C. U. SHAH UNIVERSITY

Faculty: - Pharmaceutical Sciences
Department: Pharmaceutics & Pharmaceutical Technology
Semester: VI
Name of Subject: Pharmaceutical Microbiology II (Theory)
Subject Code: 4PS06PMI2

Teaching & Evaluation Scheme:-

Sr. No	Branch Code	Subject Code	Subject Name	Teaching hours/ week				Credit	Evaluation Scheme/ Semester				
									Theory				Total
				Th	Tu	Pr	Total		Sessional Exam		University Exam		
									Marks	Hrs	Marks	Hrs	
1	04	4PS06PMI2	Pharmaceutical Microbiology-II	3	0	0	3	3	20	1	70	3	100
									10 (CEC)	--			

Objectives:-

- The objectives of Pharmaceutical Microbiology II are: To develop the knowledge behind the basic Microbiology and biotechnology which is involved in pharmacy.

Prerequisites:-

- To have a more thorough theoretical background in many of the topics covered in this course; students should have basic knowledge of microbiology.

Course outline:-

Sr. No	Course Contents	Hours
1	**Introduction to Biotechnology** Scope of Biotechnology and its applications	2
2	Gene Cloning, Hybridoma technology and monoclonal antibody preparation techniques and its applications	5
3	**Surgical dressings, sutures and ligatures** Definitions, primary wound dressings, absorbents surgical cotton, surgical gauzes etc. bandages, Adhesive tape, protective, cellulose hemostats, official dressings, absorbable sutures – catgut and non absorbable sutures	6
4	**Immunology and Immunological Preparation** Immunity, primary and secondary defense mechanism, interferon, Principles of immunology, antigen antibody reactions and application, Preparation, standardization and storage of vaccines, sera and toxoids.	12
5	**Fermentation Techniques** General requirements-culture-strain development media-equipments sterilization-fermentation process-controls-extraction, etc. Detailed production of selected antibiotics such as Penicillin, Streptomycin and vitamins such as Cynocobalamine, Riboflavin.	10
6	**Blood products and plasma substitutes** Collection, processing and storage of: whole human blood, blood components, concentrated human R.B.C. dried human plasma, human plasma protein fraction, dried human serum, human fibrinogen	7

	,human thrombin, human normal immunoglobulins human fibrin foam: plasma substitutes- ideal requirements PVP-Dextran etc. control of blood products as per IP	
7	**Immobilization of Enzymes** Techniques of immobilization, Factors affecting enzyme kinetics and applications	3
	Total	45

C. U. SHAH UNIVERSITY

Faculty: - Pharmaceutical Sciences
Department: Pharmaceutics & Pharmaceutical Technology
Semester: VI
Name of Subject: Pharmaceutical Microbiology II (Practical)
Subject Code: 4PS06PMIP

Teaching & Evaluation Scheme:-

Sr. No	Branch Code	Subject Code	Subject Name	Teaching hours/ week				Credit	Evaluation Scheme/ Semester				
									Practical				Total
				Th	Tu	Pr	Total		Sessional Exam		University Exam		
									Marks	Hrs	Marks	Hrs	
1	04	4PS06PMIP	Pharmaceutical Microbiology-II Practical	0	0	3	3	1.5	20	3	70	3	100
									10 (CEC)	--			

The practical exercises are based on topics described under theory. The practicals should broadly cover the following:

1. Experiments designed in the preparation and standardization of surgical dressings, sutures ligatures.
2. Experiments designed in the different immunological products.
3. Experiments designed in the preparation, extraction and standardization of different products of fermentation.
4. Others experiments based on the theory.

Learning Outcomes:-

- The course would help the student to achieve more confidence in terms of Pharmaceutical Biotechnology.

Teaching & Learning Methodology:-

- Lectures will be conducted with the aid of multimedia projector, black board, OHP etc.
- Assignments based on course content will be given to the students at the end of each Unit/topic and will be evaluated at regular interval.
- Specific discussion questions will be assigned each week.

Books Recommended:-

Textbook

1. Textbook of microbiology by Tortora.
2. Microbiology, Pelczar/Chan Kreig Tata McGraw Hill.
3. Dispensing Pharmacy by Cooper and Gunn, Twelfth edn.
4. Bentleys Text book of Pharamceutics.

Reference Book

1. Daan J. A. Crommedin Robert & Sindilar Pharmaceutical Biotechnology
2. Remington's Pharmaceutical Sciences.
3. Principles of fermentation tehchnology. 2nd Ed. P. F. Stanbury, A. Whiteshaker and S. J. Hall Aditya Books Pvt Ltd. New Delhi.
4. Tutorial Pharmacy - S.J. Carter.
5. Pharmaceutical Biotechnology. S.P. Vyas and V.K. Dixit, C.B.S.
6. Biotechnology Foundation Course. Ananth N. Rao. Jaypee Brothers

7. Biotechnology and Fermentation Process.John I. D'Souza, Suresh G. Killeda, Nirali Prakashan
8. Pharmaceutical Biotechnology Fundamentals and Applications. S.S. Kori, M.A. Halkai, Vallabh Prakashan
9. Pharmaceutical Microbiology and Biotechnology. Chandrakant R. Kokare, Nirali Prakashan

C. U. SHAH UNIVERSITY

Faculty: Pharmaceutical Sciences
Department: Pharmaceutics & Pharmaceutical Technology
Semester: VI
Name of Subject: Dispensing Pharmacy (Theory)
Subject Code: 4PS06DPH1

Teaching & Evaluation Scheme:-

Sr. No	Branch Code	Subject Code	Subject Name	Teaching hours/ week				Credit	Evaluation Scheme/ Semester				
									Theory				Total
				Th	Tu	Pr	Total		Sessional Exam		University Exam		
									Marks	Hrs	Marks	Hrs	
1	04	Dispensing Pharmacy	4PS06DPH1	3	0	0	3	3	20	1	70	3	100
									10 (CEC)	--			

Objectives:-

- The objectives of Dispensing Pharmacy are to develop the knowledge behind the basic dispensing pharmacy which is involved in pharmacy.

Prerequisites:-

- To have a more thorough theoretical background in many of the topics covered in this course; students should have basic knowledge of physics, chemistry, mathematics and biology.

Course outline:-

Sr. No	Course Contents	Hours
1	**Definition and scope**	01
2	**The prescription** Handling of prescription, source of errors in prescription, care required in dispensing procedures including labeling at dispensed products.	04
3	**Dispensing techniques** Compounding and dispensing procedures, packaging, storage and stability of medicines, labeling of dispensed products	04
4	**Pharmaceutical calculations** Posology: Calculations of doses for infants, adults and elderly patients, enlarging and reducing recipes, percentage solutions, allegation methods, alcohol dilution, proof spirit, isotonic solutions, displacement values, etc.	10
5	**Incompatibilities** Physical and chemical incompatibilities, inorganic incompatibilities including incompatibilities of metals and their salts, non-metals, acids, alkalis, organic incompatibilities. Purine bases, alkaloids, pyrazolone derivatives, amino acids, quaternary ammonium compounds, carbohydrates, glycosides, anesthetics, dyes, surface active agents, correction of incompatibilities. Therapeutic incompatibilities.	08
6	**Principles involved and procedures adopted in dispensing of** Mixtures, solutions, emulsions, powders and granules, oral unit dosage forms, Semisolid Products, Suppositories and inhalations.	18
	Total	**45**

C. U. SHAH UNIVERSITY

Faculty: Pharmaceutical Sciences
Department: Pharmaceutics & Pharmaceutical Technology
Semester: VI
Name of Subject: Dispensing Pharmacy (Practical)
Subject Code: 4PS06DPHP

Teaching & Evaluation Scheme:-

Sr. No	Branch Code	Subject Code	Subject Name	Teaching hours/ week				Credit	Evaluation Scheme/ Semester				
									Practical				Total
				Th	Tu	Pr	Total		Sessional Exam		University Exam		
									Marks	Hrs	Marks	Hrs	
1	04	4PS06DPHP	Dispensing Pharmacy Practical	0	0	3	3	1.5	20	3	70	3	100
									10 (CEC)	--			

The students shall be asked to perform the practical related to the topics mentioned under theory.

1. Dispensing of prescription falling under the categories: Mixtures, solutions, emulsions, external preparations, powders, suppositories, oral unit dosage forms, inhalations.
2. Dispensing procedures involving pharmaceuticals calculations, pricing of prescriptions and dosage calculations for pediatric and geriatric patients.
3. Dispensing of prescriptions involving adjustment of tonicity.
4. Identification of various types of incompatibilities in prescription, correction and dispensing.
5. Categorization and storage of pharmaceutical products based on legal requirements of labelling and storage.

Learning Outcomes:-

- The course would help the student to achieve more confidence in basics of dispensing pharmacy.

Teaching & Learning Methodology:-

- Lectures will be conducted with the aid of multimedia projector, black board, OHP etc
- Assignments based on course content will be given to the students at the end of each Unit/topic and will be evaluated at regular interval.
- Specific discussion questions will be assigned each week.

Books Recommended:-

Textbook

1. Dispensing for pharmaceutical by Cooper and Gunn by S.J. Carter, CBS Publishers
2. Dispensing Pharmacy by R. M. Mehta, Vallabh Prakashan, New Delhi.
3. A text book of pharmaceutics-II by G.K. Jani, B. S. Shah Prakashan, Ahmedabad

Reference Book

1. Remington: The Science and Practice of Pharmacy, Latest Edition, by Mack Publishing Company.
2. Pharmaceutical Practice – by Diana M. Collett and Michale E. Aulton, ELBS Publishers.
3. Pharmaceutical Calculations by Mitchell J. Stocklosa and Howard C. Ansel, B. I. Waverly Pvt. Ltd., New Delhi.

4. Pharmaceutical Dosage forms and Drug delivery systems by Howard C. Ansel, Lippincott Williams and Wilkins.
5. Martin E. W. Dispensing of Medication, Mack Publishing Co., Eastern P A.

C. U. SHAH UNIVERSITY

Faculty: - Pharmaceutical Sciences
Department: Pharmaceutical Chemistry
Semester: VI
Name of Subject: Pharmaceutical Chemistry-VI
(Medicinal Chemistry-III) (Theory)
Subject Code: 4PS06PCH6

Teaching & Evaluation Scheme:-

Sr. No	Branch Code	Subject Code	Subject Name	Teaching hours/ week				Credit	Evaluation Scheme/ Semester				
									Theory				
									Sessional Exam		University Exam		Total
				Th	Tu	Pr	Total		Marks	Hrs	Marks	Hrs	
1	04	4PS06PCH6	Pharmaceutical Chemistry-VI (Medicinal Chemistry-III)	3	0	0	3	3	20	1	70	3	100
									10 (CEC)	--			

Objectives:-

- The course is designed to make students familiar with the principles of medicinal chemistry as applied to pharmaceuticals and to study the synthetic approaches and structure activity relationship of different therapeutic class of drugs.

Prerequisites:-

- Basic understanding of concepts related to Synthetic chemistry along with pharmacology and biochemical studies.

Course outline:-

Sr. No.	Course contents	Hours
1	Course should cover Introduction, history, classification, and mechanism of action, chemistry and stereochemistry, structure activity relationship (SAR) and synthetic procedures of selected drugs, therapeutic uses, adverse effects and recent developments of following categories to be covered.	
2	**Hormones and Related drugs:**	
	a. Insulin preparations and oral hypoglycemic drugs : Synthesis: Glipizide, Metformin, Pioglitazone, Tolbutamide, Glimipride	04
	b. Thyroid Hormones and Antithyroid Drugs Synthesis: Thyroxine, Methimazole, Carbimazole.	02
	c. Steroids and Therapeutically related compounds • Nomenclature and stereochemistry of steroids • Adrenocorticoids – Mineralocorticoids, Glucocorticoids • Estrogens, Progestins and Androgens SAR: Estrogens, Adrenocorticoids, Progestins and Androgens	06
3	**Chemotherapeutic Agents:**	
	a. Synthetic Antibacterial Agents / Antimicrobial Agents: **SAR:-** • Sulfonamides • Quinolones **Synthesis:** Sulfacetamide, Sulfadoxin, Sulfamethoxazole,	05

	Sulfasalazine, Trimethoprim, Norfloxacin, Ofloxacin, Ciprofloxacin	
	b. β-Lactam Antibiotics: **SAR:** • Cephalosporins • Penicillins **Synthesis**:- Penicillin-G	04
	c. Tetracyclines, Aminoglycosides, Macrolides and Miscellaneous Antibiotics: **SAR:** • Aminoglycosides, • Tetracyclines, • Macrolides **Synthesis:-** Chloramphenicol	06
	d. Antimycobacterial Agents: **Synthesis:**Ethambutol, Isoniazid, Pyrazinamide, Clofazimine, PAS	03
	e. Antifungal Agents: **Synthesis:**Clotrimazole, Ketoconazole, Fluconazole	02
	f. Antiprotozoal Agents: **Antimalarial and Antiamoebic Agents** **SAR:**Quinolines **Synthesis**: Metronidazole, Ornidazole, Chloroquine, Amodiaquine, Primaquine, Pyrimethamine.	04
	g. Anthelmintics: Synthesis: Albendazole, Mebendazole.	01
	h. Antiviral and Anti-HIV Agents: Synthesis: Amantadine	03
	i. Antineoplastic agents:Synthesis: Chlorambucil, Cyclophosphamide, Thiotepa,Methotrexate, Fluorouracil, Tamoxifen.	05
	Total	45

C. U. SHAH UNIVERSITY

Faculty: - Pharmaceutical Sciences
Department: Pharmaceutical Chemistry
Semester: VI
Name of Subject: Pharmaceutical Chemistry-VI
(Medicinal Chemistry-III) (Practical)
Subject Code: 4PS06PCHP

Teaching & Evaluation Scheme:-

Sr. No	Branch Code	Subject Code	Subject Name	Teaching hours/ week				Credit	Evaluation Scheme/ Semester				
									Practical				
									Sessional Exam		University Exam		Total
				Th	Tu	Pr	Total		Marks	Hrs	Marks	Hrs	
1	04	4PS06PCHP	Pharmaceutical Chemistry-VI (Medicinal Chemistry-III) Practical	0	0	3	3	1.5	20	3	70	3	100
									10 (CEC)	--			

The practical exercises are based on topics described under theory. The practicals should broadly cover the following:

1. Separation and qualitative analysis of Organic binary mixtures containing water insoluble components having salt, acidic, phenolic, amphoteric, basic and neutral nature (Solid + Solid, Solid + liquid, Liquid + liquid and Eutectic mixtures) with derivative preparations.
2. Synthesis and purification of following organic compounds:
   a) Benzamide from Benzaldehyde
   b) m-Nitrophenol from Nitrobenzene
   c) p-Aminophenol from Nitrobenzene
   d) Methylene blue from N,N-dimethyl aniline
   e) Chalcone from Benzaldehyde and Acetophenone
   f) Barbituric acid from Urea and Dimethyl malonate
   g) Benzillic acid from Benzoin
   h) p-Nitro aniline from Acetanilide

Learning outcomes:-

- By the end of this course, the student should have a good understanding of the history and basic concepts of Medicinal chemistry
- Students should be able to describe detail synthetic approaches, mechanisms of action as well as structure activity relationship of some important therapeutic class of Drugs.
- The course may help the students in understanding rational approaches towards the design of important therapeutic agents and their biological implications.

Teaching Methodology:-

- Using black board and one-way communication from a teacher to a student. Using an over head and LCD projector

Books recommended:-

Text Book

6. Satoskar, R.S. and Bhadarkar, S.D. Pharmacology and Pharmacotherapeutics. 16th edition (single volume), 1999. Publisher: Popular, Dubai.

7. K. D. Tripathi, Essential of Medical Pharmacology, 6th edition J.P. Publication.
8. Kulakarni S. K.- handbook of Experimental Pharmacology (1993)2fld Edn. Vallabh Prakashan, New Delhi.
9. R. K. Goyal. Practicals in Pharmacology: B.S. Shah Prakashan, Ahmedabad.
10. Kulakarni S.K. - Handbook of Experimental Pharmacology (1993) 2 Edn. Vallabh Prakashan, New Delhi.

Reference Book

7. Rang, H.P. & Dale, M.M. Pharmacology. 4th edition, 1999. Publisher: Churchill Living stone.
8. Katzung, B.G. Basic and clinical pharmacology. Latest edition. Publisher: Prentice Hall, Int.
9. Goodman Gilman, A., Rall, T.W., Nies, A.I.S. and Taylor, P. Goodman and Gilman's The Pharmacological Basis of Therapeutics. 9th Ed, 1996. Publisher McGraw Hill, Pergamon press.
10. Ghosh, M.N. Fundamentals of experimental pharmacology. Latest edition, Publisher: Scientific book agency, Kolkata.
11. Sheth U.K. et al-Selected topics in Experimental Pharmacology (1972)15t Edn. The Kothari Book Depot, Mumbai.
12. Harvel, R.A., Champe P.C. et al — Pharmacology (1997) 2nd Edn. Lippincott- Raven Company, Philadelphia, New York.

C. U. SHAH UNIVERSITY

Faculty: - Pharmaceutical Sciences
Department: Pharmaceutics & Pharmaceutical Technology
Semester: VI
Name of Subject: Pharmaceutical Industrial Management (Theory)
Subject Code: 4PS06PIM1

Teaching & Evaluation Scheme:-

Sr. No	Branch Code	Subject Code	Subject Name	Teaching hours/ week				Credit	Evaluation Scheme/ Semester				
									Theory				Total
				Th	Tu	Pr	Total		Sessional Exam		University Exam		
									Marks	Hrs	Marks	Hrs	
1	04	4PS06PIM1	Pharmaceutical Industrial Management	2	0	0	2	2	20	1	70	3	100
									10 (CEC)	--			

Objectives: -

- The course is designed to acquaint the students with decision-making in planning, scheduling and control of production and materials management. To acquaint students with the basic concepts and techniques of Sales and Retail Management.

Prerequisites:-

- To have a more thorough theoretical background in many of the topics covered in this course; student must have taken basic management skills before this course.

Course Outline:-

Sr. No	Course Contents	Hours
1	**Concept of Management** Administrative Management (Planning, Organizing, Staffing, Directing and Controlling), Entrepreneurship development, Operative Management (Personnel, Materials, Production, Financial, Marketing, Time/space, Margin/Morale). Principles of Management (Co-ordination, Communication, Motivation, Decision-making, leadership, Innovation, Creativity, Delegation of Authority / Responsibility, Record Keeping). Identification of key points to give maximum thrust for development and perfection.	8
2	**Accountancy** Principles of Accountancy, Ledger posting and book entries, preparation of trial balance, columns of a cash book, Bank reconciliation statement, rectification of errors, Profits and loss account, balance sheet, purchase, keeping and pricing of stocks, treatment of cheques, bills of exchange, promissory notes and hundies, documentary bills.	4
3	**Economics** Principles of economics with special reference to the laws of demand and supply, demand schedule, demand curves, labor welfare, general principles of insurance and inland and foreign trade, procedure of exporting and importing goods	4
4	**Pharmaceutical Marketing** Functions, buying, selling, transportation, storage, finance, feedback,	4

	information, channels of distribution, wholesale, retail, departmental store, multiple shop and mail order business	
5	**Salesmanship** Principles of sales promotion, advertising, ethics of sales, merchandising, literature, detailing. Recruitment, training, evaluation, compensation to the pharmacist	3
6	**Materials Management** A brief exposure or basic principles of materials management-major areas, scope, purchase, stores, inventory control and evaluation of materials management. **Production Management** A brief exposure of the different aspects of Production Management-Visible and Invisible inputs, Methodology of Activities, Performance Evaluation Technique, Process-Flow, Process Knowhow, Preventive and maintenance management	7
	Total	30

Learning Outcomes:-

On the completion of the course, students will be able to:

- Understand the importance of Management in pharmaceutical industry.
- Understand the importance of Economics in pharmacy.
- Understand the role of Pharmaceutical Marketingand its involvement in Pharmaceutical Industrial

Teaching Methodology:-

- Lectures will be conducted with the aid of multimedia projector, black board, OHP etc.
- Assignments based on course content will be given to the students at the end of each Unit/topic and will be evaluated at regular interval.
- Specific discussion questions will be assigned each week.

Books Recommended:

Textbook

1. Nair: Production and Operations Management, First Edition, Tata Mc Graw Hill, Delhi.
2. Gopalakrishnan, P and Sundarshan, M : Handbook of Materials Management, N. Delhi, Prentice Hall of India,1994

Reference Book

1. Principles of Industrial Management by L. P. Alford and H. R. Beatty, The Ronald Press Company, New York.
2. Gilbert David: Retail Marketing Management, Pearson Education, N. Delhi.
3. Bermans and Evans : Retail Management – A Strategic Approach, Prentice Hall of India, N. Delhi
4. Remington: The Science and Practice of Pharmacy, Latest Edition, by Mack Publishing Company.

C. U. SHAH UNIVERSITY

Faculty: - Pharmaceutical Sciences
Department: Pharmacognosy
Semester: VI
Name of Subject: Pharmacognosy-V (Theory)
Subject Code: 4PS06COG5

Teaching & Evaluation Scheme:-

Sr. No	Branch Code	Subject Code	Subject Name	Teaching hours/ week				Credit	Evaluation Scheme/ Semester				
									Theory				
									Sessional Exam		University Exam		Total
				Th	Tu	Pr	Total		Marks	Hrs	Marks	Hrs	
1	04	4PS06COG5	Pharmacognosy -V	3	0	0	3	3	20	1	70	3	100
									10 (CEC)	--			

Objectives: -

- To make students familiar with holistic concept of medication and drugs used in traditional system of medicine and understand the safety aspects of plants used as medicine.

Prerequisites:-

- The students should have a clear concept of Botany.

Course outline:-

Sr. No	Course Contents	Hours
1	Utilization of herbs and extracts in food and Cosmetic.	07
2	Distribution, chemistry, isolation, estimation, pharmacology, commercial and medicinal utilization of Carotenoids, with special reference to α-carotene, ß- carotene, vitamin A and lycopene.	06
3	Concept of stereoisomerism taking example of natural compounds.	04
4	Studies of traditional drugs, common vernacular names, botanical sources, morphology, chemical nature of chief Constituents, pharmacology, categories and common uses and marketed formulations of following drugs: Amala, Satavari, Musali, Damvel, Bhilama, Ashoka, Nagod, Chitrak, Apamarg, Gokhru, Bhringraj, Arjuna, Methi, Guggal, Madhunashini, Shilajit, Pippali, Kapikachhu, Majith, Galo, Vaj, Punarnava, Dhatakipushpha.	22
5	Poisonous plants with special reference to Calotropis, Aconite, Hemlock, A*brusprecatorius*and fungal toxins	6
	Total	45

C. U. SHAH UNIVERSITY

Faculty: - Pharmaceutical Sciences
Department: Pharmacognosy
Semester: VI
Name of Subject: Pharmacognosy V (Practical)
Subject Code: 4PS06COGP

Teaching & Evaluation Scheme:-

Sr. No	Branch Code	Subject Code	Subject Name	Teaching hours/ week				Credit	Evaluation Scheme/ Semester				
									Practical				Total
				Th	Tu	Pr	Total		Sessional Exam		University Exam		
									Marks	Hrs	Marks	Hrs	
1	04	4PS06COGP	Pharmacognosy -V Practical	0	0	3	3	1.5	20	3	70	3	100
									10 (CEC)	--			

The practical exercises are based on topics describe under theory. The practicals should broadly cover the following:

1. Macroscopic and Microscopic study of traditional drugs.
2. Standardization of Ayurvedic formulations.
3. Standardization of herbal formulations.

Learning Outcomes:-

- The students are expected to understand Pharmacognostic aspects, uses and pharmacological properties of traditional plant drugs.
- To learn about uses of the herbal extracts in various cosmetic and herbal formulations.
- To learn about various poisonous plants.

Teaching Methodology:-

- Lectures will be conducted with the aid of multimedia projector, black board, OHP etc.
- Assignments based on course content will be given to the students at the end of each Unit/topic and will be evaluated at regular interval.
- Specific discussion questions will be assigned each week.

Books Recommended:

Text Book

1. A Text book of Pharmacognosy: Shah C. S., Quadry J. S., B. S. Shah Prakashan, Ahmedabad. 15th Edition, 2009.
2. Pharmacognosy: Kokate C. K., Purohit A. P., Gokhale S. B., Nirali Prakashan Pune, 42nd edition, 2008.
3. Trease and Evans Pharmacognosy. 16h Edition, William Charles Evans, W.
4. Textbook of Pharmacognosy: Wallis T. E., CBS Publishers and Distributors, New Delhi, 5th Edition, reprinted, 2009.
5. Study of Crude drugs, Iyengar M. A. and Nayak S.G.K. Manipal Power Press, Manipal.
6. Practical Pharmacognosy, Technique and Experiment by Kokate C. K. and Gokhale S. B., Nirali Prakashan, Pune, 8th edition, 2005.

Reference Book

1. Saunders, Edinburg London New York Philadelphia St. Louis Sydney Toronto 2009.

2. Natural Products, Vol I & II, by Agrawal O. P., Goel Publishing House, Meerut, 28th Edition, 2004.
3. Chemistry of Natural products. Bhat SV, Nagasampagi BA, Meenakshi S. Narosa Publishing house, New Delhi, 2005.
4. Medicinal Natural Products a Biosynthetic Approach, Dewick Paul M. John Wiley and Sons, West Sussex, 2009.
5. Pharmacognosy and Pharmacobiotechnology by Ashutosh Kar, 2nd Edition, New Age International Pvt. Ltd.; New Delhi, 2007.
6. The Wealth of India (Raw Material & Industrial Product), Published by Council of Scientific Industrial Research, New Delhi, 1st Edition, (1950-2014).
7. Indian Medicinal Plants by Kirtikar and Basu, 1st Edition, International Book Distributors, Dehradun, 1999.
8. Compendium of Indian Medicinal Plant Vol. 1 to 6, by Rastogi Ram P., Mehrotra B. N., CDRI & NISCOM, 1st Edition, New Delhi, 1998.
9. Review on Indian Medicinal Plants, Vol I to XI (2004 to 2014) Editor: Gupta A K
10. & Tundon Neeraj. By: Indian Council of Medicinal Research (ICMR), New Delhi.
11. Powdered Vegetable Drugs by Jeckson B. P. & Snewden D. W. Chanhan M. G & Pillai A. P.G, Microscopic profile of powdered drugs used in
12. Indian system of medicine, Volume I, Bark drugs 2005, Institute of Ayurvedic medicinal plant science, Gujarat Ayurved University, Jamnagar.
13. Chauhan M. G & Pillai A.P.G, "Microscopic profile of powdered drugs used in Indian systems of Medicine, Leaf Drugs, Vol 2, 2007, Institute of P.G Teaching & Research in Ayurveda, Gujarat Ayurved University, Jamnagar.
14. Chauhan M. G & Pillai A.P.G, " Microscopic profile of Drugs used in Indian system of Medicine, Seed drugs, Volume- 3, part- 1, 2011; Publisher: Prof Malati G Chauhan, P.G T- S.F C cell, I.P. G T. & R.A, Gujarat Ayurved University, Jamnagar.
15. Anatomy of Crude Drugs, Iyengar M. A. and Nayak S.G.K, Manipal Power Press, Manipal.
16. Quality Control of Plants. WHO publication.

C. U. SHAH UNIVERSITY

Faculty: - Pharmaceutical Sciences
Department: Pharmacology
Semester: VI
Name of Subject: Pharmacology III (Theory)
Subject Code: 4PS05COL3

Teaching & Evaluation Scheme:-

Sr. No	Branch Code	Subject Code	Subject Name	Teaching hours/ week				Credit	Evaluation Scheme/ Semester				
									Theory				Total
				Th	Tu	Pr	Total		Sessional Exam		University Exam		
									Marks	Hrs	Marks	Hrs	
1	04	4PS05CP1	Pharmacology-III	3	0	0	3	3	20	1	70	3	100
									10 (CEC)	--			

Objectives:-

- To learn Basic concept of clinical pharmacy like study of pharmacotherapy, Risk Factors, Complications and Management of the patients with Therapeutic Drug Monitoring.

Prerequisites:-

- Knowledge of Human Anatomy Physiology, Health Education, Biochemistry and basic physics and chemistry. Fundamentals of pharmacology learnt in previous semesters.

Course outline:-

Sr. No	Course Contents	Hours
1	**Introduction:** a. Development and scope of clinical pharmacy, concept of health care team. b. Role of clinical pharmacist as a member of health care team and His/her 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.	15
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.	22

	c. Renal: Acute renal failure, chronic renal failure. d. Anemia	
5	**Clinical Toxicology:** Definition of Poison and General Principles of Treatment of Poisoning with particular reference to Barbiturates, Opioids, Organo phosphorus, Atropine and Heavy Metal.	02
6	Concept of essential drugs and Rational drug use	02
7	Therapeutic drug monitoring	02
	Total	45

C. U. SHAH UNIVERSITY

Faculty: - Pharmaceutical Sciences
Department: Pharmacology
Semester: VI
Name of Subject: Pharmacology III (Practical)
Subject Code: 4PS06COLP

Teaching & Evaluation Scheme:-

Sr. No	Branch Code	Subject Code	Subject Name	Teaching hours/ week				Credit	Evaluation Scheme/ Semester				
									Practical				Total
				Th	Tu	Pr	Total		Sessional Exam		University Exam		
									Marks	Hrs	Marks	Hrs	
1	04	4PS06COLP	Pharmacology III Practical	0	0	3	3	1.5	20	3	70	3	100
									10 (CEC)	--			

The practical exercises are based on topics described under theory. The practicals should broadly cover the following:

1. To evaluate two cases involving skills of pharmacist for patient counseling.
2. To evaluate for dose adjustment in geriatrics, pediatrics and pregnant women (Min. three cases each)
3. To evaluate cases for Interpretation of laboratory data (Min. six full cases with clinical and other relevant findings)
4. To evaluate drug-drug interactions for the type of drug interaction, the mechanism responsible for drug interactions, possible outcomes or clinical manifestations of interaction and suggestion corrective measure to overcome or prevent the drug interaction (at-least 25 drug-drug interactions).
5. To evaluate case study of poisoning (particular reference to Barbiturates, Opioids, Organo phosphorus, Atropine and Heavy Metal)
6. To audit given prescription for format of prescription, essentiality and rationality and suggest carry home message (three experiments containing three prescriptions each, in totality nine prescriptions, covering various diseases or organ-systems)
7. To evaluate cases for Therapeutic Drug Monitoring (TDM) (Min. two cases)

Learning Outcomes:-

- Define and correctly use scientific terminology in regard to human body and processes.
- Apply principles of scientific inquiry, differentiate a theory from a hypothesis, and differentiate fact from opinion in regard to use of drugs in different human system.
- Describe and practice laboratory safety guidelines relating to working with drugs, experimental animals and body fluids.
- Show proficiency in taking lab practical exams, responding to questions quickly and accurately, effectively handling the pressure of a timed exam.

Teaching & Learning Methodology:-

- Lectures will be conducted with the aid of multimedia projector, black board, OHP etc.
- Assignments based on course content will be given to the students at the end of each Unit/topic and will be evaluated at regular interval.
- Specific discussion questions will be assigned each week.

Books Recommended:-

Text Book

1. Clinical Pharmacy and Therapeutics. Roger Walker and Clive Edwards, Churchill Livingstone Edinburgh / London.
2. Text Book of Therapeutics: Drug and Disease Management. 7th Ed. Editors: Eric T. Herfindal and Dick R. Gurley, Williams and Wilkins, 2000.
3. Davidson's Principle and Practice of Medicine, Eds. Christopher R.W. Edwards & Ian A.D. Boucher ELBS with Churchill Livingstone, Edinburgh.

Reference Book

1. Applied Therapeutics: The Clinical Use of Drugs Eds. Brian S. Katcher, Lloyd Yee Young, Marry Anne Koda-Kimble, Applied Therapeutics Inc.
2. Melmon and Morrelli's Clinical Pharmacology, 4th Edition. Authors: S. George Carrathers, Brian B. Hoffman, Kenneth L. Melmon and David W. Nierenberg. McGraw Hill, 2000.
3. Pharmacotherapy: A Pathophysiological Approach. J. T. Dipiro, R. L. Talbert et al, McGraw-Hill, New York.