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B. Pharm Semester-VI Program

Structure for B.Pharm Semester-VI 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	6A01 DPH	Dispensing Pharmacy-II	2	2	10 X2 = 20	3	1.5	10X 1.5 = 15	Core
02	6A02 PBT	Pharmaceutical Biotechnology	3	3	10 X 3 = 30	3	1.5	10X 1.5 = 15	Core
03	6A03 PCB	Pharmaceutical Chemistry-VII (Biochemistry-II)	3	3	10 X 3 = 30	2	1.0	10 X1.0 = 10	Core
04	6A04 PCM	Pharmaceutical Chemistry-VIII (Medicinal Chemistry-II)	3	3	10 X 3 = 30	3	1.5	10X 1.5 = 15	Core
05	6A05 PCG	Pharmacognosy-V	2	2	10 X 2 = 20	3	1.5	10X 1.5 = 15	Core
06	6A06 CLP	Clinical Pharmacy-I	3	3	10 X 3 = 30	--	--	--	Core
07	6B07 HCM	Healthcare Management	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-VI 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	6A01 DPH	Dispensing Pharmacy-II	2	3	30	45	30	70	30	70	200
2	6A02 PBT	Pharmaceutical Biotechnology	3	3	45	45	30	70	30	70	200
3	6A03 PCB	Pharmaceutical Chemistry-VII (Biochemistry-II)	3	2	45	30	30	70	30	70	200
4	6A04 PCM	Pharmaceutical Chemistry-VIII (Medicinal Chemistry-II)	3	3	45	45	30	70	30	70	200
5	6A05 PCG	Pharmacognosy -V	2	3	30	45	30	70	30	70	200
6	6A06 CLP	Clinical Pharmacy-I	3	-	45	-	30	70	-	-	100
7	6B07 HCM	Healthcare Management	3	-	45	-	30	70	-	-	100
		Total	19	14	285	210	210	490	150	350	1200

GANPAT UNIVERSITY
B. Pharm. Semester- VI
6A01DPH Dispensing Pharmacy-II

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

1.	Dispensing of proprietary medicine	***02***
2.	Principles involved and procedures adopted in dispensing of: Suppositories, passaries, enema and External preparations like cream, ointment, paste, poultice, jellies, lotion, liniment, powders, etc; Solutions like douches, mouthwashes, gargles, throat spray, throat paint etc.	***12***
3.	Principles involved & procedures adopted in dispensing of Ophthalmic dosage forms	***04***
4.	Incompatibilities Physical and chemical incompatibilities, inorganic incompatibilities including incompatibilities of metals and their salts, nonmetals, acids, alkalis, organic incompatibilities. Purin base, alkaloids, pyrazolone derivatives, amino acids, quaternary ammonium compounds, carbohydrates, glycosides, anesthetics, dyes, surface active agents, correction of incompatibilities, therapeutics incompatibilities.	***06***
5.	Dispensing of radiopharmaceuticals and its application in medicine	***04***
6.	Future trends in dispensing	***02***

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

1.	All the possible practical regarding the topics covered in the theory including following S/S formulations: Ointment, Cream, Paste Eye and Ear drops, Powders for external use
2.	Moulded formulations: Suppositories and Pessaries

References Books:

1.	Dispensing Pharmaceutical for students by Cooper and Gunn, 12th ed. CBS Publishers & Distributers, New Delhi, 2000.
2.	Pharmaceutical Dispensing by Sharma & Jain.
3.	Dispensing Pharmacy by Hausa
4.	Remington: The science and practice of Pharmacy Remington by Reminston, 21th ed. Lippincott W. W.,Philadelphia, 2009
5.	Pharmaceutical Practice by Diana M. Collett and Michale E. Aulton, ELBS Publishers
6.	Pharmaceutical Practice, Edited by A.J. Winfield and R.M.E. Richards, 3rd ed., Edinburgh : Churchill Livingstone, 2004
7.	Ansel's Pharmaceutical Dosage forms and Drug delivery systems by Allen, Loyd V., 9th ed., Walter Kluwer (India) Pvt. Ltd., New Delhi., 2009.
8.	Pharmaceutical Calculations by Ansel ,Howard C.,13th ed., Walter Kluwer (India) Pvt. Ltd., New Delhi., 2009.

GANPAT UNIVERSITY
B. Pharm. Semester- VI
6A02 PBT Pharmaceutical Biotechnology

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

1.	Introduction to biotechnology	2
2.	Microbial genetics and variation	6
3.	Genetic recombination: transformation conjugation a. Protoplast fusion, gene cloning and their applications, monoclonal antibodies b. Study of drug produced by biotechnology, viz. activase, humulin, Hb etc.	8
4.	Immunology and Immunological Preparation: a. Immunity, primary and secondary defense mechanism, interferon b. Principles of immunology, antigen antibody reactions and application, preparations of vaccines, toxoids. Standardization and storage	12
5.	Fermentation Techniques: a. Screening of organism, preparation and preservation of master culture, design of fermentor, various parameters and media used for fermentation b. Recovery of fermentation products Flowsheets penicillin, streptomycin, Vit. B_2, Vit. B_{12}	12
6.	Immobilization of Enzymes: a. Techniques of immoblilization b. Factors affecting enzyme kinetics c. Applications	5

Practical: (3hrs\week; 45 Hours) Credit:3

1.	Microbiological assay of antibiotics
2.	Preparation and standardization of vaccines
3.	Preparation of mutant , a. Gradient plate method b. Velvet replicate method
4.	Design of fermentor
5.	Study of shake flask technique
6.	Production of alcohol using Bakers yeast
7.	Extraction of citric acid from fermented mass

References Books:

1.	Textbook of microbiology by Tortora G.J., 8th ed., Pearson education, New Delhi, 2004
2.	Pharmaceutical microbiology by Denyer Stephen, 7th ed., Blackwell science, New Delhi, 2008.
3.	Principles of microbiology, Ronald M. Atlas. 2nd ed., W. C. Brown publishers, 1996
4.	Bergeys manual of systematic bacteriology Vol. 1-4, Krieg, N.R. 1st ed., Williams and Wilkins, 1984
5.	Disinfection, sterilization and preservation. By Block Symour, 5th ed., Philadelphia,Lippincott, London, 2001
6.	Industrial microbiology by Prescott and Dunn. 4th ed. CBS Publishers & Distrubuters, NewDelhi,1987.
7.	Principles of fermentation tehchnology. by P. F. Stanbury, A. Whiteshaker, 2nd ed. Aditya Books Pvt Ltd., New Delhi, 1997.
8.	Microbiology, by Pelczar, Michael J. 5th ed., Tata McGraw Hill, New Delhi, 2002.
9.	Industrial microbiology by Casida, L.E. 8th ed., New age international publishers, New Delhi,1996.
10.	Fundamental principles of bacteriology by Sale, A. J., 17th ed., Tata McGraw Hill publishing company Ltd., New Delhi, 2000.
11.	Fundamentals of microbiology by Martin Forbischer, 6th ed. W.B. Saunders, 1957
12.	Remington: The science and practice of Pharmacy Remington by Reminston, 21th ed., Lippincott W.W.,Philadelphia, 2009.

GANPAT UNIVERSITY

B. Pharm. Semester- VI

6A03PCB Pharmaceutical Chemistry-VII (Biochemistry-II)

Theory (3 Hours / Week; 45 Hrs)

1.	**Introduction to Lipid**	5
2.	**Lipid Metabolism:** Oxidation of fatty acids, beta-oxidation and energetic, alpha-oxidation, omega-oxidations,biosynthesis of ketone bodies and their utilization, biosynthesis of fatty acids, control of lipid metabolism and metabolism of cholesterol.	6
3.	**Introduction to Proteins/Amino acids** Definitions, classifications, biological importance, color reactions, structure of protein, protein denaturation, properties of amino acids, separation and identification of amino acids methods for determination of N and C terminal amino acids, methods for determination of primary structure of protein/peptide, essential amino acids and peptides	6
4.	**Protein/Amino acid metabolism** General concept of amino acid metabolism, amino acid pool, Transamination, Deamination, biosynthesis of amino acids, catabolism of amino acids with diseases involves, conversion of amino acids to specialized products or products with biological importance with diseases, urea cycle, metabolic disorders of urea cycle	8
5.	Enzymes	5
6.	**Nucleic acid and Biosynthesis of nucleic acids:** Biological importance, types, brief introduction of genetic organization of the mammalian genome, alteration and rearrangement of genetic material, biosynthesis of DNA and its replication, DNA repair mechanism, biosynthesisof RNA, protein synthesis	7
7.	**Genetic code, mutation and gene expression**	4
8.	**Techniques used in biochemistry:** Colorimetry, spectrophotometry, centrifugation, electrophoresis and chromatography	2
9.	Brief introduction to water and mineral metabolism	2

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

Practicals based on analysis of lipids, calcium in serum, colorimetric analysis of glucose, creatinine and urea in blood, titration curve of amino acid, determination of glucose, protein, bilirubin and cholesterol in plasma, estimation of GOD-POD, SGPT, SGOT, qualitative and quantitative estimation of aminoacids etc.

Reference books:

1.	Outlines of biochemistry by Conn, E. E., 5th ed., John Wiley and Sons, New York., 2001.
2	Principles of biochemistry by Lehninger, A., CBS Publishers & Distributers, New Delhi, 1993
3	Harpers biochemistry by Murray, R. K., 25th ed., Mcgraw hill, New Delhi, 2002.
4	M.Cohn, K. S. Roth, Biochemistry and disease. William and Wilkins co. Baltimore, 1996
5	Biochemistry by Satyanarayan,U., 3rd ed., Books and allied (P) ltd. Calcutta, 2008
6	G. Zubay, W. W. Parson, D. E. Vance, Principles of Biochemistry, WCB publishers, England
7	Introductory Practical biochemistry by Sawhney, S. K., 1st ed., Narosa Pub., New Delhi, 2008.
8	D. T. Plummer, An introduction to practical biochemistry, Tata McGraw Hill New Delhi
9	J. Jayaraman, Laboratory manual in biochemistry, 1st ed., New Age International.
10	Practical Biochemistry, by G. T. Mills, G. Leaf, John Smith and Son Ltd.
11	Textbook of Biochemistry by Dr. Ramarao, Latest edition.
12	Textbook of Biochemistry by Dr. A. C. Deb, Latest edition.

GANPAT UNIVERSITY
B. Pharm. Semester- VI
6A04PCM Pharmaceutical Chemistry-VIII (Medicinal Chemistry-II)

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

1	**Receptors and Drug action:** Types of receptors, Theory of receptors, Drug-receptor interaction and factors affecting the drug-receptor interaction	3
2	**Drug metabolism:** Introduction, importance of CYP450, general pathways of Xenobiotics metabolism (functional group based classification of both phases with examples), site of drug metabolism, factors affecting drug metabolism	4
3	Introduction, classification, nomenclature, mechanism of action, adverse effects, therapeutic uses, structure activity relationship (SAR) and synthetic procedures of selected drugs and recent developments of following categories to be covered.	
4	**Drug Acting on ANS** **Cholinergics: S**AR- Acetylcholine mimetics- Muscarinic agonists **Anticholinergics:** SAR:-Acetylcholine antagonists-Muscarinic antagonists Synthesis:- Neostigmine, Dcyclomine hydrochloride **Adrenergics:**SAR: Phenylethanolamines,Synthesis:Adrenaline,Dopamine,Isoprenaline, Ephedrine **Adrenergic antagonists:** Synthesis: Naphazoline,Salbutamol **Neuromuscular blocking agents and ganglionic blockers**:	 3 3 2 2 1
5	**Drugs Acting on CNS:** **CNS stimulants:** Analeptics, Antidepressants, hallucinogens SAR:- Tricyclic antidepressants Synthesis:- amphetamine, Nikethamine, Fluoxetine, Imipramine, Amitriptylline **CNS Depressants:** General andlocalanesthetics,Sedative and hypnotics, Anxiolytics, Antiepileptics, Antipsychotics, SAR:- Benzoic acid and Anniline derivatives with Local anesthetic activity, Barbiturates, Benzodiazepines, Phenothiazines, Butyrophenones, Synthesis:- Halothane, Lignocaine, Procaine, Benzocaine, Thiopental sodium, Phenobarbitone, Chlordiazepoxide, Meprobamate, Phenytoin, Sodium valproic acid, Ethosuximide, Carbamazepine,Chlopromazine, Trifluperazine	 4 12
6	**Antiparkinson's agents**	1
	Opiod Analgesics and Non-Opiod Analgesics; SAR: Morphine, Pethidine, Benzomorphan, Morphinan, Synthesis: Pethidine, Methadone **Non Steroidal Anti-Inflammatory Agents, Anti Gout and Dmards:** Synthesis:- Paracetamol, Aspirin, Diclofenac, Ibuprofen, Indomethacin, Allopurinol, Mefenamic acid, Nimesulide, Naproxen	4 5
7	**Cognition enhancers**	1

Practical 3 hr/week, 45 Hours; Credit: 1.5

1.	Separation and qualitative analysis of Organic binary mixtures containing water insoluble components having acidic, phenolic, amphoteric, basic and neutral nature (Solid + Solid, Solid + liquid, Liquid + liquid and Eutectic mixtures) with derivative preparations.
2.	Synthesis of specified drugs: Aspirin, paracetamol, methyl salicylate, phenytoin

Reference books:

1.	J. N. Delagado and W. A. R. Remers, edn, 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 Oxford University Press, Oxfords
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.	Vogel's 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
10.	Hans Thacher Clarke, A Handbook of Organic Analysis Qualitative and Quantitative, Fourth edition, Orient Longmans Ltd.
11.	Arthur Vogel, Elementary Practical Organic Chemistry, Part-I and II, Second edition, CBS Publisher.

GANPAT UNIVERSITY
B. Pharm. Semester- VI
6A05PCG Pharmacognosy–V

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

1	**Traditional drugs:** Common and vernacular names, Botanical sources, morphology, chemical nature of chief constituents Pharmacology categories and common uses, marketed formulations of following traditional drugs: **Stem:** Galo **Root & Rhizome:** Satavari, Chitrak, Majith, Vaj **Bark:** Arjuna, Ashoka, Sirish, Kanchnar **Leaf:** Karen, Adusa, Nagod, Gimnema, Tilophora, Talispatra, Neem. **Fruit:** Amla, Baheda, Harde, Malkangni, Kalijiri, Vidangh, Ghokharu, Bhilama, Piper. **Seed :** Chakramadu, Karanj **Flower:** Dhatakipushpa, Palash, **Entire herb:** Apamarg, Methi, Eclipta, Kantakari. **Underground Stem:** Garlic **Unorganised:** Shilajit, Gugal. **Wood:** Biyo	**25**
2	Herbs as health food.	**2**
3	Natural allergens, photosensitizing agents & fungal toxins	**3**

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

1. Morphological identification of Traditional drugs mentioned in theory.
2. Histological study of Traditional drugs.

References Books:

1	Mukherjee Pulok, Quality Control of Herbal Drugs: An Approach to Evaluation of Botanicals.
2	Kalia A.N., Textbook of industrial Pharmacognosy, C.B.S. Publisher, New Delhi.
3	S.K. Jain, B.K. Sinha and R.C. Gupta, Notable Plants in Ethnomedicine of India, National Botanical Research Institute, Lucknow, Deep Publications.
4	Kirtikar K.R., Basu B.D., Medicinal plants, Volume-III, 2edition (reprint), M/S Periodical experts.
5	Anonymous, Wealth of India, CSIR.
6	M.G. Chauhan, Microscopy of Leaf Drugs, Jamnagar Ayurveda University.
7	M.G. Chauhan, Microscopy of Bark Drugs, Jamnagar Ayurveda University.
8	Anonymous, Quality Standards of Indian Medicinal Plants, ICMR.
9	Vaidya Bapalal, Some Controversial Drugs in Indian Medicine, Chaukhambha Orientalia, Varanasi.
10	Review on Indian Medicinal Plants, A. K. Gupta, Neeraj Tandon, Indian Council of Medicinal Research, New Delhi, 2004,
11	Indian Medicinal Plants A compendium of 500 species, Sangam books Vaidyaratnam P. S. Varier's.
12	K.M. Nadkarni, Indian Material Medica, Bombay Popular Prakashan, Reprinted 2005.

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B. Pharm. Semester- VI

6A06 CLP Clinical Pharmacy-I

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

1.	Introduction: Development and scope of clinical pharmacy, concept of health care team, Role of clinical pharmacist as a member of health care team and important functions	**02**
2.	**Basic concepts of pharmacotherapy:** a. Recording of medication history, self medication, nonprescription drug usage, improving patient compliance and providing patient counseling, Communication skills- Behavioral and interpersonal, with patients and other professionals. b. Drugs used in special population: children, elderly (pediatric and Geriatric considerations) and pregnant women. c. Interpretation of clinical laboratory tests: Hematological, pathological and biochemical investigations as markers of Major organ damage and their effect on drug therapy decisions.	**12**
3.	**Pathophysiology, Risk Factors, Complications and Management of the Following Diseases:** a. CNS: Epilepsy, Parkinsonism, Alzheimer, Schizophrenia, Affective disorders, Pain and Migraine. b. Cardiovascular: Hypertension, Coronary heart disease, Thrombosis, Stroke, Congestive heart failure, Cardiac arrhythmias and Dyslipidemia. c. Renal: Acute renal failure, Chronic renal failure. d. Anemia e. Obesity f. Glaucoma	**20**
4.	**Clinical Toxicology:** Definition of Poison and General Principles of Treatment of Poisoning with particular reference to Barbiturates, Opioids, Organophosphorus, Atropine and Heavy Metal.	**02**
5.	Concept of essential drugs and Rational drug use.	**02**
6.	**Drug interactions :** Prescription monitoring, documentation and methods for minimizing clinically relevant drug interactions	**01**
7.	Therapeutic drug monitoring	**02**
8.	Drug induced diseases, adverse drug reactions and Pharmacovigilance	**02**
9.	Pharmacoeconomics	**02**

Reference Books:

1.	Roger Walker and Clive Edwards, Clinical Pharmacy and Therapeutics (2008), 4th ed. reprint, Churchill Livingstone, Edinburgh.
2.	Russell J. Greene and Norman F. Harris, Pathology & Therapeutics for Pharmacists (1994), 1st edn., Chapman & Hall, London, Madras.
3.	Eric T. Herfindal et al., Text Book of Therapeutics: Drug and Disease Management (2006). 8th edn., Williams and Wilkins, Philadelphia
4.	Boon Nicholas A., Davidson's Principle and Practice of Medicine (2006), 20th edn., Churchill Livingstone, Edinburgh.
5.	Brian S. Katcher et al., Applied Therapeutics: The Clinical Use of Drugs (2004), Applied Therapeutics Inc.
6.	George S., Melmon and Morrelli's Clinical Pharmacology (2008), 4th edn., McGraw Hill Medical.
7.	Dipiro, Joseph, Pharmacotherapy: A Pathophysiological Approach (2011), 8th edn., McGraw-Hill, New Delhi
8.	R.K. Goyal et al., Elementals of Clinical Pharmacy (2009-10), 5th Edn., B.S.Prakashan Ahmedabad.

GANPAT UNIVERSITY
B. Pharm. Semester- VI

6B07HCM Health Care Management (Elective)

Theory (3 hours/ week; 45 hours), Credit 3

SN	Topics	Hr
1.	**Fundamentals of Health care administration**: Definition, Functions and Structure of health care administration.	02
2.	**Health care policies and regulations**	02
3.	**Quantitative methods/techniques for taking decision**	02
4.	**Managerial accounting and cost management in health care**	04
5.	**Operation management, health management and information management in health care**	02
6.	**Administration of hospitals and health care planning**: Objectives, planning and management.	04
7.	**General and personnel management in health institutions:** Concepts & Evolution of personnel Management in Hospital, Strategic management of health care organisations, International Society for Quality in Healthcare (ISQua), Joint Commission International (JCI)	02
8.	**Concepts of epidemiology (public health administration) and medical terminology**	02
9	**Financial management and inventory control in Hospitals**: Direct & Indirect Cost, Allocation of Overhead Cost, Analysis of Marginal Costing & Unit Costing, Aims, objectives & Scope of Inventory Control.	05
10.	**Organisation & management of Hospitals:** Unique features of hospital management, Management functions, Organization concepts and processes, Behavioral concepts and theories	03
11.	**Health care legislation and medico legal issues**: Introduction & Legal Procedures: Court, Affidavit, Evidence, Complaint, Investigation, Oath, Offence, Warrant, Summons; Medico Legal Aspects of Emergency Services; Organisational & Procedural Laws: Nursing Home-Registration Act, Birth-Death Registration Act, Prenatal Diagnostic Techniques, Regulations & Prevention of Misuse Act 1994 (PNDT Act), Transplantation of human organs Act 1994.	06
12.	**Human resource management and material management in health care system**: Objectives and organisation of Personnel Department, Human Resource Development (HRD), Manpower Planning, Development & Training, Biomedical Waste Management and Hazards in Hospital	06
13.	**Disaster & risk management**: Basics of disastesr management and Mass casualties, Components of disaster plan : pre-hospital and hospital, Disaster alertness in Hospital, Disaster management planning and implementation, Severity of illness amongst disaster victims and risk assess.	03
14.	**Quality control and assurance in health care in a hospital**	02

Reference Books:

1.	S.L. Goel, "Health care management and administration" Deep and Deep Publications Pvt. Ltd., New Delhi
2.	S.L. Goel, R. Kumar, "Management of Hospitals" Deep and Deep Publications Pvt. Ltd., New Delhi
3.	Essentials of Management – By Harold Koontz & Heinz Weihrich – 7th Ed., Tata McGraw Hill.
4.	Useful Reading for Hospital Management – By Col. Khare & Others.
5.	Handbook on Accounting for Hospital Management–By Prof. D. K.Chatterjee-Himalaya Publishing House.
6.	Hospital Planning & Administration – WHO Monograph Series 54 – By R. Llewelyn, Davis & H.M.C. Macaulay – Indian Edition – Jaypee Brothers, New Delhi.
7.	Hospital Administration & Planning – By A.G. Chandorkar – Paras Medical Publisher.
8.	Principles of Anatomy & Physiology – By Gerard J. Tortora.
9.	Human Resource & Personnel Management – By Aswathappa – Tata McGraw Hill.
10.	Parikh's Text Book of Medical Jurisprudence & Toxicology – By Dr. C.K. Parikh – CBS Publications.
11.	Handbook of Materials Management – By P. Gopalkrishnan – Prentice Hall India.
12.	Syed Amin Tabish, Hospital and Health services administration- principles and practice, *oxford* university press, New Delhi, 2001.