

GANPAT UNIVERSITY
B. Pharm Semester-V Program
Structure for B.Pharm Semester-V Program

Sr. No.	Course Code	Course Title	Teaching Scheme Hrs/ week						Type of Course
			Theory	Credit	Weighted Credit Point	Practical	Credit	Weighted Credit Point	
01	5A01 HCP	Hospital & Community Pharmacy	2	2	10 X 2 = 20	--	--	--	Core
02	5A02 PMB	Pharmaceutical Microbiology	3	3	10 X 3 = 30	2	1.0	10 X 1.0 = 10	Core
03	5A03 PCB	Pharmaceutical Chemistry-V (Biochemistry-I)	2	2	10 X 2 = 20	3	1.5	10 X 1.5 = 15	Core
04	5A04 PCM	Pharmaceutical Chemistry-VI (Medicinal Chemistry-I)	3	3	10 X 3 = 30	3	1.5	10 X 1.5 = 15	Core
05	5A05 PCG	Pharmacognosy-IV	3	3	10 X 3 = 30	3	1.5	10 X 1.5 = 15	Core
06	5A06 PCL	Pharmacology- II	3	3	10 X 3 = 30	3	1.5	10 X 1.5 = 15	Core
07	5B07 PHM	Pharmaceutical Management-I	3	3	10 X 3 = 30	--	--	--	Common
		Total	19	19	190	14	7	70	
Total credit 19+7 =26 and Total weighted credit point 190+70 = 260									

GANPAT UNIVERSITY
B. Pharm Semester-V Program
Teaching and Examination scheme

S. N	Course Code	Course Title	Teaching Scheme Hrs/Week		Total Hours		Examination				
			Th.	Pra.	Th.	Pra.	Theory		Practical		Total
							Int	Ext	Int	Ext	
1	5A01 HCP	Hospital & Community Pharmacy	2	-	30	-	30	70	-	-	100
2	5A02 PMB	Pharmaceutical Microbiology	3	2	45	30	30	70	30	70	200
3	5A03 PCB	Pharmaceutical Chemistry-V (Biochemistry-I)	2	3	30	45	30	70	30	70	200
4	5A04 PCM	Pharmaceutical Chemistry-VI (Medicinal Chemistry-I)	3	3	45	45	30	70	30	70	200
5	5A05 PCG	Pharmacognosy-IV	3	3	45	45	30	70	30	70	200
6	5A06 PCL	Pharmacology- II	3	3	45	45	30	70	30	70	200
7	5B07 PHM	Pharmaceutical Management-I	3	-	45	-	30	70	-	-	100
		Total	19	14	285	210	210	490	150	350	1200

GANPAT UNIVERSITY
B. Pharm. Semester- V
5A01HCP Hospital & Community Pharmacy

Theory (2 Hours / Week; 30 Hrs) Credit: 2

1.	Organization and Structure of Hospital and Hospital Pharmacy a. Responsibilities of Hospital Pharmacist, Including Community Service, b. Supportive Service, Medical Tourism and Development. c. Pharmacy and Therapeutic Committee. d. Establishment, Budget Preparation and Implementation.	5
2.	Hospital Formulary Format, Content, Preparation and Keeping it updated.	3
3.	Drug Information Service a. Sources, Procurement, Retrieval and Computerization of Information, Poison Information and Services. b. Online Services on Disease, Treatment, Dosage, Administration, Concomitant Prescription and Medication error.	3
4.	Pharmacy Management Service Purchase, Procurement, Storage and Organization, Inactive Control Prescription Filling, Pricing, Insurance	3
5.	Records And Reports a. Patient Historical and Medication Profile. b. Adverse Reactions c. Patient Treatment Records and Auxiliary Reporting.	3
6.	Manufacturing of sterile and non sterile products for captive consumption and its extensional aspects to radiopharmaceuticals and manufacturing practices	5
7.	Drug dispensing and distribution service for all the sectors of hospitals	3
8.	Role of pharmacist in pre-packaging services of the hospitals, CSSD services	2
9.	Accreditation aspects of hospital services and the rule pertaining to it	1
10.	Role of contribution of pharmacist in community towards health care, education, health and hygiene of society in general and patient counseling services	2

References Books:

1.	Hospital Organization and Management by Kurt Dan and Jonathan S. Ratich, 4th Edition, CBS Publishers.
2.	Remington: The science and practice of Pharmacy Remington by Reminston, 21 th ed., Lippincott W. W. Philadelphia, 2009.
3.	Hospital Pharmacy: Dr. R. K. Goyal and Parikh, B. S. Shah Publication.
4.	Hospital Pharmacy by Hassan, Henry, 5 th ed., Lea & Febiger, Philadelphia, 1986
5.	Hospital organization and management by Kurt Dan and Jonathan S. Ratich, 4 th edition, CBS Publisher.
6.	Merchant & Goyal's A Textbook of Hospital Pharmacy: Dr. R. K. Goyal and Parikh, 11 th ed., B. S. Shah prakashan, Ahmedabad, 2011.

GANPAT UNIVERSITY

B. Pharm. Semester- V 5A02PMB Pharmaceutical Microbiology

Theory(3 Hours / Week; 45 Hrs) Credit:3

1.	Introduction to Scope of Microbiology	2
2.	General microbiology a. Structure and Bacterial Cell, Classification and taxonomy of Actinomycetes, Bacteria, Spirochetes, Rickettsia and Viruses b. Identification: Electron microscopy and Staining Technique c. Nutrition, Cultivation and Isolation of Microbes	14
3.	Control of microbes a. Disinfection: Factor affecting Disinfection i. Dynamics of Disinfection ii. Evaluation of Disinfection b. Sterilization: Methods of Sterilization, Validation of Sterilization Methods and Equipment.	15
4.	Analytical microbiology a. Bacterial Counts b. Sterility of Pharmaceuticals c. Microbiological Assay of Vitamins and Antibiotics and Amino acids	14

Pharmaceutical Microbiology- I, Practical (2hr\week) Credit:1

1.	Preparation of Various Media
2.	Subculturing techniques of Common Bacteria (Aerobic and Anaerobic)
3.	Staining of microorganism
4.	Methods of isolation of microorganism
5.	Study of sterilization and their validation
6.	Sterility testing of Pharmaceuticals as per IP
7.	Study of bacterial counts

References Books:

1.	Textbook of Microbiology by Tortora.
2.	Pharmaceutical Microbiology, sixth edn, edited by W. B. Hugo and A. D. Rusell Blackwell science.
3.	Principles of Microbiology, Ronald M. Atlas. Second edn. W. C. Brown Publishers.
4.	Bergeys manual of Systematic Bacteriology, Williams and Wilkins-A Waverly company.
5.	Disinfection, Sterilization and Preservation. Fourth edn, Seymour S. Black. Lea and Febiger Philadelphia, London.
6.	Industrial Microbiology. Fourth edn, Prescott and Dunn. CBS Publishers and Distributors.

GANPAT UNIVERSITY

B. Pharm. Semester- V

5A03PCB Pharmaceutical Chemistry – V (Biochemistry-I)

Theory (2 Hours / Week; 30 Hrs) Credit: 2

1.	Biochemical organization of the cell and Transport processes across cell membrane	02
2.	Bioenergetics: The Concept of free energy, Exergonic and Endergonic reactions, determination of change in free energy from equilibrium constant, Sources and release of energy, ATP and its biological significance, Other energy rich phosphate compounds	03
3.	Introduction to Carbohydrates	05
4.	Carbohydrate Metabolism Conversion of Polysaccharides to Glucose-1-Phosphate. Glycolysis and fermentation and their Regulation, Gluconeogenesis, Glycogenesis and Glycogenolysis, Metabolism of Galactose and Fructose. Role of Sugar Nucleosides in Biosynthesis and Pentose-Phosphate Pathway. Role of hormones in maintenance of blood sugar level The Citric Acid Cycle Significance, Reaction and Energetic of the Cycle, Amphibolic Role of the cycle and Glyoxalic Acid Cycle, Uric Acid Cycle	10
5.	Co-enzymes: Vitamins as Co-Enzymes and their Significance.	05
6.	Biological oxidation: Redox potential, Electron transport OR Respiratory chain with enzymes and inhibitors, Oxidative Phosphorylation, mechanism of oxidative phosphorylation, inhibitors of oxidative phosphorylation, Enzymes involved in oxidation reduction reactions	05

Pharmaceutical Chemistry – V (Biochemistry) – Practical (3hr/week) Credit: 1.5

1.	Separation of Amino Acids by Paper Chromatography and TLC.
2.	Analysis of Normal and Abnormal Constituents of Urine.
3.	Estimation of Chlorides, Phosphates, Acidity and Ammonia, Glucose in Urine.
4.	Identification of Carbohydrates and Proteins.
5.	Biochemistry of Cheese, Milk, Bread.
6.	Identification of Substances of Physiological Importance in urine.
7.	Estimation of Diastase in Urine.
8.	Achromic and Chromic Period of Salivary Amylase.

References Books:

1.	E. E. Conn and P. K. Stumpf, Outlines of biochemistry, John Wiley and Sons, New York.
2.	A. L. Lehninger, Principles of biochemistry, CBS Publishers and Distributors, Latest edition.
3.	Harper's Biochemistry, Prentice hall International Inc. latest edition.
4.	S. C. Rastogi, Biochemistry, Tata McGraw Hill New Delhi, Latest edition.
5.	M.Cohn, K.S. Roth, Biochemistry and Disease. William and Wilkins co. Baltimore.
6.	U.Satyanarayan, Biochemistry, Books and allied (P) Ltd. Calcutta, Latest edition.
7.	G. F. Zubay, W. W. Parson, D. E. Vance, Principles of Biochemistry, WCB Publishers, England.
8.	S. Ramkrishnan, K. G. Prasannan, Textbook of medical Biochemistry, Orient Longman Madras.
9.	S.K. Sawhney, Randir Singh, Introductory Practical Biochemistry, Narosa Publishers, New Delhi.
10.	D. T. Plummer, An Introduction to Practical Biochemistry, Tata McGraw Hill New Delhi
11.	J. Jayaraman, Laboratory manual in Biochemistry, Wiley eastern Ltd. New Delhi.
12.	Textbook of Biochemistry by Dr. A. C. Deb, Latest edition.
13.	Textbook of Biochemistry by Dr. Ramarao, Latest edition.

GANPAT UNIVERSITY

5A04 PCM Pharmaceutical Chemistry – VI (Medicinal Chemistry-I)

Theory: (3 Hours/week; 45 Hours) Credit: 3

1.	An introduction to medicinal chemistry, History and development, Drug therapy	2
2.	Physiochemical properties of drug molecules influencing biological activity	10
	a. Solubility, Partition coefficient, Hydrogen bonding, Complexation, Ionisation, Redox potential, Surface activity and protein binding b. Stereochemical features of drugs: geometric and optical isomers, Bioisosterism	
3.	Heterocyclic compounds: Chemistry, preparation and properties of (a) Furan, thiophene, pyrrol and pyridine (b) Pyrazole, imidazole, oxazole, isoxazole and thiazole (c) Pyrazine, pyridazine and pyrimidine, Quinoline, isoquinoline and indole	10
4.	A study history, development, structure activity relationship, mechanism of action and synthesis* of following classes of drugs (*Synthesis of drugs mentioned in each category)	
	i. Drugs acting on respiratory tract: a. Antiasthmatics b. Expectorants c. Antitussive d. Respiratory stimulants e. Mucolytics f. Decongestants	6
	ii. Drugs acting on gastrointestinal tract : a. Antacids b Antisecretary (Ranitidine) c. Proton pump inhibitors (Omeprazole) d. Antiemetics e. Antidiarrheals f. Laxatives g. Prokinetics h. Antispasmodics & drug modifying intestinal motility i. Drugs for irritable bowel syndrome j. Local colorectal preparations k. Enzymes, carminatives & hepatobiliary agent	7
	iii. Autocoids a. Histamines and antihistamines, Histamine receptors, H ₁ antagonists, H ₂ antagonists (histamines, diphenhydramine, tripelemine, chlorcyclizine, trimeprazine, chlorpheniramine, promethazine, cyproheptadiene, antazoline, cetirizine). b. Eicosanoids: history and discovery, eicosanoids biosynthesis, drug action mediated by eicosanoids, eicosanoids approved for human clinical use.	8
	iv. Diagnostic agents: Radiopharmaceuticals, Radiological contrast media, (diphenoxylate, diatrizoic acid, sodium iothalamate)	2

Practical (3 hr/week; 45 Hours); Credit: 1.5

1.	Organic spotting of solid-solid binary mixtures including eutectic mixture.
2.	Synthesis of some organic compounds including some heterocyclic compounds.
3.	Workshops on stereo models using some selected drugs

References Books:

1.	Wilson and Giswolds Textbook of Organic Medicinal and Pharmaceutical Chemistry, J. Lippincott Co. Philadelphia.
2.	W. C. Foye, Principles of medicinal chemistry, Lea and febiger, Philadelphia.
3.	H. E. Wolff, edn, Burgers Medicinal chemistry, John Wiley and sons, New York
4.	Daniel Lednicer, Strategies for organic drug synthesis and design, John Wiley and Sons USA
5.	B. N. Ladu, H. G. Mandel and E. L. Way. Fundamentals of drug metabolism and disposition. William and Willkins co. Baltimore
6.	I. L. Finar. Organic chemistry Vol. I and Vol. II. ELBS/Longman, London
7.	Vogels Text books practical organic chemistry, ELBS/Longman, London
8.	Mann and Saunders, Practical organic chemistry, Orient Longman, UK
9.	Shriner, Hermann, Morill, Curtin and Fusion. The systematic identification of organic compounds, John Wiley and Sons

GANPAT UNIVERSITY
B. Pharm. Semester- V
5A05PCG Pharmacognosy – IV

Theory (3 Hours / Week; 45 Hrs) Credit: 3

1.	<p>Alkaloids: Sources, cultivation, collection, processing, commercial varieties, chemical constituents, substitutes, adulterants, uses, diagnostic macroscopic & microscopic features & Specific chemical tests of following Alkaloidal drugs: Pyridine & Piperidine: Tobacco, Areca, Lobelia Tropane: Datura, Belladonna, Hyocyamus, Dubosia, Cocca Quinoline & Isoquinoline: Cinchona, Ipecac, Opium Indole: Ergot, Rauwolfia, Catharanthus, Nuxvomica, Physostigma Imidazole: Pilocarpus Steroidal: Veratrum, Kurchi, Withania Alkaloidal Amine: Ephedra, Colchicum Purines: Coffee, Tea, Cola Quinazoline: Vasaka Diterpene Alkaloids: Aconite</p>	32
2.	Poisonous plants	2
3.	Biosynthetic studies & basic metabolic pathways. Brief Introduction to biogenesis of secondary metabolites of pharmaceutical importance.	8
4.	Concept of stereoisomerism taking examples of Natural Products such as sennoside, hyoscyamine, citral, menthol, quinine, ephedrine, papaverine, LSD etc.	3

Pharmacognosy – IV– Practical (3 hr/week) Credit: 1.5

- 1 Morphology of crude drugs containing Alkaloids mentioned in theory.
- 2 Histological Study of Alkaloidal drugs mentioned in theory.

References Books:

1	Wallis T.E., Text Book of Pharmacognosy, 5th Edition, Cbs Publishers and Distributors.
2	Qadry J.S., Shah and Qadry's Pharmacognosy, B.S.Shah Publication.
3	Trease E and Evans W.C., Pharmacognosy, Balliere Tindall. Eastbourne, U.K.
4	Tyler V.C., Brady L.R. and Robers W.E., Pharmacognosy, Lea and Febiger, Ph.
5	Ashutosh Kar, Pharmacognosy and Pharmacobiotechnology, New Age International Publication.
6	Paul M. Dewick, Medicinal Natural Products: A biosynthetic Approach, Willy Publishers.
7	Kokate C.K, Purohit A.P. and Gokhale S.B. Pharmacognosy (Degree), Nirali Prakashan, Pune.
8	Kokate C.K. Practical Pharmacognosy, Vallabh Prakashan, Delhi.
9	Ansari, Pharmacognosy Textbook of Natural Products, Latest Edition.
10	Iyengar, Text Book of Pharmacognosy, Manipal Power Press.
11	Agrawal O.P., Natural Products, Vol I & II, Goel Publishing House, Meerut, 2004.
12	C.K. Atal and B.M. Kapoor, Cultivaiton and Utilization of Medicinal Plants, CSIR, New Delhi

GANPAT UNIVERSITY
B. Pharm. Semester- V
5A06PCL Pharmacology – II

Theory (3 Hours / Week; 45 Hrs) Credit: 3

1.	Drugs acting on Nervous system: a. Neuronal transmitters in CNS b. General Anesthetics c. Ethyl and Methyl Alcohols d. Sedatives and Hypnotics, Anxiolytic Agents and Centrally acting Muscle Relaxants e. Antipsychotics and Drugs used in Affective Disorders f. Antiepileptic Drugs g. Antiparkinsonian Drugs h. Analgesics, Antipyretics and Anti-Inflammatory Drugs i. Opioids Analgesics and Antagonists j. CNS Stimulants and Psychomimetic Agents k. Drug Dependence and Drug abuse	22
2.	Drugs acting on Cardiovascular and Renal System: a. Cardiac Glycosides and other Cardiotonics b. Antihypertensive Drugs c. Anti-anginal Drugs d. Anti-arrhythmic Drugs e. Antihyperlipidemic Drugs f. Diuretics and anti-Diuretics	17
3.	Drugs Acting on the Hemopoietic System: a. Haematinics and Erythropoietin b. Drugs Affecting Coagulation, Bleeding and Thrombosis c. Plasma Expanders	3
4.	Gene Based Therapy	3

Pharmacology-II Practical (3 hr/week) Credit: 1.5

1.	Experiments on Central Nervous System: Recording of Spontaneous Motor Activity, Stereotype, Analgesia, Anticonvulsant Activity and Muscle Relaxant Activity
2.	Study on Analgesic and Anti-Inflammatory Activity.
3.	Simulation Experiments on Cardiovascular System, Effects of Drugs on Isolated Frog Heart.
4.	Demonstration on the Effects of Various Drugs on the Rat blood Pressure.
5.	To find out Nature of Unknown Drugs (Acetylcholine, Histamine, Bacl2, Physostigmine, Atropine, Mepyramine And Papaverine) using Rat/Guinea Pig/Chicken Ileum Preparation.
6.	Study on the Effects of CNS Stimulant (Coffee/Tea) on Human Volunteers.

References Books:

1.	Rang H.P., Dale M.M., et al- Rang and Dale's Pharmacology (2007) 6 th Edn. Churchill livingstone Elsevier, USA.
2.	Satoskar R.S., et al- Pharmacology and Pharmacotherapeutics (2005) 20 th Edn. Popular Prakashan, Mumbai.
3.	Harvel, R.A., Champe P.C. et al —Pharmacology (1997) 2nd Edn. Lippincott-Raven Company, Philadelphia, New York.
4.	Goodman and Gilman's- The Pharmacological basis of Therapeutics, 11 th Edn., 2005, Mc Graw Hill Companies, Pergamon Press, Singapore.
5.	Seth S.D. Text Book of pharmacology, 2 nd Edn., B.I. Churchill Livingstone Pvt. Ltd., New Delhi.
6.	Goyal R.K, et al- Elements of Pharmacology, 19 th Edn., B.S. Shah Prakashan, Ahmedabad
7.	Goyal R.K.-Practicals in Pharmacology (2010), 9 th Edn., B. S. Shah Prakashan, Ahmedabad.
8.	Kulkarni S.K.- Handbook of Experimental Pharmacology (2009), 3 rd Edn. Reprint, Vallabh Prakashan, New Delhi.
9.	Ghosh M.N, Fundamentals of Experimental Pharmacology, 4 th Edn., Hilton & Company, Kolkata
10.	Tripathi K.D.- Essentials of Medical Pharmacology (2008), 6 th Edn, Jaypee Brothers Medical Publishers (P) Ltd, Ahmedabad
11.	Richard Finkel- Lippincott's Pharmacology (2010), 4 th Edn., Wolter Kluwer Pvt. Ltd., Delhi

GANPAT UNIVERSITY
B. Pharm. Semester- V
Pharmaceutical Management -I

Theory (3 Hours / Week; 45 Hrs) Credit:3

1	Basic Principle of Management: Introduction to management, Evolution of management theories, Basic managerial function(Planning, Organizing, Leading, Controlling)	10
2	Managerial Economics & Foreign Trade: Nature And scope, Consumer behavior and Demand analysis, Profit maximization of firms, Monopoly, Oligopoly, National Income, Inflation, Foreign Trade & Rate function, EXIM policy.	8
3	Organizational behavior: Concept, Nature, Characteristics, Determinants and importance, Concept of Perception, Motivation, Group dynamic, Leadership, Organizational conflict.	8
4	Managerial communication: Definition, Objective of communication, Forms of communication (Written; no-verbal, oral),Business Negotiation.	5
5	Business environment: Significance and nature, Relationship with Government, Consumer Protection Act, Public and Private sector, Technological collaboration, Liberalization, Globalization.	7
6	Total Quality Management: Juran's and Deming's principles, Small group activities, Quality circles, Suggestion scheme, Project team approach, Continuous improvement.	7

References Books:

1	Principles and practice of management by L. M. Prasad
2	Organization theory by Stephens P. Robins, 3 th edition
3	Organization behavior by Stephens P. Robins, Pearson education
4	Organization behavior by Himalaya Publishing Pvt. Ltd.
5	Contemporary Business Communication by Scot O., 2004
6	Business environment by excel books and Himalaya Publishing
7	The 5 Pillars of TQM: How to Make Total Quality Management Work for You by Bill Creech.