapoor	Vallabh Prakashan, New delhi
3.	Medicinal Chemistry	Ashutosh Khar	Wiley Estern, Limited Publishers, New Delhi
4.	Drug Design Series	E.J. Arins	Academic Press, New York
5.	Practical Application of Computer Aided Drug Design	Paul Charifron	Marcel Dekker-1997
6.	Practical Pharmaceutical Chemistry	A.A. Siddiqui & Mohd. Ali	CBS Publishers & Distributors Pvt. Ltd.
7.	Practical Organic Chemistry	Mann & Saunder	Orient Longman, UK

REFERENCE BOOKS

S. NO.	BOOK'S NAME	AUTHOR'S NAME	PUBLISHER'S NAME
1.	Indian Pharmacopoeia 1985, 1996 & 2007	Annonymous	Ministry of Health, New Delhi
2.	Principles of Medicinal Chemistry	W. C. Foye	Lea and Febiger, Philadelphia
3.	A Text Book of Organic, Medicinal and Pharmaceutical Chemistry	Wilson & Giswold	J. Lippincott Co., Philadelphia
4.	Organic Chemistry (Vol. I & II)	I.L. Finar	ELBS London
5.	Vogel's Text Book of Practical Organic Chemistry (5^{th} Edition)	Furniss *et al.*	ELBS London
6.	Practical Organic Chemistry (Vol. I, II, III)	Vogel's	The ELBS / Longman, London

B. Pharm.

V Semester

PHARMACOGNOSY - III

(Pharmacognosy & Phytochemistry - II)

COURSE OBJECTIVE The subject of Pharmacognosy-III will be treated in its modern prospective including Introduction, Classification, keeping for the sake of convenience.

UNIT: I

a) General method of investigation of biosynthetic pathways of primary & secondary metabolites. Introduction to basic metabolic pathways.

b) Radio – tracer techniques and utilization in biogenetic studies. A brief introduction of chemical nature of phytoconstituents.

UNIT: II

Concepts of stereoisomerisms Nature, distribution, classification, general methods of isolation and properties of:

a) Alkaloids **b)** Glycosides

UNIT: III

a) Herbs as health food& cosmeceuticals.

b) Natural dyes, Immunomodulators and Adaptogents.

UNIT: IV

a) Biogenesis and pharmaceutical application of the following phytoconstituents Atropine, Morphine, digoxin, Reserpine, Ergometrine.

b) Role of Medicinal & aromatic plants in National Economy.

Unit-V

a) Systematic pharmacognostical study of alkoloidal drugs like: Cinchona, Ergot, Ephedra, Ipecac, Kurchi, Rauwolfia and Vasaka Belladonna, Vinca, Coffee, Colchicum, Datura,Duboisia, Hyosyamus, Lobelia, Opium, Nux-vomoca, Pilocarpus, Solanum, Tobacco, Tea and Withania.

b) Systematic pharmacognostical study of Glycosides drugs like: Aloe, Ammi majus, Digitalis, Liquorice, Senna and Saffron Ammi visnaga, Cascara, Chirata, Dioscoria, Gentian, Ginseng, Squill, Strophanthus and Quassia.

LIST OF PRACTICALS

1. Identify Colchicum, Ginseng and Ipecac leaves morphologically.
2. Identify Aconite, Hyoscyamus and Withania leaves morphologically.
3. Perform morphological, microscopic and chemical evaluation of Vinca.
4. Perform morphological, microscopic and chemical evaluation of Withania.
5. Perform morphological, microscopic and chemical evaluation of Senna leaves.
6. Perform morphological, microscopic and chemical evaluation of Liquorice.
7. Perform morphological, microscopic and chemical evaluation of Nux vomica seeds.
8. Perform morphological, microscopic and chemical evaluation of Ephedra.
9. Perform morphological, microscopic and chemical evaluation of Kurchi bark.
10. Isolate Nicotine from tobacco.
11. Isolate Caffeine from tea leaves.
12. Isolate aloin from Aloe vera.
13. Isolate alkaloids from nux vomica seeds.
14. Isolate starch from potatoes.
15. To identify the given sample of powdered crude drug by various phytochemical tests.

(Cinchona/Rauwolfia/Senna/Ephedra)

BOOKS RECOMMENDED

S. No.	BOOK'S NAME	AUTHOR'S NAME	PUBLISHER'S NAME
1.	Pharmacognosy	. Trease, G.E. and Evans, W.C	Bailliere Tindall, Eastbourne, U.K
2.	Pharmacognosy	Tayler, V.C., Brady, L.R. and Robers, J.E.	Lea and Febiger, Philadelphia
3.	A text book of Pharmacognosy	Shah, C.S. and Quadry, J.S.,	B.S. Shah Publishers, Ahmedabad.

REFERENCE BOOKS

S. No.	BOOK'S NAME	AUTHOR'S NAME	PUBLISHER'S NAME
1.	Indian Pharmacopoeia 1985, 1996 & 2007	Annonymous	Ministry of Health, New Delhi
2.	Pharmacognosy,	Kokate, C.K., Purohit, A.P. and Gokhale, S.B.,	Nirali Prakashan, Pune

B. Pharm.
V Semester
HOSPITAL PHARMACY & HEALTH EDUCATION

Course Objective: The aim of the subject is to provide how a pharmacy interfaces with the total hospital operations, the personnel utilized within the pharmacy, the standards of the practice, technology and the distributive function of the pharmacy in the hospital.

UNIT: I

(i) Status of Health Delivery System In India: Definition and role of hospitals in the health delivery system. Type of hospitals, Beneficial available for medical facility in India.

(ii) Hospital Pharmacy: Definition, function and objectives of hospital pharmacy, location, layout and flow chart of material and men, Personnel and facilities required including equipment.

UNIT: II Drug Distribution System in Hospitals

1. Purchasing Procedures.
2. Dispensing of drugs to inpatients.
3. Dispensing of drugs to outpatient.
4. Dispensing of scheduled drugs.
5. Types of distribution of drugs and charging policies in hospital.
6. Central sterile supply unit and their management.

UNIT: III

a) Drug Information Service and Drug Information Bulletin: Sources of Information on drugs, disease treatment schedule, procurement of Information, computer services, Medication error

b) Records: Maintenance of records of issue and use of Narcotics and dangerous drug, ward stock medicines and emergency drug.

UNIT: IV

Medical Store and OTC Counter: Objective, layout facility and procedure for procurement of drug and supplies from medical stores depot. OTC establishment, dispensing, personnel, space, equipment, apparatus and other facility required for safe efficient speedy dispensing of drugs.

UNIT: V

Pharmacy Therapeutic Committee (PTC): Constitution and function of PTC, Hospital formulary system and its organization function and composition.

Surgical Instrument, Hospital Equipment and Health accessories and their uses.

BOOKS RECOMMENDED

S. NO.	BOOK'S NAME	AUTHOR'S NAME
1	Pharmaceutical Science	Remington
2	Hospital and clinical Pharmacy	Pratibha nand and Khar
3.	Pharmacist year book	PC dandiya, RK khar and ghumbani

REFERENCE BOOKS

S. NO.	BOOK'S NAME	AUTHOR'S NAME
1	Hospital Pharmacy	W.E Hassan
2.	GCP ICH guidelines	---------
3.	Hospital Pharmacy	SH Merchant and J S Quadry

B. Pharm.
V Semester
PHARMACOLOGY - I

COURSE OBJECTIVE The course describes the basic understanding of drugs, their science of interaction with the body and the response of body to the drug.

UNIT: I GENERAL PHARMACOLOGY

a) Introduction To Pharmacology, Sources of Drugs, Dosage Forms And Routes of Administration. Mechanism of Action. Combined Effect of Drugs. Factors Modifying Drug Action. Tolerance and Dependence.

b) Brief Overview of Discovery and Development of New Drugs. Drug Nomenclature and Sources of Drug Information.

UNIT: II PHARMACOKINETICS & PHARMACODYNAMICS

a) Absorption, Distribution, Metabolism and Excretion of Drugs.

b) Mechanism of Drug Action through Cell Membrane, Receptors and Types, Drug Receptor Interactions, Ion Channels, Enzymes and Carrier Proteins.

UNIT: III PHARMACOLOGY OF ANS: Cholinergic System

a) Parasympathomimetic (Cholinergic) drugs.

b) Parasympatholytic (anti Cholinergic) drugs.

c) Drug acting on autonomic ganglia (Stimulants and blocking agents).

UNIT: IV PHARMACOLOGY OF ANS: Adrenergic system

a) Sympathomimetic (Adrenergic) drugs.

b) Sympatholytic (Anti-adrenergic) drugs.

UNIT: V AUTOCOIDS

a) Histamine, Antihistaminics.

b) Serotonin, agonists and antagonists.

c) Arachidonic acid metabolites.

LIST OF PRACTICALS

1. To study various Experimental pharmacology based Softwares.
2. Study of instruments used in experimental pharmacology.
3. Enlist various experimental laboratory animals.

4. To perform the preparation of physiological salt solution and storage.
5. To perform the preparation of various drug solution and storage.
6. Study of anesthetics used in animal studies.
7. Study of various route of administration in Mice.
8. To perform the smoking and fixing of kymograph.
9. To study Organ Bath Assembly and assemble it to perform bioassay.
10. To Know about role of CPCSEA and AEC in Experimental Pharmacology

RECOMMENDED BOOKS

S. No.	BOOK'S NAME LATEST EDITION	AUTHOR'S NAME	PUBLISHER'S NAME
1.	The Pharmacological Basis of Therapeutics by Alfred Goodman Gilman	Theodore W.Rall, Alan S.Nies and Palmer Taylor.	R.W. Ruddon and A.G. Gil, Pergamon press.
2.	Essentials of Medical Pharmacology.	K.D.Tripathi	Vallabh Prakashan, Delhi.
3.	Pharmacology and Pharmacotherapeutics.	R.S.Satoskar and S.D.Bhandarkar	
4.	Pharmacology.	H.P.Rang and M.M.Dale	
5	Clinical Pharmacology.	D.R.Laurence and P.N.Bennett	

REFERENCE BOOKS

S. No.	BOOK'S NAME LATEST EDITION	AUTHOR'S NAME	PUBLISHER'S NAME
1.	Fundamentals of Experimental Pharmacology	Ghosh, MN	Scientific Book Agency, Calcutta.
2.	Drug Delivery Systems	R.L. Juliano	Oxford University Press, Oxford
3.	Cosmetics: Science and Technology	Balsam and Sagarin	
4.	Modern Cosmetics	Thomssen E.G.	Universal Publishing Corporation

SSD- CPP (Campus Placement Program)
5th Semester
B.Tech (Engg.)/B.Tech (Ag.)/B.Tech (BT)/B.Sc.(Hons) Ag./B.Sc (BT)/B.Pharm/BBA/B.Com/B.com(Hons)/BCA(Hons)/Diploma (Engg.)

Introduction to CPP Program: 'Soft skills' are a framework of desirable qualities which gives a candidate an edge over his peers during the selection process of a company. We, at AKS University, have designed the Campus Placement Program (CPP) to help out our students who are sitting for their placement process in various Companies.

Objective of The Program:

- Develop effective communication and Presentation skills.
- Develop all-round personality with a mature outlook to function effectively in different circumstances.
- Take part effectively in various selection procedures adopted by the recruiters.
- Develop broad career plans, evaluate the employment market, identify the organizations to get good placement, match the job requirements and skill sets.

UNIT-1

Talking about Present, Past and Future, Describing Processes and operations, Expressing Opinion: Agreement & Disagreement, Pronunciation and neutral accent, Group Discussion: Concept and Practice, Resume Writing.

UNIT-2

Public Speaking:A presentation about the company will be made by the students throughout the Unit. Each and every student is required to go through at least 10 Companies Profile related to their domain expertise. Basically the presentation includes the information like selection procedure, company's milestones, organizational achievements, candidate scope of improvement within the organization if selected, salary, employment benefits. Usually this presentation will end up with question and answer session, students given chance to ask questions about company.

UNIT-3

Mastering Personal Interviews: Paper Interview, Personal Interview, FAQs, Interview Practice, Domain Specific Interview Preparation, Peer review- Pair interview, Interview model (Vocabulary for an effective Interview).

UNIT-4

Communication Skills and Reading Comprehension Test Preparation: Interpersonal Communication Assignment, Sentence Fluency Assignment, A way with words Assignment, Vocabulary Assignment, Communication skills placement paper Test, Reading Comprehension Assignment, Communication Assignment: Presentation Skills and Group discussion.

B. Pharm.
VI Semester

PHARMACEUTICAL TECHNOLOGY- II

(Pharmaceutical Formulation and NDDS)

COUSRE OBJECTIVE: The students can learn about formulation of tablets, capsules, microcapsules, microcapsules, parenterals and novel drug delivery systems. This subject also provides information about equipments and procedures employed in development of formulation strategies.

UNIT: I : TABLETS

a) Oral tablets

Product development: Formulation additives, methods of preparations like wet granulation, dry granulation, direct compression, sheronization etc.

Production: Tablet machines, physics of tablet making, processing problems, Compression and consolidation of powdered solids, Heckel plots, force displacement curves (F-D curves), factors influencing the strength of tablets.

b) Other forms of tablets:

Formulation and evaluation of chewable, soluble, effervescent, buccal and sublingual, implants, compression coated tablets, multilayer tablets etc.

c) Evaluation procedure for tablets.

d) Tablet coating: Types of coating, film forming materials, formulation of coating solutions, equipments for coating processes. Evaluation of coating tablets.

UNIT: II : CAPSULES

Definition, advantages and disadvantages of capsule dosage form.

a) Hard gelatin capsules: Formulation of shell and material for production of hard gelatin capsule, size of capsule, capsule production, methods of capsule filling and equipment employed.

b) Soft gelatin capsules: Soft gelatin, capsule shell, capsule content, importance of base absorption and minimum/ gram factors in soft capsule, quality control, stability testing and storage.

c) Microencapsulation:

Types of microcapsules, Importance & application of microencapsulation in pharmacy. Techniques employed like phase separation, coascervation, spray drying, fluidized bed coating, polymerization, complex emulsion etc.

d) Evaluation of microcapsules.

UNIT: III

CONTROLLED DRUG DELIVERY SYSTEMS: Introduction, terminologies, factors in design, fabrication of oral controlled release drug delivery systems. In vitro methods of evaluation of CDDSs. Formulation and evaluation- of ophthalmic, nasal and ear products.

UNIT: IV

a) PARENTERAL PRODUCTS

Preformulation factors, routes of administration, WFI, pyrogenicity, non-aqueous vehicles, Isotonicity and methods of its adjustment. Formulation details, containers and closures and their selection.

Prefilling treatment, washing of containers and closures, preparation of solutions and suspensions, filling and sealing of ampoules, vials and infusions.

b) PRODUCTION FACILITIES AND PROCESS CONTROL

Source of contamination and method of prevention, design of aseptic area, layout, air control, LAF and maintenance. Sterility testing of parenterals.

UNIT: V

a) SURGICAL PRODUCTS:

Definition, primary wound dressing, absorbents, surgical cotton, surgical gauze etc, bandages, adhesive tape, protective cellulosic haemostatics, official dressings, absorbable and non-absorbable sutures, ligatures and catguts.

b) PACKAGING AND PHARMACEUTICAL PRODUCTS

Packaging materials, types, specification and methods of evaluation, stability, aspects of packaging. Packaging equipments, factors influencing choice of containers, legal and other official requirements for containers. Packaging testing.

LIST OF PRACTICALS

A) Tablets:

I. Preparation and evaluation of tablets (Uncoated)

i) Paracetamol tablets IP

ii) Diclofenac sodium tablets

iii) Aspirin tablets

iv) Effervescent tablets

II. Preparation and evaluation of tablets (Coated)

i) Ibuprofen tablets IP (film coated)

ii) Aspirin tablets (enteric coated)

iii) Diclofenac sodium tablets (dip coated)

B) Capsules:

i) Capsule filling: Chloramphenicol capsules

C) Parenterals:

i) Disodium EDTA injection IP

ii) Dextrose- NaCl IV infusion IP

iii) Water for injection IP

D) Eye drops and ointment

i) Zinc Sulphate IP (eye drop)

ii) Sulphacetamide Sodium IP (eye ointment)

E) Controlled drug delivery systems:

i) Aspirin extended release tablets (matrix type)

ii) Diclofenac sodium SR tablets (coated granules/ matrix type)

RECOMMENDED BOOKS

S. No.	BOOK'S NAME (LATEST EDITION)	AUTHOR'S NAME	PUBLISHER'S NAME
1.	The Theory & Practice of Industrial Pharmacy.	Lachman, L., Lieberman, H.A., and Kanig, J.L.	Lea & Febiger, Philadelphia
2.	Introduction to Pharmaceutical Dosage Forms.	Ansel, H.C.	V.M. Verghese & Co., Mumbai.
3.	Modern Pharmaceutics	Banker, G.S. and Rhode, C.T.	Marcel Dekker

REFERENCE BOOKS

S. No.	BOOK'S NAME (LATEST EDITION)	AUTHOR'S NAME	PUBLISHER'S NAME
1.	Drug Delivery Systems	R.L. Juliano	Oxford University Press, Oxford
2.	Tutorial Pharmacy	J.W. Cooper, & G. Gunn	Petman Books Ltd., London.
3.	Modern Cosmetics	Thomssen E.G.	Universal Publishing Corporation
4.	Cosmetics: Science and Technology	Balsam and Sagarin	Wiley-Interscience, Canada

B. Pharm.
VI Semester
MEDICINAL CHEMISTRY-II

Course Objective: The subject of Medicinal Chemistry-II will be treated in its modern prospective including Introduction, Synthesis, Classification, Mode of Action and Structure Activity Relationship of Medicinal Agents, keeping for the sake of convenience.

UNIT: I DRUG DESIGN (A MODERN APPROACH)
a) Principles of Drug Design, Quantitative Structure Activity Relationship (Hansch Analysis, 3 D QSAR, COMFA), Preliminary Idea of QSPR in Drug Design.
b) Molecular Modeling and Computer Aided Drug Design. Introduction to Analogue Based Drug Design.

Synthetic Procedure of Selected Drugs Only, Classification, Mode of Action, Therapeutic Use, Structure Activity Relationship of the following class of drug:

UNIT: II DRUGS ACTING ON CENTRAL NERVOUS SYSTEM
a) General & Local Anaesthetics: Thiopental, Methohexital, Lignocaine, Benzocaine.
b) Sedative & Hypnotics: Phenobarbitone, Alprazolam.
c) Anti-depressants: Imipramine, Amitryptyline.
d) Anti-anxiety Agent: Diazepam, Chlordizepoxide.
e) Anti- convulsants: Phenytoin, Carbamazepine, Ethosuximide, Valproic Acid.
f) Anti-psychotic Drugs: Haloperidol.
g) CNS Stimulants: Caffeine, Nikethamide.

UNIT: III
a) Diuretics: Acetazolamide, Chlorthiazide, Furosemide, Ethacrynic Acid, Spironolactone.
b) Non-Steroidal Anti-inflammatory Drugs (NSAID), Anti-pyretic Agents and Analgesic Drugs: Paracetamol, Diclofenac Sodium/Potassium, Ibuprofen, Aspirin, Mefenamic Acid, Indomethacin.
c) Anti-Gout Drugs: Allopurinol.

UNIT: IV DRUGS ACTING ON CARDIOVASCULAR SYSTEM
a) Cardiac Glycosides: Digitoxin, Digoxin.
b). Anti-anginal Drugs (Vasodilators & Cardiotonics): Verapamil, Nifedipine, Amlodipine.
c) Anti-arrhythmic Drugs: Procainamide, Disopyramide.
d) Anti-hypertensive Drugs: Captopril, Enalapril, Minoxidil, Lisinopril, Reserpine.
e) Anti-hyperlipidaemic Drugs: Clofibrate, Niacin, Probucol.
f) Anti-coagulant & Anti-thrombolytic Drugs: Warfarine, Heparine, Protamine.

UNIT: V SYNTHESIS OF AT LEAST TWO DRUGS FROM EACH CATEGORY
a) Drugs Acting on Gastro-intestinal System: Emetics & Anti-emetics, Purgative & Laxatives, Antacids & Drugs Used in the Treatment of Peptic Ulcer.
b) Drugs Acting on Respiratory System: Anti-asthmatics & Expectorants, Anti-tussives & Bronchodilators.

LIST OF PRACTICALS

1. Tosynthesize the drugs acting on central nervous system. (At least 5)
2. To synthesize the drugs acting on cardiovascular system. (At least 5)
3. To synthesize the drugs having diuretic activity. (At least 2)
4. To synthesize the drugs having anti - inflammatory, analgesic and anti - pyretic activity. (At least 2)
5. To synthesize the drugs acting on gastrointestinal system. (At least 3)
6. To synthesize the drugs acting on respiratory system. (At least 3)
7. To determine melting point and boiling point of the synthesized drugs.
8. To establish the Pharmacopoeial standards for the synthesized drugs.

BOOKS RECOMMENDED

S. No.	BOOK'S NAME	AUTHOR'S NAME	PUBLISHER'S NAME
1.	A Text Book of Medicinal Chemistry (Synthetic & Biochemical Approach)	S. N. Pandey	S.G. Publishers, Varanasi
2.	Medicinal & Pharmaceutical Chemistry	Harkishan Singh & V. K. Kapoor	Vallabh Prakashan, New delhi
3.	Medicinal Chemistry	Ashutosh Khar	Wiley Estern, Limited Publishers, New Delhi
4.	Drug Design Series	E.J. Arins	Academic Press, New York
5.	Practical Application of Computer Aided Drug Design	Paul Charifron	Marcel Dekker-1997
4.	Practical Pharmaceutical Chemistry	A.A. Siddiqui & Mohd. Ali	CBS Publishers & Distributors Pvt. Ltd.
5.	Practical Organic Chemistry	Mann & Saunder	Orient Longman, UK

REFERENCE BOOKS

S. NO.	BOOK'S NAME	AUTHOR'S NAME	PUBLISHER'S NAME
1.	Indian Pharmacopoeia 1985, 1996 & 2007	Annonymous	Ministry of Health, New Delhi
2.	Principles of Medicinal Chemistry	W. C. Foye	Lea and Febiger, Philadelphia
3.	A Text Book of Organic, Medicinal and Pharmaceutical Chemistry	Wilson & Giswold	J. Lippincott Co., Philadelphia
4.	Organic Chemistry (Vol. I & II)	I.L. Finar	ELBS London
5.	Vogel's Text Book of Practical Organic Chemistry (5^{th} Edition)	Furniss *et al.*	ELBS London
6.	Practical Organic Chemistry (Vol. I, II, III)	Vogel's	The ELBS / Longman, London

B. Pharm.
VI Semester

PHARMACY LAW & ETHICS

Objective- The law defines a set of responsibilities for pharmacists and for others who are formally involved with medication use. The law also provides a mechanism through which adverse outcomes are reviewed by affording responsible persons.

UNIT: 1

a) Legislation of India: Drug Legislation of India Legislation for import, export, Manufacture Distribution sale of Drugs and Cosmetics.

b) Pharmaceutical Education (Related to Pharma journals and Articles)

UNIT- 2

A) Drug and Cosmetic Act and rules 1945: General Study of drug and cosmetic act and rules, Retail and wholesale distribution of drugs, Drug inspectors its powers duties, Sampling, procedures, procedure for obtaining license under this act. All schedules, labeling and storage condition of drugs.

b) Medicinal and Toilet Prepration Act.

c) Poisons Act 1919.

d) Patents Acts 1970.

UNIT: 3

a) Narcotics Drugs and Psychotropic Substance (Acts and rules).

b) Prevention of Cruelty to Animal Act 1961.

c) State shop and establishment Act and rules.

d) AICTE Act.

UNIT: 4

a) Weighing and Measure Act.

b) Packaging and commodity Act.

c) US Food and fedrel D and C Act.

d) Medical termination of pregnancy 1970 act and rules.

UNIT: 5

a) Factory Act.

b) Minimum Wages Act.

c) Insecticides Act.

d) Consumer protection Act 1948 its amendments.

e) A Brief review of Drugs and Pharmaceutical industry.

BOOKS RECOMMENDED

S. NO.	BOOK'S NAME	AUTHOR'S NAME
1.	Pharmaceutical Jurisprudence	N.K jain
2.	Pharmaceutical Jurisprudence	S.P.Aggarwal and R.Khanna
3.	A Rext Book of Forensic Pharmacy	Mittal national book depot

4.	Drug and Cosmetics Act rules	Despande,S.W
5	Drug and Pharmacy Laws in India	Sadhna Mandir

REFERENCE BOOKS

S. NO.	BOOK'S NAME	AUTHOR'S NAME
1.	The Bare Acts and rules	Government of India
2.	Drug and Cosmetics Act and Rules with drug order	Mallick eastern book company1998
3.	The Laws of drugs	Beotra

B. Pharm.
VI Semester

PHARMACEUTICAL ANALYSIS – II

Course Objective: The course describes the basic understanding of the principle of Instrumentation and techniques involved in drugs analysis and evaluation.

UNIT: I

A. Non-Aqueous Titrations: General discussion and principle of titrations in non aqueous media, aprotic, protophilic, protogenic and amphiprotic solvents. Titrations with perchloric acid, potassium methoxide and tetrabutyl ammonium hydroxide.

B. Complexometric Titration: Principles of complexometric titrations, chelating agent, indicators, titrations with disodium edentate.

UNIT: II

A. Potentiometric Titrations: Introduction, Electrochemical cells, Nernst equation, half-cells, electrodes, measurement of potential, applications and advantages.

B. Conductometric Titrations: Basic concepts, different types of Conductometric titrations, apparatus used, applications and advantages.

UNIT: III

A. Polarography And Amperometry: Basic concept, theoretical considerations, Basic instrumentation, apparatus, principles, general polarography analysis and applications in pharmaceutical analysis. Amperometric titrations with one polarized electrode, general Procedure, titration curves and applications.

B. Miscellaneous Methods Of Analysis: Diazotization titrations, Kjeldahl method of Nitrogen estimation, Karl- Fischer titration**.**

UNIT: IV

A. Turbidometry: Theory, instrumentation and applications.

B. Fluorimetry: Theory, instrumentation and applications.

UNIT: V

A. Colorimetric Method: Theory, instrumentation and applications.

B. Principle, Instrumentation And Pharmaceutical Applications: Paper, TLC & Column Chromatography.

LIST OF PRACTICALS

1) Preparation and Standardization of 0.1 N Perchloric acid.
2) Preparation and Standardization of 0.1 N Sodium Methoxide Solution.
3) Preparation and Standardization of 0.05N Disodum EDTA Solution.
4) Separation of a mixture of Amino acid by thin layer Chromatography Technique
5) Determination of the percentage of purity of Aniline by non aqueous method
6) Separation of Amino acid by Ascending paper Chromatography
7) Separation of Amino acid by Radial paper Chromatography
8) Exercises based on Column chromatography (demonstration only).
9) Fluorimetric estimation of quinine.
10) Assay of riboflavin - Colorimetric method
11) Assay of rifampicin - Colorimetric method**.**
12) Titrations using potentiometric technique.
13) Exercises involving conductometric titrations.
14) Exercises based on Turbidimetry
15) Exercise involving Kjeldahl

RECOMMENDED BOOKS

S.no.	Book Name	Author's Name	Publisher's Name
1.	Practical Pharmaceutical Chemistry	Beckett, A H and Stenlake, J.B	The Athlone Press of the University of London
2.	Textbook of Chemical Analysis	Joffery Vogel's	ELBS -Longman
3.	Gurdeep Chatwal	Instrumental methods of analysis	-

REFERENCE BOOKS

S.no.	Book Name	Author's Name	Publisher's Name
1.	Pharmacopoeia of India	-	Ministry of Health, Govt of India.
2.	Instrumental methods of analysis	Willard H.H. and Merrit L. Jr and Dean J.A	Van Nostrand Renhold, New York

B. Pharm.

VI Semester

Pharmacology II

COURSE OBJECTIVE: The course describes the basic understanding of drugs acting on various systems and the mechanism involved.

UNIT I Drugs Acting on Central Nervous System:

a. General anesthetics
b. Local anesthetics.
c. Alcohols and Disulfiram.
d. Sedatives and Hypnotics.
e. Antidepressants
f. Anti-epileptic drugs.
g. Anti-Parkinsonian drugs.
h. Non-steroidal analgesics, anti-inflammatory and anti-pyretic agents, drugs used in gout.
i. Drug addiction and drug abuse.

UNIT II Drugs Acting on Cardiovascular System

a. Cardiac glycosides.
b. Antiarrhythmic drugs.
c. Antihypertensive drugs.
d. Coronary vasodilators and drugs used in angina.
e. Hypolipidemic drugs.

UNIT III Drugs Acting on Gastrointestinal System

a. Purgatives.
b. Antacids and treatment of peptic ulcers.
c. Emetics and antiemetics.

UNIT IV Drugs Acting on Respiratory System

a. Expectorants.
b. Antitussive bronchodilators.
c. Drugs used in common cold.

UNIT V Bioassay:

a. Principles of Bioassay and Biological Standardization.
b. Bioassay of Drugs and Biological Standardization.

PRACTICALS:

1. To study analgesic effect of morphine in mice using tail flick method.
2. To study analgesic effect of morphine in mice using hot plate method.
3. To study the writhing effect in mice against acetic acid.
4. To study anticonvulsant activity of phenytoin against convulsiometer.
5. To determine the acute toxicity of a given drug (LD_{50}).
6. To demonstrate the effect of drug on blood pressure in anesthetized rat.
7. To study muscle relaxant property of diazepam in mice using rotarod apparatus.
8. To study antianxiety effect of diazepam in mice using elevated plus maze apparatus.

B. Pharm.
VII Semester

BIOPHARMACEUTICS & PHARMACOKINETICS

COURSE OBJECTIVE: This subject create the basis for student pharmacists and helpful in the design of dosage forms. The present syllabus also provides information about pharmacokinetic and pharmacodynamic profile of API and statistical study design for bioavailability and bioequivalence.

UNIT: I

a) BIOPHARMACEUTICS

Introduction to biopharmaceutics, definition, fundamental principles, concepts and its role in formulation development and clinical testing.

b) DRUG ABSORPTION

Mechanism of drug absorption like passive diffusion, active transport facilitated diffusion and pinocytosis. Factors affecting drug absorption-

i) Physicochemical factors

ii) Physiological factors

iii) Pharmaceutical factors etc.

c) DRUG DISTRIBUTION

Distribution of drug in blood and other body tissues. Apparent volume of distribution (V_d), Plasma-protein binding. Applications of drug- protein binding.

UNIT:II

a) PHARMACOKINETICS

Introduction to pharmacokinetics, Importance in bioavailability and clinical practice. Significance of plasma drug concentration measurement.

b) COMPARTMENT MODEL

Definition, types, concepts and their importance in Pharmacokinetics. Pharmacokinetics of drug absorption, zero order and first order absorption rate constant using Wagner-Nelson and Loo-Reigelman method.

UNIT: III

a) ONE COMPARTMENT AND MULTICOMPARTMENT MODELS

Volume of distribution and distribution coefficient. Determination of pharmacokinetic parameters from plasma and urine data after drug administration IV injection and oral administration. Curve fitting method (method of residuals), regression procedure.

b) NON-LINEAR PHARMACOKINETIC: With special reference to one compartment model i.v. drug administration. Michaeles Menton equation.

c) CLINICAL PHARMACOKINETICS: Definition, concept and scope. Dosage adjustment in patients with or without renal failure. Pharmacokinetic of drug interactions and their significance in combination therapy.

UNIT: IV

CONCEPT OF CLEARANCE

a) Mechanism of renal clearance, clearance ratio, determination of renal clearance. Extraction ratio, hepatic clearance, biliary excretion, extra hepatic circulation.

b) Non-compartment model: Concept, methods of determination of area under curve (AUC) and mean residence time (MRT).

UNIT: V

BIOAVAILABILITY AND BIOEQUIVALENCE: DEFINITION, TERMINOLOGIES AND IMPORTANCE. Measures of bioavailability, C-max, and AUC. Study design for bioavailability study. Review of regulatory requirements for conduction of bioequivalent.

LIST OF PRACTICALS

1. Establishment of standard curve of drug substances.
2. In vitro release study of the paracetamol tablets using various dissolution media.
3. In vitro dissolution study of the given sustained release dosage form.
4. To study the effect of hardness of tablet on dissolution rate.
5. To study the effect formulation on drug release.
6. T study the effect of protein binding of the given drugs.
7. To calculate various pharmacokinetic parameters from the given zero order drug release data.
8. To calculate various Pharmacokinetic parameters from the given first order drug release data.
9. To calculate the various Pharmacokinetic parameters from the given blood data of I.V bolus injection (one compartment model).
10. To study the effect of various diluents on dissolution rate of dosage form.
11. To perform and study dissolution study.
12. To study and prepare pharmaceutical buffers.

RECOMMENDED BOOKS

S. NO.	BOOK'S NAME (LATEST EDITION)	AUTHOR'S NAME	PUBLISHER'S NAME
1.	Biopharmaceutics and pharmacokinetics	*Brahmankar* D. M., Sunil B Jaiswal	Vallabh Prakashan
2.	Biopharmaceutics and Pharmacokinetics	Notari, R.E	An introduction Marcel Dekker Inc. N.Y.
3.	Biopharmaceutics & Clinical Pharmacokinetics	Gibaldi, Milo	Lea & Febiger, Philadelphia
4.	The Science & Practice of Pharmacy	Remington	Mack Publishing Co., Easton, Pennsylvania.

REFERENCE BOOKS

S. NO.	BOOK'S NAME (LATEST EDITION)	AUTHOR'S NAME	PUBLISHER'S NAME
1.	Clinical Pharmacokinetics	Rowland, M. and Tozer, T.N	Lea & Febiger, N.Y.
2.	A Pharmacokinetics	Pecile, A & Rescigno, A.	Plenum Press, N.Y.
3.	Handbook of Basic Pharmacokinetics	Ritschel, W.A.	Drug Intelligence Publications, Hamilton.

B. Pharm.
VII Semester

MEDICINAL CHEMISTRY - III

Course Objective: The subject of Medicinal Chemistry-III will be treated in its modern prospective including Introduction, Synthesis, Classification, Mode of Action and Structure Activity Relationship of Medicinal Agents, keeping for the sake of convenience.

UNIT: I

a) Drug Metabolism (General Pathway of Drug Metabolism, Factors Affecting Drug Metabolism & Significance of Drug Metabolism in Medicinal Chemistry).

b) Basic Concept of Pro Drug and Applications.

UNIT: II

Vitamins (Structure, Physiological Role, Important Chemical Reactions & Therapeutic Uses)

a) Fat Soluble Vitamins: Vitamin A1 & A2, Vitamin D, Tocopherols (α, β, γ), Vitamin K1, K2, K3 & K4.

b) Water Soluble Vitamins: Vitamin B (B1, B2, B6 & B12), Folic Acid, Ascorbic Acid, Nicotinic Acid & Cyanocobalamine.

UNIT: III

Introduction, Structures, Synthesis, Classification, Mode of Action and Structure Activity Relationship of Medicinal Agents.

a) Steroids & Hormones

i) Androgens & Anabolic Steroids: Testosterone, Stanazolol.

ii) Estrogens & Progestogens: Estradiol, Progesterone.

iii) Adrenocorticoids: Prednisolone, Dexamethasone, Betamethasone.

iv) Thyroid & Anti-thyroid Drugs: Carbimazole, Levothyroxine, Methimazole.

v) Insulin & Oral Hypoglycemic Agents: Glibenclamide, Metformin, Tolbutamide.

b) Nucleotidomimmetics & Peptidomimmetics.

UNIT: IV

Introduction, Structures, Synthesis, Classification, Mode of Action and Structure Activity Relationship of Medicinal Agents.

a) Anti-neoplastic Agents (Alkylating Agents, Folic Acid Antagonists, Natural Anti-cancer agents And Others)**:** Methotrexate, Chlorambucil, Cyclophosphamide, Fluorouracil, Carmustine, Thiotepa, Busulphan, Cisplatin.

b) Antibiotics: Penicillins, Cephalosporins, Tetracyclines, Chloramphenicol, Sulfonamides, Aminoglycosides, Macrolides.

c) Immunosupressive & Immunomodulatory Agents.

UNIT: V

Introduction, Structures, Synthesis, Classification, Mode of Action and Structure Activity Relationship of Medicinal Agents.

Anti-infective & Anti-invasive Agents.

a) Anti-amoebic Drugs: Metronidazole, Tinidazole.

b) Anti-helminthic Drugs: Mebendazole, Niclosamide.

c) Anti-malarial Drugs: Chloroquine, Primaquine, Proguanil.

d) Anti-trypanosomal Drugs: Pentamide, Isothionate.
e) Anti-tubercular Drugs: Isoniazid, PAS, Ethambutol, Rifampicin, Pyrazinamide.
f) Anti-fungal Drugs: Fluconazole, Tolnaftate, Clotrimazole.
g) Anti-viral & Anti-HIV Drugs: Amantadine, Acyclovir, Idoxuridine, Lamivudine, Zidovudine, Zalcitabin, Saquinavir.
h) Disinfectants: Benzalkonium chloride**.**

BOOKS RECOMMENDED

S. No.	BOOK'S NAME	AUTHOR'S NAME	PUBLISHER'S NAME
1.	A Text Book of Medicinal Chemistry (Synthetic & Biochemical Approach)	S. N. Pandey	S.G. Publishers, Varanasi
2.	Medicinal & Pharmaceutical Chemistry	Harkishan Singh & V. K. Kapoor	Vallabh Prakashan, New delhi
3.	Medicinal Chemistry	Ashutosh Khar	Wiley Estern, Limited Publishers, New Delhi
4.	Drug Design Series	E.J. Arins	Academic Press, New York
5.	Practical Application of Computer Aided Drug Design	Paul Charifron	Marcel Dekker-1997
4.	Practical Pharmaceutical Chemistry	A.A. Siddiqui & Mohd. Ali	CBS Publishers & Distributors Pvt. Ltd.
5.	Practical Organic Chemistry	Mann & Saunder	Orient Longman, UK

REFERENCE BOOKS

S. NO.	BOOK'S NAME	AUTHOR'S NAME	PUBLISHER'S NAME
1.	Indian Pharmacopoeia 1985, 1996 & 2007	Annonymous	Ministry of Health, New Delhi
2.	Principles of Medicinal Chemistry	W. C. Foye	Lea and Febiger, Philadelphia
3.	A Text Book of Organic, Medicinal and Pharmaceutical Chemistry	Wilson & Giswold	J. Lippincott Co., Philadelphia
4.	Organic Chemistry (Vol. I & II)	I.L. Finar	ELBS London
5.	Vogel's Text Book of Practical Organic Chemistry (5^{th} Edition)	Furniss *et al.*	ELBS London
6.	Practical Organic Chemistry (Vol. I, II, III)	Vogel's	The ELBS / Longman, London

B. Pharm.
VII Semester

PHARMACOGNOSY-IV
(Industrial Pharmacognosy)

Course Objective: The subject of Pharmacognosy-IV will be treated in its modern prospective including Introduction, Classification, keeping for the sake of convenience.

UNIT: I

a) Introduction, classification & study of different chromatographic methods in pharmacognosy.

b) Application of chromatographic techniques in evaluation of herbal drugs.

UNIT: II

a) Historical development of plant tissue culture, type of culture, Nutritional requirement, growth & their maintenance.

b) Application of plant tissue culture for production of secondary metabolites and Role of plant growth regulators for the production of secondary metabolites.

UNIT: III

a) Volatile oils: General methods of obtaining volatile oils from plants, Study of volatile oils from Mentha, Coriander, Cinnamon, Jatamansi, Cumin, Black pepper, Cassia, Lemon peel, Orange peel, Lemon grass, Citronella, Caraway, Dill, Spearmint, Clove, Fennel, Nutmeg, Eucalyptus, Chenopodium, Cardamom, Valerian, Musk, Palmarosa, Gaultheria.

b) Fibres: General methods of obtaining fibres from plants. Study of fibres used in pharmacy such as Cotton, silk, wool, nylon, glass-wool, polyester and asbestos.

UNIT: IV

a) Production and analysis of phytoconstituents of pharmaceutical importance like Quinine, Strychnine, Atropine, Morphine Podophyllotoxin, Papain, Vincristine, Ephedrine and Tannic acid.

b) Spectral analysis of herbal drugs with emphasis on application of UV, IR, NMR, Mass Spectroscopy.

UNIT: V

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.

LIST OF PRACTICALS

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

BOOKS RECOMMENDED

S. NO.	BOOK'S NAME	AUTHOR'S NAME	PUBLISHER'S NAME
1.	Pharmacognosy	Trease, G.E.and Evans, W.C.,	Baillierc, Tindall, Eastbourne,
2.	Pharmacognosy	Tayler, V.E., Brady, L.R. and Robers, J.E.,	Lea and Febiger, Philadelphia
3.	Pharmacognosy	Kokate, C.K., Purohit, A.P. and Gokhale, S.B.,	Nirali Prakashan, Pune -

REFERENCE BOOK

S. NO.	BOOK NAME	AUTHOR'S NAME	PUBLISHER'S NAME
1.	Herbal Pharmacopoeia of India	-	Ministry of Health, Govt of India.
2.	Cultivation & Utilization of Aromatic Plants,	C.R Atal and B.M. Kapoor	Council of Scientific Industrial Research (CSIR) New Delhi.

B. Pharm.
VII Semester

PHARMACEUTICAL ANALYSIS – III

Course Objective: The course describes the basic understanding of the principle of Instrumentation and techniques involved in drugs analysis and evaluation.

UNIT: I

a) QUALITY ASSURANCE: Basics concepts of GLP, ISO 9000, TQM, International Conference of Harmonization (ICH), Regulatory control, regulatory drug analysis, interpretation of analytical data.

b) VALIDATION: Validation of Analytical methods (parameters of validation, pharmacopoeial requirements of analytical methods of validation) and Validation of Analytical Instruments as per Indian Pharmacopoeia.

UNIT: II

Introduction and theoretical concepts, preparation, procedure, instrumentation, method of detection and application of the following chromatographic techniques: Gas Chromatography, High performance liquid chromatography, High Performance Thin Layer Chromatography.

UNIT: III

a) ULTRAVIOLET ABSORPTION SPECTROSCOPY: Theory of electronic spectroscopy, absorption by organic molecules, choice of solvent and solvent effects, modern instrumentation –design and working principle. Applications of UV-Visible spectroscopy (qualitative and quantitative analysis), Woodward – Fischer rules for calculating absorption maximum, Photometric titrations and its applications.

b) Infra Red Spectroscopy: Introduction, basic principles, vibrational frequency and factors influencing vibrational frequency, instrumentation and sampling techniques, applications in Pharmacy. FT-IR-theory and applications

UNIT: IV

a) NMR SPECTROSCOPY: Theoretical aspects, basic instrumentation, elements of interpretation of spectra and application of 1H NMR & $_{13}$C NMR, Chemical Shift, Shielding & Desheilding, Spin - Spin Coupling.

b) FLAME PHOTOMETRY: Theory of emission spectra, equipment, and qualitative and quantitative applications with reference to flame photometry.

UNIT: V

a) MASS SPECTROSCOPY: Theoretical aspects, basic instrumentation, elements of interpretation of spectra and applications in pharmacy.

b) RADIO IMMUNO ASSAY: The theoretical aspects, basic instrumentation, elements of interpretation of spectra, and applications.

LIST OF PRACTICALS

1) To perform the quantitative spectrophotometric estimation of drug by (calibration) standard absorptivity method
2) To study the effect of various solvent on spectral features of any drug (Paracetamol)
3) To perform the quantitative spectrophotometric estimation of drug by calibration curve method
4) To perform the simultaneous estimation of Paracetamol & Nimesulide by simultaneous equation method
5) To perform the simultaneous quantitative spectrophotometric estimation of the two drugs by dual wavelength method
6) To interpret the given IR Spectra
7) Estimation of sodium ions using flame photometry
8) Estimation of potassium ions using flame photometry
9) Estimation of calcium ions using flame photometry
10) Determination of λ_{max} of a drug
11) Assay of ibuprofen - UV-spectro photometry
12) Assay of paracetamol - UV-spectro photometry

RECOMMENDED BOOKS

S.no.	Book Name	Author's Name	Publisher's Name
1.	Practical Phamaceutical Chemistry	Beckett, A H and Stenlake, J.B	The Athlone Press of the University of London
2.	Textbook of Chemical Analysis	Joffery Vogel's	ELBS -Longman
3.	Gurdeep Chatwal	Instrumental methods of analysis	-

REFERENCE BOOK

S.no.	Book Name	Author's Name	Publisher's Name
1.	Pharmacopoeia of India	Anonymous	Ministry of Health, Govt of India.
2.	Instrumental methods of analysis	Willard H.H. and Merrit L. Jr and Dean J.A	Van Nostrand Renhold, New York

B. Pharm.
VII Semester

PHARMACOLOGY – III

Course objective: The course describes the basic understanding to inculcate a rational and scientific basis of therapeutics in a pharmaceutical graduate.

UNIT: I DRUGS ACTING ON THE HAEMOPOIETIC SYSTEM

a) Haematinics.

b) Anticoagulants, vitamin K and haemostatic agents.

c) Fibrinolytic and anti-platelet drugs.

d) Blood plasma volume expanders.

UNIT: II PHARMACOLOGY OF ENDOCRINE SYSTEM

a) Hypothalamic & pituitary hormones.

b) Thyroid hormones & Thyroid Drugs.

c) Parathormone, Calcitonin & Vitamin D.

d) Insulin & glucagon.

UNIT: III

a) ACTH & Cortico steroids.

b) Androgens & anabolic steroids, Estrogens, Progesterone.

c) Oral Contraceptives.

UNIT: IV

a) General Principles of Chemotherapy, Sulfonamides, Cotrimoxazole, Quinolones.

b) Antibiotics –Penicillins, Cephalosporins, Chloramphenicol, Tetracyclines, Macrolides.

UNIT: V

a) Chemotherapy of Parasitic infections, Tuberculosis, Leprosy, Malaria, Fungal Infections, Viral diseases.

b) Chemotherapy of Cancer.

RECOMMENDED BOOKS

S. No.	BOOK'S NAME LATEST EDITION	AUTHOR'S NAME	PUBLISHER'S NAME
1.	The Pharmacological Basis of Therapeutics by Alfred Goodman Gilman	Theodore W.Rall, Alan S.Nies and Palmer Taylor.	R.W. Ruddon and A.G. Gil, Pergamon press.
2.	Essentials of Medical Pharmacology.	K.D.Tripathi	Vallabh Prakashan, Delhi.
3.	Pharmacology and Pharmacotherapeutics.	R.S.Satoskar and S.D.Bhandarkar	
4.	Pharmacology.	H.P.Rang and M.M.Dale	
5	Clinical Pharmacology.	D.R.Laurence and P.N.Bennett	

REFERENCE BOOKS

S. No.	BOOK'S NAME LATEST EDITION	AUTHOR'S NAME	PUBLISHER'S NAME
1.	Fundamentals of Experimental Pharmacology	Ghosh, MN	Scientific Book Agency, Calcutta.
2.	Drug Delivery Systems	R.L. Juliano	Oxford University Press, Oxford
3.	Cosmetics: Science and Technology	Balsam and Sagarin	
4.	Modern Cosmetics	Thomssen E.G.	Universal Publishing Corporation

B. Pharm.

VIII Semester

PHARMACEUTICAL BIOTECHNOLOGY

Course Objective: Pharmaceutical Biotechnology is the therapeutic application of Biotechnology that uses biological systems, living organisms, or derivatives thereof, to make or modify the drugs from various sources as well as to help us in the area of disease diagnosis.

UNIT: I IMMUNOLOGY AND IMMUNOLOGICAL PREPARATIONS

a) Principles, Antigen and haptens, immune system, Cellular, and humoral immunity. immunological tolerance, antigen-antibody reactions and their applications.

b) Active and passive immunization to human body. Vaccines their preparation and storage.

UNIT: II GENETIC RECOMBINATION

a) Transformation, conjugation, transduction, protoplast fusion and gene cloning. Monoclonal antibodies & hybridoma technology with their application.

b) Recombinant DNA technology & application. study of drugs produced by biotechnology such as Activase, Insulin.

UNIT: III ENZYME BIOTECHNOLOGY

a) Brief introduction to immobilization methods and applications.

b) Study of enzymes such as amylases, proteases, penicillinase, and streptokinase.

UNIT: IV ANTIBIOTICS

a) Historical development of antibiotics, Screening of soil for organisms producing antibiotics. Antimicrobial spectrum and methods used for their standardization.

b) Fermentor, its design and control of different parameters. Fermentation products with special reference to vitamin B12.

UNIT: V

a) Introduction, types of reactions mediated by microorganisms, design of biotransformation processes, selection of organisms, and applications.

b) Current developments in immune-technology: Diagnostic kits for: HIV, VDRL and other clinical pathological tests.

LIST OF PRACTICALS

1) Estimation of the given protein sample by UV spectrophotometric method.
2) Isolation and characterization of DNA from onion.
3) Preparation of nutrient media.
4) Culture techniques liquid media inoculation.
5) Culture techniques solid media inoculation like pour plate, stab culture, swab culture.
6) Bacterial enumeration by standard plate count technique(viable count).
7) Production of fermentation products like alcohol, amylase, streptomycin.
8) Microbiological assay of antibiotics & vitamins by turbidimetric method.
9) Isolation of DNA & its purity estimation .
10) Experimental devised to prepare various types of culture media.
11) Sterilization techniques & their validation.
12) Testing the sterility of pharmaceutical products as per I.P. requirements.

RECOMMENDED BOOKS

S.no.	Book Name	Author's Name	Publisher's Name
1.	Textbook of biotechnology	Vyas & Dixit	CBS Publication, New Delhi
2.	Method in biotechnology & Bioengineering	Vyas & Kohli	CBS Publication, New Delhi
3.	Laboratory Manual in Biochemistry	Jayaraman	New Age International Publishers

REFERENCE BOOK

S.no.	Book Name	Author's Name
1.	Microbiology	Pelczar,Reid & Chan
2.	Text Book of Biotechnology	R.C Dubey

B. Pharm.
VIII Semester
Pharmaceutical Management

Objective-This Subjects Deals with various methods for the smooth running of Pharmaceutical Industry.

UNIT- 1

Concept of management- Administrative management (Planning, Organizing Staff, Directing and Controlling) Entrepreneurship development, Operative Management (Personnel, materials, production , financial communication Motivation Decision making , innovative creativity, identification of key points to give maximum thrust for development and perfection.

UNIT-2

Economics - Principles of economics with special reference to the laws of demand and supply demand schedule, labor welfare ,General principle of insurance and inland and foreign trade , procedure of exporting and importing goods.

UNIT-3

Accountancy- Principles of accountancy , ledger posting and book entries, Preparation of trial balance, column of cash book, Bank reconciliation statement, Rectification of errors profit and loss statement Balance sheet , Purchase keeping and pricing of stock.

UNIT-4

Pharmaceutical Marketing – Functions ,buying, selling, transportation, storage, finance, Feedback, ,information, channels of distribution, wholesale, retail department store, multiple shop and mail order business.

Salesmanship- Principles of sales promotion, advertising ethics of sales, merchandising, literature, detailing, Recruitment, Training, evaluation compensation to the pharmacist.

UNIT-5

Production Management- A brief exposure of the different aspects of Production Management-Visible and Invisible inputs, Methodology of Activities, Performance Evaluation Technique, process Flow, maintenance Management.

Market Research- measuring and Forecasting Market demands- Major concept in demand Measurement, Estimating current demand, estimating industrial Sales, market share and future demand.

REFERENCE BOOKS

S. No.	BOOK'S NAME	AUTHOR'S NAME	PUBLISHER'S NAME
1.	Principles and Methods of pharmacy management	Smith	Febiger
2.	Principles of management	Koontz and O Donnel	Mcgraw Hill
3.	The Practices	H.C. Ansel	Lea & Febiger, Philadelphia, U.S.A.
4.	A handbook of cosmetics	Mittal B.M. & Saha R.N.	Vallabh Prakashan.

REFERENCE BOOKS

S. No.	BOOK'S NAME	AUTHOR'S NAME	PUBLISHER'S NAME
1.	Tutorial Pharmacy	J.W. Cooper, & G. Gunn	Petman Books Ltd., London.
2.	Drug Delivery Systems	R.L. Juliano	Oxford University Press, Oxford
3.	Cosmetics: Science and Technology	Balsam and Sagarin	Wiley-Interscience, Canada
4.	Modern Cosmetics	Thomssen E.G.	Universal Publishing Corporation

B. Pharm.
VIII Semester

CHEMISTRY OF NATURAL PRODUCTS

Course Objective: The subject of CHEMISTRY OF NATURAL PRODUCTS will be treated in its modern prospective including Introduction, Classification, keeping for the sake of convenience.

UNIT: I

a) General methods of isolation of natural products, belonging to different groups.

b) Concept of stereoisomerism taking examples of natural products.

UNIT: II

a) Chemistry, biogenesis and pharmacological activity of medicinally important mono terpenes, sesquiterpenes, diterpenes, and triterpenoids.

b) Chemistry and biogenesis of medicinally important lignans and quassanoids, flavonoids.

UNIT: III

a) Chemistry and therapeutic activity of penicillin, streptomycin and tetracyclines

b) Chemistry of lipids (fats, oils and waxes), phospholipids. Study of the chemistry of lipids (fats, oils and waxes), Phospholipids.

UNIT: IV

a) Chemical and spectral approaches to simple molecules of natural origin

b) Chemistry of Nucleic acid- Preliminary studies along with synthesis of purine and pyrimidine bases.

UNIT: V

Vitamins: Source, extraction, structure elucidation, synthesis and medicinal uses of the following

i. Fat soluble vitamins- A, D, E & K.

ii. Water soluble vitamins- B1, B2, B6, and C.

Carotenoids: α-carotenoids, β-carotenes, vitamin A, Xanthophylls of medicinal importance.

LIST OF PRACTICALS: Based on theory.

RECOMMENDED BOOK

S. No.	Book Name	Author's Name	Publisher's Name
1.	Organic Chemistry Vol.-I and II,	I.L. Finar	The English Language Book Society, London
2.	Pharmacopoeia of India	Govt. of India	Ministry of Health, Delhi
3.	Heterocyclic Chemistry	R.K.Bansal	Wiley Eastern, New Delhi -

REFERENCE BOOK

S. No.	Book Name	Author's Name	Publisher's Name
1.	Pharmacopoeia of India	-	Ministry of Health, Govt. of India.
2.	Heterocyclic Chemistry	Joul Smith	ELBS, London