

[School of Pharmacy
Syllabus]

**Bachelor of Pharmacy 3rd year (V Semester)
(Theory and Practical)**

S No.	Course	Subject name	Credits		Sessional			Exam	Total
			T	P	TA	MSE	Total	ESE	
1	GSP-501	Biochemistry	3	0	30	20	50	50	100
2	GSP-502	Pharmaceutical Technology-I	3	0	30	20	50	50	100
3	GSP-503	Medicinal Chemistry- I	3	0	30	20	50	50	100
4	GSP-504	Pharmacognosy- III	3	0	30	20	50	50	100
5	GSP-505	Pharmacology-I	3	0	30	20	50	50	100
PRACTICAL									
1	GSP-501P	Biochemistry	0	2	30	20	50	50	100
2	GSP-502P	Pharmaceutical Technology-I	0	2	30	20	50	50	100
3	GSP-503P	Medicinal Chemistry- I	0	2	30	20	50	50	100
4	GSP-504P	Pharmacognosy- III	0	2	30	20	50	50	100
5	GSP-505P	Pharmacology-I	0	2	30	20	50	50	100
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T- Theory, P- Practical, TA- Teacher Assessment, MSE- Mid Term Examination, ESE- End semester examination.

GSP-501

BIOCHEMISTRY

UNIT-1.

Enzymes: Nomenclature, enzymes-kinetics and mechanism of action, mechanism of inhibition of enzymes and isoenzymes in chemical diagnosis. Co-enzymes: Vitamins as co-enzymes and their significance. Metals as co-enzymes and their significance.

UNIT-2.

Carbohydrate metabolism: Glycolysis, Gluconeogenesis and Glycogenolysis. Metabolism of galactose.

UNIT-3.

Role of sugar nucleotides in biosynthesis and pentose phosphate pathway. The citric acid cycle, significance, reactions and energetics of the cycle.

UNIT-4.

Lipid metabolism: Oxidation of fatty acid & energetics, Biosynthesis of ketonebodies and their utilization, Biosynthesis of saturated and unsaturated fatty acids, regulation of lipid metabolism, essential fatty acids. Biological Oxidation: The respiratory chain, its role in energy capture & control, energetics of oxidative phosphorylation, mechanism of oxidative phosphorylation.

UNIT-5.

Protein metabolism: Biosynthesis of amino acids, metabolism of amino acids and conversion of amino acids to specialized products, biosynthesis of purine and pyrimidine, formation of deoxyribonucleotides. Biosynthesis of RNA, DNA replication, Biochemical aspects of Carcinogenesis & DNA repair mechanism.

GSP-501P

BIOCHEMISTRY

PRACTICAL

1. Preparation of standard buffers (citrate, phosphate and carbonate) and measurement of pH.
2. Titration curve for amino acids.
3. Separation of amino acids by chromatography.
4. Separation of lipids by TLC.
5. Quantitative estimation of amino acids.
6. Determination of glucose by means of the enzyme glucose oxidase.
7. Enzymatic hydrolysis of glycogen by α & β amylase.
8. Effects of temperature on the activity of alpha amylase.
9. Estimation of cholesterol in Blood.
10. Estimation of Glucose in blood & urine.
11. Estimation of Urea in blood.
12. Estimation of ketone bodies in blood.
13. Qualitative analysis of inorganic as well as organic constituents of Urine.

BOOKS RECOMMENDED:

1. "Harpers Review of Biochemistry" Lange Medical Publication.

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2. Boyer, modern experimental biochemistry, Pearson education
3. Jayaraman J., Laboratory Manual of Biochemistry, Wiley Eastern Limited.

GSP-502

PHARMACEUTICAL TECHNOLOGY -I

UNIT-1.

Preformulation studies: Study of physical properties of drug like physical form, polymorphism, particle size, shape, density, wetting, dielectric constant, dissociation constant, distribution coefficient Solubility, dissolution and organoleptic properties and their effect on formulation, stability and bioavailability.

UNIT-2.

Liquid Dosage Forms: Introduction, types of permissible additives, formulation, manufacturing, evaluation and packaging of clear liquids, suspensions permissible and emulsions.

UNIT-3.

Semisolid Dosage Forms: Definitions, types, mechanisms of drug penetration, factors influencing penetration, semisolid bases and their selection, permissible additives, manufacturing procedure, evaluation and packaging and general formulation of semisolids, clear gels, permissible additives.

UNIT-4.

Suppositories: Ideal requirements, bases, manufacturing procedure, evaluation and packaging.

Pharmaceutical Aerosols: Definition, Propellants, general formulation and evaluation, manufacturing and packaging methods, pharmaceutical applications.

UNIT-5.

Cosmetology and cosmetic Preparations: Formulation of cold cream, vanishing cream, cleansing cream, all purpose cream, sunscreen lotion, antiperspirants, deodorant. Shampoos, Conditioner, Shaving and after shaving products, Dentifrice, Lipstick, Nail lacquer.

GSP-502P

PHARMACEUTICAL TECHNOLOGY-I (PRACTICAL)

1. Preformulation studies of API. (As per pharmacopoeial requirements)
2. Preparation, evaluation and packing of liquid orals like solutions, suspensions and emulsions, ointments, suppositories, eye drops, eye ointments etc.
3. Preparation and evaluation of cold cream, vanishing cream, cleansing lotion and creams. Moisturizing creams, Skin tonics, Hair creams, Hair Conditioners, Shampoos, Shaving creams and sticks. Tooth powder, Tooth pastes, After shave lotion, Lipstics.

BOOKS RECOMMENDED

1. Remington's Pharmaceutical Sciences, Vol. I & Vol. – II, Mack Publishing Co., U.S.A.
2. Dinda,SC, Advances in pharmaceutical Technology,pharmaMed Press,Hyderabad.
3. Lachman L., Lieberman H.A, Kanig J.L, Theory and Practice of Industrial Pharmacy, Lea & Febiger, Philadelphia, U.S.A.
4. H.C. Ansel, Introduction to Pharmaceutical Dosage Forms, Lea & Febiger,Philadelphia, U.S.A.
5. Balsam and Sagarin, Cosmetics: Science and Technology.
6. Thomssen E.G. Modern Cosmetics, Universal Publishing Corporation.

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7. Mittal B.M. & Saha R.N.-A handbook of cosmetics, Vallabh Prakashan.
8. Swarnlata saraf,Cosmetics a practical manual,2nd.ed, PharmaMed Press,Hyderabad

GSP-503

MEDICINAL CHEMISTRY –I

UNIT-1.

Basic Principles of Medicinal Chemistry: Physicochemical aspects (Optical, geometric and bioisosterism) of drug molecules and biological action. Drug-receptor interaction including transduction mechanism, concept of prodrug. Mode of action, uses, structure activity relationship of the following classes of drugs (Synthetic and assay procedures of individually mentioned drugs only) included in the latest edition of pharmacopoeia.

UNIT-2.

Drugs acting at Synaptic and neuro-effector junction sites:

Cholinergic, Anticholinergic & Anticholinesterases- Neostigmine, Physostigmine, Pilocarpine, Atropine. Adrenergic Drugs- Ephedrine, Salbutamol, Adrenaline.

UNIT-3.

Drugs acting on the Central Nervous System: General Anaesthetics- Thiopental, Ketamine
Local Anaesthetics- Lignocaine, Benzocaine. Sedatives and Hypnotics- Phenobarbitone, Alprazolam. Opioid Analgesics- Pethidine, Methadone, Pentazocine.

UNIT-4.

Anticonvulsants- Phenytoin, Carbamazepine, Ethosuximide, Valproic Acid. Antiparkinsonism drugs- Carbidopa, Levodopa. CNS Stimulants-Caffeine, Nikethamide.

UNIT-5.

Psychopharmacological Agents: Antianxiety drugs- Diazepam, chlordiazepoxide. Antidepressants– Imipramine, Amitriptyline, Fluoxetine. Skeletal muscle Relaxants– Gallamine Mephenesin, Antipsychotic- Chlorpromazine, Haloperidol.

GSP -503P

MEDICINAL CHEMISTRY-I (PRACTICAL)

1. Synthesis of atleast five drugs from the course content involving two or more steps. eg Benzocaine, Phenytoin, Barbituric acid, Nikethamide etc
2. Establishing the pharmacopoeial standards of the drugs synthesized.

BOOKS RECOMMENDED:

1. Degado J.N. and Remers W A R, 10th eds., Wilson and Giswold's Text book of Organic Medicinal and Pharmaceutical Chemistry, Lippincott, William & Wilkins.
2. Foye W C. Principles of Medicinal Chemistry, Lea & Febiger, Philadelphia.
3. Wolff ME. Ed. Burger's Medicinal Chemistry, John Wiley & Sons, New York.
4. Singh Harkrishan and Kapoor, V.K., Organic Pharmaceutical Chemistry, Vallabh Prakashan, Delhi.
5. Norgady, Medicinal chemistry, biochemical approach, Pharma Med press,Hyd.
6. Pharmacopoeia of India, Minsitry of Health, Govt. of India 2010
7. Mann P G & Saunders B C, Practical Organic Chemistry, ELBS/Longman, London.

GSP-504

PHARMACOGNOSY – III

UNIT-1.

Plant Taxonomy:- Study of the following families with special reference to medicinally important plants: Apocynaceae, Solanaceae, Rutaceae, Umbelliferae, leguminosae, Rubiaceae, Liliaceae, Graminae, Labiatae, Cruciferae, and Papaveraceae, Compositae.

UNIT-2.

Lipids: Biological sources, chemical constituents, adulterants & uses of Arachis oil, castor oil, sesame oil, cotton seed oil, olive oil, chalmooogra oil, shark liver oil, cod liver oil, neem oil, kokum bitter, rice bran oil, guggul lipids.

UNIT- 3.

Studies On Traditional Drugs: Common Vernacular name, Biological sources, morphology, chemical nature of chief constituents, pharmacology, categories and common uses and toxicological activity of marketed formulations of following indigenous drugs: Amla, Kantkari, Satavari, Bhilwa, Vach, Rasna.

UNIT-4.

Punarnava, Chitrak, Apamarg, Gokhru, Shankhpushpi, Brahmi, Methi, Lehsun, Guggul, Gymnema, Shilajit, Tulsi and Neem.

UNIT-5.

Brief Introduction and principles of Ayurvedic, Unani, Siddha and Homeopathic systems of medicines. Introduction to Herbal Pharmacopoeia, study of Arishtas, Asavas, Gutikas, Tailas, Churnas, Lehyas and Bhasmas.

GSP-504 P

PHARMACOGNOSY – III (PRACTICAL)

1. Identification of at least 10 crude drugs mentioned in theory
2. Powder microscopic study of at least 5 drugs/powder mixture study.
3. Evaluation and standardization of at least 3 marketed Ayurvedic formulations.

BOOKS RECOMMENDED:

1. Trease, G.E., & Evans, W.C., Evans, W.C., "Pharmacognosy" Bailliere Tindall east Baorne, U.K.
2. Tyler V.E. et al : "Pharmacognosy" Lea & Febiger, Philadelphia.
3. Wallis. T.E, Practical pharmacognosy, 4rt. Ed, PharmaMed Press, Hyderabad.
4. Senger, A Texbook of pharmacognosy, PharmaMed Press
5. Nadkarni A.K. Indian Materia Medica 1-2, Popular Prakashan (P) Ltd. Bombay.
6. Atal C.K. & Kapur BM. "Cultivation & utilization of Medicinal plants, RRL, Jammu.
7. Compendium of Indian Medicinal Plants I-VII, Rastogi & Malhotra.
8. Indian Ayurvedic Pharmacopoeia, Govt. of India.
9. Kokate CK, Gokhale AS, Gokhale SB, Cultivation of Medicinal Plants, Nirali Prakashan
10. Kokate C.K. "Practical Pharmacognosy" Vallabh Prakashan, New Delhi.
11. Wallis T.E. "Analytical Microscopy" J&A Churchill Ltd., London.

GSP-505

PHARMACOLOGY – I

UNIT-1.

General Pharmacology– Introduction to pharmacology, routes of drug administration, combined effect of drugs, Adverse drug reactions, factors modifying drug action. Drug interactions.

UNIT-2.

Basic Concepts of Pharmacokinetics- Absorption, Distribution, Metabolism, Excretion. Basic Concepts of Pharmacodynamics, Principles of drug action, Mechanism of drug action, Receptors, Receptors effect or mechanism Dose Response relationships, Therapeutics index -LD 50 & ED50.

UNIT-3.

Drug acting on autonomic nervous system. General Pharmacology of ANS. Cholinergic system-Parasympathomimetic (Cholinergic) drugs. Parasympatholytic (anti Cholinergic) drugs.

Drug acting on autonomic ganglia (Stimulants and blocking agents)

UNIT-4.

Adrenergic system: General mechanism of adrenergic neurotransmission, Sympathomimetic (Adrenergic) drugs Sympatholytic (Anti-adrenergic) drugs, Local anesthetics, Skeletal muscle Relaxants Peripherally and centrally acting muscle Relaxants.

UNIT-5.

Pharmacology of CNS- General Anaesthetics, Alcohols & disulfiram, Sedative hypnotics, Psychopharmacological agents-anti anxiety agents, antipsychotics, antidepressants. Antiepileptic drugs, Antiparkinsonism drugs, antialzheimer's, Analgesics & antagonists.

GSP-505P

PHARMACOLOGY- I (PRACTICAL)

1. Use of computer simulated CDs or Video cassettes for pharmacology practical where possible.
2. Preparation of different solutions for experiments. Drug dilutions, use of molar and w/v solutions in experimental pharmacology. Common laboratory animals and anesthetics used in animal studies. Commonly used instruments in experimental pharmacology. Some common and standard techniques.
3. Study of different routes of administration of drugs in mice/rats. Practical related to DRC

BOOKS RECOMMENDED:

1. Goodman & Gilman, The Pharmacological basis of Therapeutics, Editors: J.G. Hardman, McGraw Hill Pub Co.,
2. Tripathi, K.D. Essentials of Medical Pharmacology, Jay Pee Publishers, New Delhi.
3. Bothara Sunil, Essentials of Experimental pharmacology, vol. 1. PharmaMed Press
4. Satoskar & Bhandarkar; Pharmacology & Pharmacotherapeutics., Popular Prakashan Pvt. Ltd. Bombay.

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5. Ghosh, MN; Fundamentals of Experimental Pharmacology, Scientific Book Agency, Calcutta.
6. Grover J.K., Experiments in Pharmacy & Pharmacology, CBS Publishers, New Delhi.