



TEACHING SCHEME / DETAIL SYALLBUS

PHARM

BP10101A

2017-18

Subject Code

Enter Subject Name

N=Theory T=Tutorial P=Practical E=Theory(External) M=Theory(internal) I=Practical Internal V=Practical External On job Training OJT is equivalent to Practical

Sl. No.	Course Code	Cr. No.	Year	Subject Name	Category	Th	T	P	E	M	I	V	OJT	Total	
1	BP101TE	90	2017-18	Human Anatomy and Physiology ¹	Compulsory	1	3	1	4	6	80	20	20	80	200
2	BP102TE	90	2017-18	Pharmaceutical Analysis I	Compulsory	1	3	1	4	6	80	20	20	80	200
3	BP103TE	90	2017-18	Pharmaceutics I	Compulsory	1	3	1	4	6	80	20	20	80	200
4	BP104TE	90	2017-18	Pharmaceutical Inorganic Chemistry	Compulsory	1	3	1	4	6	80	20	20	80	200
5	BP105TE	90	2017-18	Communication Skills ²	Compulsory	1	2	0	2	3	35	15	15	35	100
6	BP106TE	90	2017-18	Remedial Biology ³	Compulsory	1	2	0	2	3	35	15	15	35	100
7	BP107TE	90	2017-18	Remedial Mathematics ³	Compulsory	1	2	0	0	2	35	15	0	0	50

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G.M. Bilakha College of Pharmacy

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TEACHING SCHEME / DETAIL SYALLBUS

BP202M

90 - PHARMACY

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2017-18

Subject Code

Enter Subject Name

*L=Lectures,Practical,Ph-Practical,T=Theory,External,M=Theory/Internal,I=Practical Internal,V=Practical External,On Job Training(OJT) is equivalent to Practical

Sl. No.	Course Code	Cr. Credit	SEM	Year	Course Name	Category	L	T	P	V	Practical	On Job Training	Total
1	BP201IE	90	2017-18		Human Anatomy and Physiology II	Compulsory	2	3	1	4	6		80 20 20 80 200
2	BP202IE	90	2017-18		Pharmaceutical Organic Chemistry I	Compulsory	2	3	1	4	6		80 20 20 80 200
3	BP203IE	90	2017-18		Pharmaceutical Engineering	Compulsory	2	3	1	4	6		80 20 20 80 200
4	BP204IE	90	2017-18		Computer Applications in Pharmacy*	Compulsory	2	3	0	2	4		35 15 15 35 100
5	BP205IT	90	2017-18		Environmental Sciences*	Compulsory	2	3	0	0	3		35 15 0 0 50


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TEACHING SCHEME / DETAIL SYALLBUS

BP PHARM

BP PHARMACY

2017-18

Subject Code

Enter Subject Name

*L=Lectures, T=Tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training/OTI is equivalent to Practical

Sl. No.	Subject Code	Semester	Year	Subject Name	Category	Sem. Hours	Theory				Practical				Total
							L	T	P	E	M	I	V	OTI	
01	BP301TP	90	2017-18	Pharmaceutical Organic Chemistry II	Compulsory	3	3	1	4	6	80	20	20	80	200
02	BP302TP	90	2017-18	Physical Pharmaceutics I	Compulsory	3	3	1	4	6	80	20	20	80	200
03	BP303TP	90	2017-18	Biochemistry	Compulsory	3	3	1	4	6	80	20	20	80	200
04	BP304TI	90	2017-18	Pathophysiology	Compulsory	3	3	1	0	4	80	20	0	0	100
05	BP305TP	90	2017-18	Pharmacognosy and Phytochemistry I	Compulsory	3	3	1	4	6	80	20	20	80	200

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TEACHING SCHEME / DETAIL SYALLBUS

BP4000M

B. PHARMACY

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2017-18

Subject Code

Enter Subject Name

L=Lectures, T=Tutorial, P=Practical, E=Theory External, M=Theory Internal, I=Practical Internal, V=Practical External, On Job Training(OJT) is equivalent to Practical

Sl. No.	Subject Code	Year	Sem. Name	Subject Name	Category	L	T	P	E	M	I	V	OJT	Internal	External	Total
1	BP401TI	90	2017-18	Pharmaceutical Organic Chemistry II	Compulsory	4	3	1	0	4	80	20	0	0	0	100
2	BP402TP	90	2017-18	Medicinal Chemistry I	Compulsory	4	3	1	4	6	80	20	20	80	200	
3	BP403TP	90	2017-18	Physical Pharmaceutics II	Compulsory	4	3	1	4	6	80	20	20	80	200	
4	BP404TP	90	2017-18	Pharmacology I	Compulsory	4	3	1	4	6	80	20	20	80	200	
5	BP405TI	90	2017-18	Pharmaceutical Jurisprudence	Compulsory	4	3	1	0	4	80	20	0	0	100	

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TEACHING SCHEME / DETAIL SYALLBUS

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
2017-18

Subject Code

Enter Subject Name

*L=Lectures,T=Tutorial,P=Practical,E=Theory External,M=Theory internal,I=Practical internal,V=Practical External,On job Training(OJT) is equivalent to Practical

Sl. No.	Course Code	Course Credit	EST. Year	Course Name	Category	Th	T	P	E	M	I	V	OJT	Total	
01	BP501TI	90	2017-18	Medical Chemistry II	Compulsory	5	3	1	0	4	80	20	0	0	100
02	BP502TP	90	2017-18	Pharmacology I	Compulsory	5	3	1	4	6	80	20	20	80	200
03	BP503TP	90	2017-18	Pharmacognosy and Phytochemistry II	Compulsory	5	3	1	4	6	80	20	20	80	200
04	BP504TP	90	2017-18	Pharmaceutical Microbiology	Compulsory	5	3	1	4	6	80	20	20	80	200
05	BP505TI	90	2017-18	Pharmaceutical Biotechnology	Compulsory	5	3	1	0	4	80	20	0	0	100
06	BP506TP	90	June 2020	Contributor Personality Development Program	Personality development Elective	5	4	0	0	4	80	20	20	30	150
07	BP507TP	90	June 2020	Integrated Personality Development Course	Personality development Elective	5	4	0	0	4	80	20	20	30	150


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TEACHING SCHEME / DETAIL SYALLBUS

BPHARM

BD - PHARMACY

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2017-18

Subject Code

Enter Subject Name

*L= Lectures, T= Tutorial, P= Practical, E= Theory External, M= Theory Internal, I= Practical Internal, U= Practical External, On Job Training (OJT) is equivalent to Practical

Sl. No.	Subject Code	Credits	Year	Subject Name	Assessment	Theory	Practical	Internal	External	On Job Training	Total
1	BP601IP	90	2017-18	Medicinal Chemistry II	Compulsory	6	3	1	4	6	80 20 20 80 200
2	BP602IP	90	2017-18	Pharmacology II	Compulsory	6	3	1	4	6	80 20 20 80 200
3	BP603IP	90	2017-18	Herbal Drug Technology	Compulsory	6	3	1	4	6	80 20 20 80 200
4	BP604II	80	2017-18	Biopharmaceutics and Pharmacokinetics	Compulsory	6	3	1	0	4	80 20 0 0 100
5	BP605IP	90	2017-18	Industrial Pharmacy I	Compulsory	6	3	1	4	6	80 20 20 80 200


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TEACHING SCHEME / DETAIL SYALLBUS

BP701PM

BP - PHARMACY

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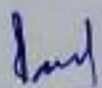
2017-18

Subject Code

Enter Subject Name

T= Lectures, Th= Tutorial, P= Practical, E= Theory External, M= Theory Internal, I= Practical Internal, V= Practical External, On job Training (OJT) is equivalent to Practical

Sr.	Code	Credits	Year	Subject Name	Category	Th	T	P	E	M	I	V	OJT	Total	
01	BP701TE	90	2017-18	Instrumental Methods of Analysis	Compulsory	7	3	1	4	6	80	20	20	80	200
02	BP702TI	90	2017-18	Industrial Pharmacy II	Compulsory	7	3	1	0	4	80	20	0	0	100
03	BP703TI	90	2017-18	Pharmacy Practice	Compulsory	7	3	1	0	4	80	20	0	0	100
04	BP704TI	90	2017-18	Novel Drug Delivery System	Compulsory	7	3	1	0	4	80	20	0	0	100
05	BP705PP	90	2017-18	Practice School	Compulsory	7	0	0	12	6	0	0	100	0	100
06	BP706TI	90	2017-18	Quality Assurance	Compulsory	7	3	1	0	4	80	20	0	0	100


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TEACHING SCHEME / DETAIL SYALLBUS

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90 - PHARMACY

6

2017-18

Subject Code

Enter Subject Name

* Lectures (L), Tutorial (T), Practical (P), Theory (Th), External (M), Theory Internal (I), Practical Internal (Y), Practical External (On job Training) (OJ) is equivalent to Practical.

Sl. No.	Course Code	Semester	Year	Subject Name	Category	L	T	P	OJ	Th	M	I	Y	OJ	Total
01	BP801IT	90	2017-18	Biostatistics and Research Methodology	Compulsory	8	3	1	0	4	80	20	0	0	100
02	BP802IT	90	2017-18	Social and Preventive Pharmacy	Compulsory	8	3	1	0	4	80	20	0	0	100
03	BP803IT	90	2017-18	Pharma Marketing Management	Elective II	8	3	1	0	4	80	20	0	0	100
04	BP804IT	90	2017-18	Pharmaceutical Regulatory science	Elective II	8	3	1	0	4	80	20	0	0	100
05	BP805IT	90	2017-18	Pharmacovigilance	Elective I	8	3	1	0	4	80	20	0	0	100
06	BP806IT	90	2017-18	Quality Control and standardization of Herbs	Elective I	8	3	1	0	4	80	20	0	0	100
07	BP807IT	90	2017-18	Computer Aided Drug Design	Elective I	8	3	1	0	4	80	20	0	0	100
08	BP808IT	90	2017-18	Cell and Molecular Biology	Elective I	8	3	1	0	4	80	20	0	0	100
09	BP809IT	90	2017-18	Cosmetic Science	Elective I	8	3	1	0	4	80	20	0	0	100
10	BP810IT	90	2017-18	Experimental Pharmacology	Elective I	8	3	1	0	4	80	20	0	0	100
11	BP811IT	90	2017-18	Advanced Instrumentation Techniques	Elective II	8	3	1	0	4	80	20	0	0	100
12	BP812IT	90	2017-18	Dietary Supplements and Nutraceuticals	Elective II	8	3	1	0	4	80	20	0	0	100
13	BP813PP	90	2017-18	Project Work	Compulsory	8	0	0	12	6	0	0	50	100	150
14	BP814IT	90	Dec 2020	Pharmaceutical Product Development	Elective I	8	3	1	0	4	80	20	0	0	100
15	BP815IT	90	Dec 2020	Epidemiology	Elective I	8	3	1	0	4	80	20	0	0	100

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BT/14/2017

Department of Pharmacy

GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: I

Subject Name: HUMAN ANATOMY AND PHYSIOLOGY-I
Subject Code: BP101TP

Scope: This subject is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms. The subject provides the basic knowledge required to understand the various disciplines of pharmacy.

Objectives: Upon completion of this course the student should be able to

1. Explain the gross morphology, structure and functions of various organs of the human body.
2. Describe the various homeostatic mechanisms and their imbalances.
3. Identify the various tissues and organs of different systems of human body.
4. Perform the various experiments related to special senses and nervous system.
5. Appreciate coordinated working pattern of different organs of each system.

Sr No	Course Contents	Total Hrs
1	Introduction to human body: Definition and scope of anatomy and physiology, levels of structural organization and body systems, basic life processes, homeostasis, basic anatomical terminology Cellular level of organization: Structure and functions of cell, transport across cell membrane, cell division, cell junctions. General principles of cell communication, intracellular signaling pathway activation by extracellular signal molecule, Forms of intracellular signaling: a) Contact-dependent b) Paracrine c) Synaptic d) Endocrine Tissue level of organization: Classification of tissues, structure, location and functions of epithelial, muscular and nervous and connective tissues.	10
2	Integumentary system: Structure and functions of skin Skeletal system: Divisions of skeletal system, types of bone, salient features and functions of bones of axial and appendicular skeletal system Organization of skeletal muscle, physiology of muscle contraction, neuromuscular junction Joints Structural and functional classification, types of joints movements and its articulation	10
3	Body fluids and blood: Body fluids, composition and functions of blood, hemopoiesis, formation of hemoglobin, anemia, mechanisms of coagulation, blood grouping, Rh factors, transfusion, its significance and disorders of blood, Reticulo endothelial system Lymphatic system: Lymphatic organs and tissues, lymphatic vessels, lymph circulation and functions of lymphatic system	10
4	Peripheral nervous system: Classification of peripheral nervous system: Structure and functions of sympathetic and parasympathetic nervous system. Origin and functions of spinal and cranial nerves Special senses: Structure and functions of eye, ear, nose and tongue and their disorders.	8
5	Cardiovascular system: Heart – anatomy of heart, blood circulation, blood vessels, structure and functions of artery, vein and capillaries, elements of conduction system of heart and heart beat, its regulation by autonomic nervous system, cardiac output, cardiac cycle. Regulation of blood pressure, pulse, electrocardiogram and disorders of heart.	7

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Practical

Practical physiology is complimentary to the theoretical discussions in physiology. Practicals allow the verification of physiological processes discussed in theory classes through experiments on living tissue, intact animals or normal human beings. This is helpful for developing an insight on the subject.

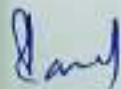
1. Study of compound microscope.
2. Microscopic study of epithelial and connective tissue
3. Microscopic study of muscular and nervous tissue
4. Identification of axial bones
5. Identification of appendicular bones
6. Introduction to hemocytometry.
7. Enumeration of white blood cell (WBC) count
8. Enumeration of total red blood corpuscles (RBC) count
9. Determination of bleeding time
10. Determination of clotting time
11. Estimation of hemoglobin content
12. Determination of blood group.
13. Determination of erythrocyte sedimentation rate (ESR).
14. Determination of heart rate and pulse rate.
15. Recording of blood pressure.

Recommended Books:

1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brothers medical publishers, New Delhi.
2. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York
3. Physiological basis of Medical Practice-Best and Taylor. Williams & Wilkins Co, Riverview, MI USA
4. Text book of Medical Physiology- Arthur C. Guyton and John E. Hall. Miamisburg, OH, U.S.A.
5. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.
6. Textbook of Human Histology by Inderbir Singh, Jaypee brother's medical publishers, New Delhi
7. Textbook of Practical Physiology by C.L. Ghai, Jaypee brother's medical publishers, New Delhi
8. Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi

Reference Books (Latest Editions)

1. Physiological basis of Medical Practice-Best and Taylor. Williams & Wilkins Co, Riverview, MI USA
2. Text book of Medical Physiology- Arthur C. Guyton and John E. Hall. Miamisburg, OH, U.S.A.
3. Human Physiology (vol 1 and 2) by Dr. C.C. Chatterje, Academic Publishers Kolkata



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GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: I

Subject Name: PHARMACEUTICAL ANALYSIS

Subject Code: BP102TP

Scope: This course deals with the fundamentals of analytical chemistry and principles of electrochemical analysis of drugs

Objectives: Upon completion of the course student shall be able to

1. understand the principles of volumetric and electro chemical analysis
2. carryout various volumetric and electrochemical titrations
3. develop analytical skills

Sr No	Course Contents	Total Hrs
1	(a) Pharmaceutical analysis- Definition and scope i) Different techniques of analysis ii) Methods of expressing concentration iii) Primary and secondary standards. iv) Preparation and standardization of various molar and normal solutions- Oxalic acid, sodium hydroxide, hydrochloric acid, sodium thiosulphate, sulphuric acid, potassium permanganate and ceric ammonium sulphate (b)Errors: Sources of errors, types of errors, methods of minimizing errors, accuracy, precision and significant figures (c)Pharmacopoeia, Sources of impurities in medicinal agents, limit tests	10
2	Acid base titration: Theories of acid base indicators, classification of acid base titrations and theory involved in titrations of strong, weak, and very weak acids and bases, neutralization curves Non aqueous titration: Solvents, acidimetry and alkalimetry titration and estimation of Sodium benzoate and Ephedrine HCl	10
3	Precipitation titrations: Mohr's method, Volhard's, Modified Volhard's, Fajans method, estimation of sodium chloride. Complexometric titration: Classification, metal ion indicators, masking and demasking reagents, estimation of Magnesium sulphate, and calcium gluconate. Gravimetry: Principle and steps involved in gravimetric analysis. Purity of the precipitate: co-precipitation and post precipitation, Estimation of barium sulphate. Basic Principles, methods and application of diazotisation titration.	10
4	Redox titrations: (a) Concepts of oxidation and reduction (b) Types of redox titrations (Principles and applications) Cerimetry, Iodimetry, Iodometry, Bromatometry, Dichrometry, Titration with potassium iodate	8
5	Electrochemical methods of analysis Conductometry- Introduction, Conductivity cell, Conductometric titrations, applications. Potentiometry - Electrochemical cell, construction and working of reference (Standard hydrogen, silver chloride electrode and calomel electrode) and indicator electrodes (metal electrodes and glass electrode), methods to determine end point of potentiometric titration and applications. Polarography - Principle, Ilkovic equation, construction and working of dropping mercury electrode and rotating platinum electrode, applications	7

Principal

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Shri G.M. Bilkhia College of Pharmacy
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Practical

Preparation and standardization of

- (1) Sodium hydroxide
- (2) Sulphuric acid
- (3) Sodium thiosulfate
- (4) Potassium permanganate
- (5) Ceric ammonium sulphate

Assay of the following compounds along with Standardization of Titrant

- (1) Ammonium chloride by acid base titration
- (2) Ferrous sulphate by Cerimetry
- (3) Copper sulphate by Iodometry
- (4) Calcium gluconate by complexometry
- (5) Hydrogen peroxide by Permanganometry (6) Sodium benzoate by non-aqueous titration (7) Sodium Chloride by precipitation titration

Determination of Normality by electro-analytical methods

- (1) Conductometric titration of strong acid against strong base
- (2) Conductometric titration of strong acid and weak acid against strong base
- (3) Potentiometric titration of strong acid against strong base

Recommended Books: (Latest Editions):

1. A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press of University of London
2. A.I. Vogel, Text Book of Quantitative Inorganic analysis
3. P. Gundu Rao, Inorganic Pharmaceutical Chemistry
4. Bentley and Driver's Textbook of Pharmaceutical Chemistry
5. John H. Kennedy, Analytical chemistry principles
6. Indian Pharmacopoeia.


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VAPL

GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: I

Subject Name: PHARMACEUTICS-I

Subject Code: BP103TP

Scope: This course is designed to impart a fundamental knowledge on the preparatory pharmacy with arts and science of preparing the different conventional dosage forms.

Objectives: Upon completion of this course the student should be able to:

1. Know the history of profession of pharmacy
2. Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations
3. Understand the professional way of handling the prescription
4. Preparation of various conventional dosage forms

Sr No	Course Contents	Total Hrs
1	Historical background and development of profession of pharmacy: History of profession of Pharmacy in India in relation to pharmacy education, industry and organization, Pharmacy as a career, Pharmacopoeias: Introduction to IP, BP, USP and Extra Pharmacopoeia Dosage forms: Introduction to dosage forms, classification and definitions Prescription: Definition, Parts of prescription, handling of Prescription and Errors in prescription Pesology: Definition, Factors affecting posology. Pediatric dose calculations based on age, body weight and body surface area	10
2	Pharmaceutical calculations: Weights and measures – Imperial & Metric system, Calculations involving percentage solutions, alligation, proof spirit and isotonic solutions based on freezing point and molecular weight Powders: Definition, classification, advantages and disadvantages, Simple & compound powders – official preparations, dusting powders, effervescent, efflorescent and hygroscopic powders, eutectic mixtures. Geometric dilutions Liquid dosage forms: Advantages and disadvantages of liquid dosage forms. Excipients used in formulation of liquid dosage forms. Solubility enhancement techniques	10
3	Monophasic liquids: Definitions and preparations of Gargles, Mouthwashes, Throat Paint, Eardrops, Nasal drops, Enemas, Syrups, Elixirs, Liniments and Lotions. Biphasic liquids: Suspensions: Definition, advantages and disadvantages, classifications, Preparation of suspensions; Flocculated and Deflocculated suspension & stability problems and methods to overcome Emulsions: Definition, classification, emulsifying agent, test for the identification of type of emulsion, Methods of preparation & stability problems and methods to overcome.	8
4	Suppositories: Definition, types, advantages and disadvantages, types of bases, methods of preparations. Displacement value & its calculations, evaluation of suppositories Pharmaceutical incompatibilities: Definition, classification, physical, chemical and therapeutic incompatibilities with examples	8
5	Semisolid dosage forms: Definitions, classification, mechanisms and factors influencing dermal penetration of drugs. Preparation of ointments, pastes, creams and gels. Excipients used in semi solid dosage forms. Evaluation of semi solid dosages forms	7

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Practical

1. Syrups:

- a) Syrup IP'66 b) Compound syrup of Ferrous Phosphate BPC'68

2. Elixirs:

- a) Piperazine citrate elixir b) Paracetamol pediatric elixir

3. Linctus

- a) Terpin Hydrate Linctus IP'66 b) Iodine Throat Paint (Mandles Paint)

4. Solutions:

- a) Strong solution of ammonium acetate b) Cresol with soap solution c) Lagol's solution

5. Suspensions:

- a) Calamine lotion b) Magnesium Hydroxide mixture c) Aluminium Hydroxide gel

6. Emulsions:

- a) Turpentine Liniment b) Liquid paraffin emulsion

7. Powders and Granules

- a) ORS powder (WHO) b) Effervescent granules c) Dusting powder d) Divided powders

8. Suppositories

- a) Glycerol gelatin suppository b) Cocoa butter suppository c) Zinc Oxide suppository

8. Semisolids

- a) Sulphur ointment b) Non staining-iodine ointment with methyl salicylate c) Carbopal gel

9. Gargles and Mouthwashes

- a) Iodine gargle b) Chlorhexidine mouthwash

Recommended Books: (Latest Editions)

1. H.C. Ansel et al., Pharmaceutical Dosage Form and Drug Delivery System, Lippincott Williams and Wilkins, New Delhi.
2. Carter S.J., Cooper and Gunn's-Dispensing for Pharmaceutical Students, CBS publishers, New Delhi.
3. M.E. Aulton, Pharmaceutics, The Science & Dosage Form Design, Churchill Livingstone, Edinburgh.
4. Indian pharmacopoeia.
5. British pharmacopoeia.
6. Lachmann. Theory and Practice of Industrial Pharmacy, Lea & Febiger Publisher, The University of Michigan.
7. Alfonso R. Gennaro Remington. The Science and Practice of Pharmacy, Lippincott Williams, New Delhi.
8. Carter S.J., Cooper and Gunn's Tutorial Pharmacy, CBS Publications, New Delhi.
9. E.A. Rawlins, Bentley's Text Book of Pharmaceutics, English Language Book Society, Elsevier Health Sciences, USA.
10. Isaac Ghebre Sellassie: Pharmaceutical Pelletization Technology, Marcel Dekker, INC, New York.
11. Dilip M. Parikh: Handbook of Pharmaceutical Granulation Technology, Marcel Dekker, INC, New York.
12. Francoise Nieloud and Gilberte Marti-Mestres: Pharmaceutical Emulsions and Suspensions, Marcel Dekker, INC, New York.


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GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: I

Subject Name: PHARMACEUTICAL INORGANIC CHEMISTRY

Subject Code: BP104TP

Scope: This subject deals with the monographs of inorganic drugs and pharmaceuticals

Objectives: Upon completion of course student shall be able to

1. know the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals
2. understand the medicinal and pharmaceutical importance of inorganic compounds

Sr No	Course Contents	Total Hrs
1	<p>Impurities in pharmaceutical substances: History of Pharmacopoeia, Sources and types of impurities, principle involved in the limit test for Chloride, Sulphate, Iron, Arsenic, Lead and Heavy metals, modified limit test for Chloride and Sulphate</p> <p>General methods of preparation, assay for the compounds superscripted with asterisk (*), properties and medicinal uses of inorganic compounds belonging to the following classes</p>	10
2	<p>Acids, Bases and Buffers: Buffer equations and buffer capacity in general, buffers in pharmaceutical systems, preparation, stability, buffered isotonic solutions, measurements of tonicity, calculations and methods of adjusting isotonicity.</p> <p>Major extra and intracellular electrolytes: Functions of major physiological ions, Electrolytes used in the replacement therapy: Sodium chloride*, Potassium chloride, Calcium gluconate* and Oral Rehydration Salt (ORS), Physiological acid base balance.</p> <p>Dental products: Dentifrices, role of fluoride in the treatment of dental caries, Desensitizing agents, Calcium carbonate, Sodium fluoride, and Zinc eugenol cement</p>	10
3	<p>Gastrointestinal agents</p> <p>Acidifiers: Ammonium chloride* and Dil. HCl</p> <p>Antacid: Ideal properties of antacids, combinations of antacids, Sodium Bicarbonate*, Aluminum hydroxide gel, Magnesium hydroxide mixture</p> <p>Cathartics: Magnesium sulphate, Sodium orthophosphate, Kaolin and Bentonite</p> <p>Antimicrobials: Mechanism, classification, Potassium permanganate, Boric acid, Hydrogen peroxide*, Chlorinated lime*, Iodine and its preparations</p>	10
4	<p>Miscellaneous compounds</p> <p>Expectorants: Potassium iodide, Ammonium chloride*,</p> <p>Emetics: Copper sulphate*, Sodium potassium tartarate</p> <p>Haematinics: Ferrous sulphate*, Ferrous gluconate</p> <p>Poison and Antidote: Sodium thiosulphate*, Activated charcoal, Sodium nitrite³³³</p> <p>Astringents: Zinc Sulphate, Potash Alum</p>	8
5	<p>Radiopharmaceuticals: Radio activity, Measurement of radioactivity, Properties of α, β, γ radiations, Half life, radio isotopes and study of radio isotopes - Sodium iodide I131, Storage conditions, precautions & pharmaceutical application of radioactive substances.</p>	7

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Practical

I Limit tests for following ions

Limit test for Chlorides and Sulphates
Modified limit test for Chlorides and Sulphates
Limit test for Iron
Limit test for Heavy metals
Limit test for Lead
Limit test for Arsenic

II Identification test Magnesium hydroxide Ferrous sulphate Sodium bicarbonate Calcium gluconate
Copper sulphate

III Test for purity

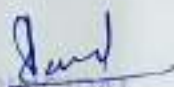
Swelling power of Bentonite
Neutralizing capacity of aluminum hydroxide gel
Determination of potassium iodate and iodine in potassium iodide

IV Preparation of inorganic pharmaceuticals

Boric acid Potash alum Ferrous sulphate

Recommended Books (Latest Editions)

1. A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlose Press of University of London, 4th edition.
2. A.I. Vogel, Text Book of Quantitative Inorganic analysis
3. P. Gundu Rao, Inorganic Pharmaceutical Chemistry, 3rd Edition
4. M.L. Schroff, Inorganic Pharmaceutical Chemistry
5. Bentley and Driver's Textbook of Pharmaceutical Chemistry
6. Anand & Chatwal, Inorganic Pharmaceutical Chemistry
7. Indian Pharmacopoeia


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GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm

SEMESTER: I

Subject Name: COMMUNICATION SKILLS

Subject Code: BP105TP

Scope: This course will prepare the young pharmacy student to interact effectively with doctors, nurses, dentists, physiotherapists and other health workers. At the end of this course the student will get the soft skills set to work cohesively with the team as a team player and will add value to the pharmaceutical business.

Objectives:

Upon completion of the course the student shall be able to

1. Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation
2. Communicate effectively (Verbal and Non Verbal)
3. Effectively manage the team as a team player
4. Develop interview skills
5. Develop Leadership qualities and essentials

Sr No	Course Contents	Total Hrs
1	Communication Skills: Introduction, Definition, The Importance of Communication, The Communication Process – Source, Message, Encoding, Channel, Decoding, Receiver, Feedback, Context Barriers to communication: Physiological Barriers, Physical Barriers, Cultural Barriers, Language Barriers, Gender Barriers, Interpersonal Barriers, Psychological Barriers, Emotional barriers Perspectives in Communication: Introduction, Visual Perception, Language, Other factors affecting our perspective - Past Experiences, Prejudices, Feelings, Environment	7
2	Elements of Communication: Introduction, Face to Face Communication - Tone of Voice, Body Language (Non-verbal communication), Verbal Communication, Physical Communication Communication Styles: Introduction, The Communication Styles Matrix with example for each -Direct Communication Style, Spirited Communication Style, Systematic Communication Style, Considerate Communication Style	7
3	Basic Listening Skills: Introduction, Self-Awareness, Active Listening, Becoming an Active Listener, Listening in Difficult Situations Effective Written Communication: Introduction, When and When Not to Use Written Communication - Complexity of the Topic, Amount of Discussion Required, Shades of Meaning, Formal Communication Writing Effectively: Subject Lines, Put the Main Point First, Know Your Audience, Organization of the Message	7
4	Interview Skills: Purpose of an interview, Do's and Don't's of an interview Giving Presentations: Dealing with Fears, Planning your Presentation, Structuring Your Presentation, Delivering Your Presentation, Techniques of Delivery	5
5	Group Discussion: Introduction, Communication skills in group discussion, Do's and Don't's of group discussion	4


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Practical

The following learning modules are to be conducted using Any Software English language lab software

Basic communication covering the following topics

Meeting People
Asking Questions
Making Friends
What did you do?
Do's and Don't's

Pronunciations covering the following topics

Pronunciation (Consonant Sounds)
Pronunciation and Nouns
Pronunciation (Vowel Sounds)

Advanced Learning

Listening Comprehension / Direct and Indirect Speech
Figures of Speech
Effective Communication
Writing Skills
Effective Writing
Interview Handling Skills
E-Mail etiquette
Presentation Skills

Recommended Books: (Latest Edition)

1. Basic communication skills for Technology, Andreja. J. Ruther Ford, 2nd Edition, Pearson Education, 2011
2. Communication skills, Sanjay Kumar, Pushpalata, 1st Edition, Oxford Press, 2011
3. Organizational Behaviour, Stephen .P. Robbins, 1st Edition, Pearson, 2013
4. Brilliant- Communication skills, Gill Hasson, 1st Edition, Pearson Life, 2011
5. The Ace of Soft Skills: Attitude, Communication and Etiquette for success, Gopala Swamy Ramesh, 5th Edition, Pearson, 2013
6. Developing your influencing skills, Deborah Dalley, Lois Burton, Margaret, Green hall, 1st Edition Universe of Learning LTD, 2010
7. Communication skills for professionals, Konar nira, 2nd Edition, New arrivals - PHIL 2011
8. Personality development and soft skills, Barun K. Mitra, 1st Edition, Oxford Press, 2011
9. Soft skill for everyone, Butter Field, 1st Edition, Cengage Learning india pvt ltd, 2011
10. Soft skills and professional communication, Francis Peters SJ, 1st Edition, Mc Graw Hill Education, 2011
11. Effective communication, John Adair, 4th Edition, Pan Mac Millan, 2009
12. Bringing out the best in people, Aubrey Daniels, 2nd Edition, Mc Graw Hill, 1999


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GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm

SEMESTER: I

Subject Name: REMEDIAL BIOLOGY Subject Code: BP106TP

Scope: To learn and understand the components of living world, structure and functional system of plant and animal kingdom

Objectives: Upon completion of the course, the student shall be able to

1. know the classification and salient features of five kingdoms of life
2. understand the basic components of anatomy & physiology of plant
3. know understand the basic components of anatomy & physiology animal with special reference to human

Sr No	Course Contents	Total Hrs
1	<p>Living world: Definition and characters of living organisms Diversity in the living world Binomial nomenclature Five kingdoms of life and basis of classification. Salient features of Monera, Protista, Fungi, Animalia and Plantae, Virus, Morphology of Flowering plants Morphology of different parts of flowering plants – Root, stem, inflorescence, flower, leaf, fruit, seed. General Anatomy of Root, stem, leaf of monocotyledons & Dicotyledones</p>	7
2	<p>Body fluids and circulation Composition of blood, blood groups, coagulation of blood Composition and functions of lymph Human circulatory system Structure of human heart and blood vessels Cardiac cycle, cardiac output and ECG Digestion and Absorption Human alimentary canal and digestive glands Role of digestive enzymes Digestion, absorption and assimilation of digested food Breathing and respiration Human respiratory system Mechanism of breathing and its regulation Exchange of gases, transport of gases and regulation of respiration Respiratory volumes</p>	7
3	<p>Excretory products and their elimination Modes of excretion Human excretory system- structure and function Urine formation Renin-angiotensin system Neural control and coordination Definition and classification of nervous system Structure of a neuron Generation and conduction of nerve impulse Structure of brain and spinal cord Functions of cerebrum, cerebellum, hypothalamus and medulla oblongata Chemical coordination and regulation Endocrine glands and their secretions Functions of hormones secreted by endocrine glands Human reproduction Parts of female reproductive system</p>	7

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	Parts of male reproductive system Spermatogenesis and Oogenesis Menstrual cycle	
4	Plants and mineral nutrition: Essential mineral, macro and micronutrients Nitrogen metabolism, Nitrogen cycle, biological nitrogen fixation Photosynthesis Autotrophic nutrition, photosynthesis, Photosynthetic pigments, Factors affecting photosynthesis.	5
5	Plant respiration: Respiration, glycolysis, fermentation (anaerobic). Plant growth and development Phases and rate of plant growth, Condition of growth, Introduction to plant growth regulators Cell - The unit of life Structure and functions of cell and cell organelles. Cell division Tissues Definition, types of tissues, location and functions.	4

Text Books

- Text book of Biology by S. B. Gokhale
- A Text book of Biology by Dr. Thulajappa and Dr. Seetaram.

Reference Books

- A Text book of Biology by B.V. Sreenivasa Naidu
- A Text book of Biology by Naidu and Murthy
- Botany for Degree students By A.C.Dutta.
- Outlines of Zoology by M. Ekambaranatha ayyer and T. N. Ananthakrishnan.
- A manual for pharmaceutical biology practical by S.B. Gokhale and C. K. Kokate

Practical

- Introduction to experiments in biology a) Study of Microscope b) Section cutting techniques c) Mounting and staining d) Permanent slide preparation
- Study of cell and its inclusions
- Study of Stem, Root, Leaf, seed, fruit, flower and their modifications
- Detailed study of frog by using computer models
- Microscopic study and identification of tissues pertinent to Stem, Root Leaf, seed, fruit and flower
- Identification of bones
- Determination of blood group
- Determination of blood pressure
- Determination of tidal volume

Reference Books

- Practical human anatomy and physiology. by S.R.Kale and R.R.Kale.
- A Manual of pharmaceutical biology practical by S.B.Gokhale, C.K.Kokate and S.P.Shriwastava.
- Biology practical manual according to National core curriculum .Biology forum of Karnataka. Prof .M.J.H.Shafi


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SRI Q M. Bhatkole College of Pharmacy
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GUJARAT TECHNOLOGICAL UNIVERSITY

**B.Pharm
SEMESTER: I**

Subject Name: REMEDIAL MATHEMATICS

Subject Code: BP107TT

Scope: This is an introductory course in mathematics. This subject deals with the introduction to Partial fraction, Logarithm, matrices and Determinant, Analytical geometry, Calculus, differential equation and Laplace transform

Objectives: Upon completion of the course the student shall be able to:-

1. Know the theory and their application in Pharmacy
2. Solve the different types of problems by applying theory
3. Appreciate the important application of mathematics in Pharmacy

Sr No	Course Contents	Total Hrs
1	<p>Partial fraction Introduction, Polynomial, Rational fractions, Proper and Improper fractions, Partial fraction, Resolving into Partial fraction, Application of Partial Fraction in Chemical Kinetics and Pharmacokinetics</p> <p>Logarithms Introduction, Definition, Theorems/Properties of logarithms, Common logarithms, Characteristic and Mantissa, worked examples, application of logarithm to solve pharmaceutical problems</p> <p>Function: Real Valued function, Classification of real valued functions.</p> <p>Limits and continuity: Introduction, Limit of a function, Definition of limit of a function ($\epsilon - \delta$ definition) . $\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a} = na^{n-1}$. $\lim_{\theta \rightarrow 0} \frac{\sin \theta}{\theta} = 1$.</p>	6
2	<p>Matrices and Determinant: Introduction matrices, Types of matrices, Operation on matrices, Transpose of a matrix, Matrix Multiplication, Determinants, Properties of determinants, Product of determinants, Minors and co-Factors, Adjoint or adjugate of a square matrix, Singular and non-singular matrices, Inverse of a matrix, Solution of system of linear of equations using matrix method, Cramer's rule, Characteristic equation and roots of a square matrix, Cayley-Hamilton theorem, Application of Matrices in solving Pharmacokinetic equations</p>	6
3	<p>Calculus: Differentiation: Introductions, Derivative of a function, Derivative of a constant, Derivative of a product of a constant and a function, Derivative of the sum or difference of two functions, Derivative of the product of two functions (product formula), Derivative of the quotient of two functions (Quotient formula) – Without Proof, Derivative of x^n w.r.t x, where n is any rational number, Derivative of e^x, Derivative of $\log_e x$, Derivative of $\sin x$, Derivative of trigonometric functions from first principles (without Proof), Successive Differentiation, Conditions for a function to be a maximum or a minimum at a point. Application</p>	6
4	<p>Analytical Geometry Introduction: Signs of the Coordinates, Distance formula, Straight Line: Slope or gradient of a straight line, Conditions for parallelism and perpendicularity of two lines, Slope of a line joining two points, Slope – intercept form of a straight line Integration: Introduction, Definition, Standard formulae, Rules of integration, Method of</p>	6

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	substitution, Method of Partial fractions, Integration by parts, definite integrals, application	
5	Differential Equations : Some basic definitions, Order and degree, Equations in separable form , Homogeneous equations, Linear Differential equations, Exact equations, Application in solving Pharmacokinetic equations Laplace Transform : Introduction, Definition, Properties of Laplace transform, Laplace Transforms of elementary functions, Inverse Laplace transforms, Laplace transform of derivatives, Application to solve Linear differential equations, Application in solving Chemical kinetics and Pharmacokinetics equations	6

Recommended Books (Latest Edition)

1. Differential Calculus by Shanthinarayan
2. Pharmaceutical Mathematics with application to Pharmacy by Panchaksharappa Gowda D.H.
3. Integral Calculus by Shanthinarayan
4. Higher Engineering Mathematics by Dr.B.S.Grewal

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GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: II

Subject Name: Human Anatomy and Physiology II

Subject Code: BP201TP

Scope: This subject is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms. The subject provides the basic knowledge required to understand the various disciplines of pharmacy

Objectives: Upon completion of the course student shall be able to

1. Explain the gross morphology, structure and functions of various organs of the human body.
2. Describe the various homeostatic mechanisms and their imbalances.
3. Identify the various tissues and organs of different systems of human body.
4. Perform the hematological tests like blood cell counts, haemoglobin estimation, bleeding/clotting time etc and also record blood pressure, heart rate, pulse and respiratory volume.
5. Appreciate coordinated working pattern of different organs of each system
6. Appreciate the interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body.

Sr No	Topics	% weightage
1.	Nervous system: Organization of nervous system, neuron, neuroglia, classification and properties of nerve fibre, electrophysiology, action potential, nerve impulse, receptors, synapse, neurotransmitters Central nervous system: Meninges, ventricles of brain and cerebrospinal fluid, structure and functions of brain (cerebrum, brain stem, cerebellum), spinal cord (gross structure, functions of afferent and efferent nerve tracts, reflex activity)	10
2.	Digestive system Anatomy of GI Tract with special reference to anatomy and functions of stomach, (Acid production in the stomach, regulation of acid production through parasympathetic nervous system, pepsin role in protein digestion) small intestine and large intestine, anatomy and functions of salivary glands, pancreas and liver, movements of GIT, digestion and absorption of nutrients and disorders of GIT Energetics: Formation and role of ATP, Creatinine Phosphate and BMR.	6
3.	Respiratory system Anatomy of respiratory system with special reference to anatomy of lungs, mechanism of respiration, regulation of respiration Lung Volumes and capacities transport of respiratory gases, artificial respiration, and resuscitation methods Urinary system Anatomy of urinary tract with special reference to anatomy of kidney and nephrons, functions of kidney and urinary tract, physiology of urine	10


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	formation, micturition reflex and role of kidneys in acid base balance, role of RAS in kidney and disorders of kidney	
4.	Endocrine system Classification of hormones, mechanism of hormone action, structure and functions of pituitary gland, thyroid gland, parathyroid gland, adrenal gland, pancreas, pineal gland, thymus and their disorders.	10
5.	Reproductive system Anatomy of male and female reproductive system, Functions of male and female reproductive system, sex hormones, physiology of menstruation, fertilization, spermatogenesis, oogenesis, pregnancy and parturition. Introduction to genetics Chromosomes, genes and DNA, protein synthesis, genetic pattern of inheritance	9

Practical

Practical physiology is complimentary to the theoretical discussions in physiology. Practicals allow the verification of physiological processes discussed in theory classes through experiments on living tissue, intact animals or normal human beings. This is helpful for developing an insight on the subject.

1. To study the integumentary and special senses using specimen, models, etc.,
2. To study the nervous system using specimen, models, etc.,
3. To study the endocrine system using specimen, models, etc
4. To demonstrate the general neurological examination
5. To demonstrate the function of olfactory nerve
6. To examine the different types of taste.
7. To demonstrate the visual acuity
8. To demonstrate the reflex activity
9. Recording of body temperature
10. To demonstrate positive and negative feedback mechanism
11. Determination of tidal volume and vital capacity
12. Study of digestive, respiratory, cardiovascular systems, urinary and reproductive systems with the help of models, charts and specimens
13. Recording of basal mass index
14. Study of family planning devices and pregnancy diagnosis test
15. Demonstration of total blood count by cell analyser
16. Permanent slides of vital organs and gonads

Recommended Books (Latest Editions)

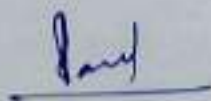
1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam, Jaypee brothers medical publishers, New Delhi
2. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York
3. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co, Riverview, MI USA
4. Text book of Medical Physiology- Arthur C. Guyton and John E. Hall. Miamisburg, OH, U.S.A
5. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A


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6. Textbook of Human Histology by Inderbir Singh, Jaypee brothers medical publishers, New Delhi
7. Textbook of Practical Physiology by C.L. Ghai, Jaypee brothers medical publishers, New Delhi
8. Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi

Reference Books:

1. Physiological basis of Medical Practice-Beat and Tailor. Williams & Wilkins Co, Riverview, MI USA
2. Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. Miamisburg, OH, U.S.A
3. Human Physiology (vol 1 and 2) by Dr. C.C. Chatterje ,Academic Publishers Kolkat



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GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: II

Subject Name: Pharmaceutical Organic Chemistry I
Subject Code: BP202TP

Scope: This subject deals with classification and nomenclature of simple organic compounds, structural isomerism, intermediates forming in reactions, important physical properties, reactions and methods of preparation of these compounds. The syllabus also emphasizes on mechanisms and orientation of reactions.

Objectives: Upon completion of the course the student shall be able to

1. write the structure, name and the type of isomerism of the organic compound
2. write the reaction, name the reaction and orientation of reactions
3. account for reactivity/stability of compounds
4. identify/confirm the identification of organic compound

Course Content:

General methods of preparation and reactions of compounds superscripted with asterisk (*) to be explained

To emphasize on definition, types, classification, principles/mechanisms, applications, examples and differences

Sr No	Topics	% weightage
1.	Classification, nomenclature and isomerism: Classification of Organic Compounds Common and IUPAC systems of nomenclature of organic compounds (up to 10 Carbons open chain and carbocyclic compounds) Structural isomerisms in organic compounds	7
2.	Alkanes*, Alkenes* and Conjugated dienes*: SP hybridization in alkanes, Halogenation of alkanes, uses of paraffins, Stabilities of alkenes, SP hybridization in alkenes, E ₁ and E ₂ reactions – kinetics, order of reactivity of alkyl halides, rearrangement of carbocations, Saytzeff's orientation and evidences. E ₁ versus E ₂ reactions. Factors affecting E ₁ and E ₂ reactions. Ozonolysis, electrophilic addition reactions of alkenes, Markownikoff's orientation, free radical addition reactions of alkenes, Anti Markownikoff's orientation. Stability of conjugated dienes, Diel-Alder, electrophilic addition, free radical addition reactions of conjugated dienes, allylic rearrangement	10
3.	Alkyl halides*: SN ₁ and SN ₂ reactions - kinetics, order of reactivity of alkyl halides, stereochemistry and rearrangement of carbocations SN ₁ versus SN ₂ reactions, Factors affecting SN ₁ and SN ₂ reactions Structure and uses of ethylchloride, Chloroform, trichloroethylene, tetrachloroethylene, dichloromethane, tetrachloromethane and iodoform Alcohols*: Qualitative tests, Structure and uses of Ethyl alcohol, Methyl alcohol, chlorobutanol, Cetosteryl alcohol, Benzyl alcohol, Glycerol, Propylene glycol	10
4.	Carbonyl compounds* (Aldehydes and ketones): Nucleophilic addition, Electromeric effect, aldol condensation, Crossed Aldol condensation, Cannizzaro reaction, Crossed Cannizzaro reaction, Benzoin condensation, Perkin condensation/ qualitative tests, Structure and uses of Formaldehyde,	10

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	Paraldehyde, Acetone, Chloral hydrate, Hexamine, Benzaldehyde, Vanillin, Cinnamaldehyde	
5.	Carboxylic acids* : Acidity of carboxylic acids, effect of substituents on acidity, inductive effect and qualitative tests for carboxylic acids, amide and ester Structure and Uses of Acetic acid, Lactic acid, Tartaric acid, Citric acid, Succinic acid, Oxalic acid, Salicylic acid, Benzoic acid, Benzyl benzoate, Dimethyl phthalate, Methyl salicylate and Acetyl salicylic acid Aliphatic amines* - Basicity, effect of substituent on Basicity, Qualitative test, Structure and uses of Ethanolamine, Ethylenediamine, Amphetamine	8

Systematic qualitative analysis of unknown organic compounds like:

1. Preliminary test: Color, odour, aliphatic/aromatic compounds, saturation and unsaturation, etc
2. Detection of elements like Nitrogen, Sulphur and Halogen by Lassaigne's test
3. Solubility test
4. Functional group test like Phenols, Amides/ Urea, Carbohydrates, Amines, Carboxylic acids, Aldehydes and Ketones, Alcohols, Esters, Aromatic and Halogenated Hydrocarbons, Nitro compounds and Anilides
5. Melting point/Boiling point of organic compounds
6. Identification of the unknown compound from the literature using melting point/ boiling point
7. Preparation of the derivatives and confirmation of the unknown compound by melting point/ boiling point
8. Minimum 5 unknown organic compounds to be analysed systematically
9. Preparation of suitable solid derivatives from organic compounds
10. Construction of molecular models

Recommended Books (Latest Editions)

1. Organic Chemistry by Morrison and Boyd
2. Organic Chemistry by I.L. Finar, Volume-I
3. Textbook of Organic Chemistry by B.S. Bahl & Arun Bahl.
4. Organic Chemistry by P L.Soni
5. Practical Organic Chemistry by Mann and Saunders.
6. Vogel's text book of Practical Organic Chemistry
7. Advanced Practical organic chemistry by N.K.Vishnoi.
8. Introduction to Organic Laboratory techniques by Pavia, Lampman and Kriz.
9. Reaction and reaction mechanism by Ahluwalia/Chatwal.


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GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: II

Subject Name: Pharmaceutical Engineering
Subject Code: BP203TP

Scope: This course is designed to impart a fundamental knowledge on the art and science of various unit operations used in pharmaceutical industry.

Objectives: Upon completion of the course the student shall be able to

1. To know various unit operations used in Pharmaceutical industries.
2. To understand the material handling techniques.
3. To perform various processes involved in pharmaceutical manufacturing process.
4. To carry out various test to prevent environmental pollution.
5. To appreciate and comprehend significance of plant lay out design for optimum use of resources.
6. To appreciate the various preventive methods used for corrosion control in Pharmaceutical industries

Sr No	Topics	% weightage
1.	Flow of fluids: Types of manometers, Reynolds number and its significance, Bernoulli's theorem and its applications, Energy losses, Orifice meter, Venturimeter, Pitot tube and Rotometer. Size Reduction: Objectives, Mechanisms & Laws governing size reduction, factors affecting size reduction, principles, construction, working, uses, merits and demerits of Hammer mill, ball mill, fluid energy mill, Edge runner mill & end runner mill. Size Separation: Objectives, applications & mechanism of size separation, official standards of powders, sieves, size separation Principles, construction, working, uses, merits and demerits of Sieve shaker, cyclone separator, Air separator, Bag filter & elutriation tank	10
2.	Heat Transfer: Objectives, applications & Heat transfer mechanisms. Fourier's law, Heat transfer by conduction, convection & radiation. Heat interchangers & heat exchangers. Evaporation: Objectives, applications and factors influencing evaporation, differences between evaporation and other heat process. principles, construction, working, uses, merits and demerits of Steam jacketed kettle, horizontal tube evaporator, climbing film evaporator, forced circulation evaporator, multiple effect evaporator & Economy of multiple effect evaporator Distillation: Basic Principles and methodology of simple distillation, flash distillation, fractional distillation, distillation under reduced pressure, steam distillation & molecular distillation	10
3.	Drying: Objectives, applications & mechanism of drying process, measurements & applications of Equilibrium Moisture content, rate of drying curve. principles, construction, working, uses, merits and demerits of Tray dryer, drum dryer spray dryer, fluidized bed dryer, vacuum dryer, freeze dryer Mixing: Objectives, applications & factors affecting mixing, Difference between solid and liquid mixing, mechanism of solid mixing, liquids mixing and semisolids mixing. Principles, Construction, Working, uses, Merits and Demerits of Double cone blender, twin shell blender, ribbon	8


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	blender, Sigma blade mixer, planetary mixers, Propellers, Turbines, Paddles & Silverson Emulsifier	
4.	Filtration: Objectives, applications, Theories & Factors influencing filtration, filter aids, filter medias, Principle, Construction, Working, Uses, Merits and demerits of plate & frame filter, filter leaf, rotary drum filter, Meta filter & Cartridge filter, membrane filters and Seidtz filter Centrifugation: Objectives, principle & applications of Centrifugation, principles, construction, working, uses, merits and demerits of Perforated basket centrifuge, Non-perforated basket centrifuge, semi continuous centrifuge & super centrifuge.	8
5.	Materials of pharmaceutical plant construction, Corrosion and its prevention: Factors affecting during materials selected for Pharmaceutical plant construction, Theories of corrosion, types of corrosion and there prevention, Ferrous and nonferrous metals, inorganic and organic non metals, basic of material handling systems.	7

Recommended Books (Latest Editions)

1. Introduction to chemical engineering – Walter L Badger & Julius Banchemo, Latest edition.
2. Solid phase extraction, Principles, techniques and applications by Nigel J.K. Simpson-Latest edition.
3. Unit operation of chemical engineering – McCabe Smith, Latest edition.
4. Pharmaceutical engineering principles and practices – C.V.S Subrahmanyam et al., Latest edition.
5. Remington practice of pharmacy- Martin, Latest edition.
6. Theory and practice of industrial pharmacy by Lachmann., Latest edition.
7. Physical pharmaceutics- C.V.S Subrahmanyam et al., Latest edition.
8. Cooper and Gunn's Tutorial pharmacy, S.J. Carter, Latest edition

Practical:

1. Determination of radiation constant of brass, iron, unpainted and painted glass
2. Steam distillation – To calculate the efficiency of steam distillation.
3. To determine the overall heat transfer coefficient by heat exchanger
4. Construction of drying curves (for calcium carbonate and starch).
5. Determination of moisture content and loss on drying.
6. Determination of humidity of air – i) From wet and dry bulb temperatures –use of Dew point method
7. Description of Construction working and application of Pharmaceutical Machinery such as rotary tablet machine, fluidized bed coater, fluid energy mill, de humidifier
8. Size analysis by sieving – To evaluate size distribution of tablet granulations – Construction of various size frequency curves including arithmetic and logarithmic probability plots
9. Size reduction: To verify the laws of size reduction using ball mill and determining Kicks, Rittinger's, Bond's coefficients, power requirement and critical speed of Ball Mill
10. Demonstration of colloid mill, planetary mixer, fluidized bed dryer, freeze dryer and such other major equipment
11. Factors affecting Rate of Filtration and Evaporation (Surface area, Concentration and Thickness/viscosity)
12. To study the effect of time on the Rate of Crystallization.
13. To calculate the uniformity Index for given sample by using Double Cone Blender


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GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: II

Subject Name: Computer Applications in Pharmacy
Subject Code: BP204TP

Scope: This subject deals with the introduction Database, Database Management system, computer application in clinical studies and use of databases.

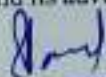
Objectives: Upon completion of the course the student shall be able to

1. know the various types of application of computers in pharmacy
2. know the various types of databases
3. know the various applications of databases in pharmacy

Sr.No	Topics	% weightage
1.	Number system: Binary number system, Decimal number system, Octal number system, Hexadecimal number systems, conversion decimal to binary, binary to decimal, octal to binary etc, binary addition, binary subtraction – One's complement, Two's complement method, binary multiplication, binary division Concept of Information Systems and Software : Information gathering, requirement and feasibility analysis, data flow diagrams, process specifications, input/output design, process life cycle, planning and managing the project	6
2.	Web technologies: Introduction to HTML, XML, CSS and Programming languages, introduction to web servers and Server Products. Introduction to databases, MYSQL, MS ACCESS, Pharmacy Drug database	6
3.	Application of computers in Pharmacy – Drug information storage and retrieval, Pharmacokinetics, Mathematical model in Drug design, Hospital and Clinical Pharmacy, Electronic Prescribing and discharge (EP) systems, barcode medicine identification and automated dispensing of drugs, mobile technology and adherence monitoring Diagnostic System, Lab-diagnostic System, Patient Monitoring System, Pharma Information System	6
4.	Bioinformatics: Introduction, Objective of Bioinformatics, Bioinformatics Databases, Concept of Bioinformatics, Impact of Bioinformatics in Vaccine Discovery	6
5.	Computers as data analysis in Preclinical development: Chromatographic data analysis(CDS), Laboratory Information management System (LIMS) and Text Information Management System(TIMs)	6

Practical List:

1. Design a questionnaire using a word processing package to gather information about a particular disease.
2. Create a HTML web page to show personal information.
3. Retrieve the information of a drug and its adverse effects using online tools



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4. Creating mailing labels Using Label Wizard , generating label in MS WORD
5. Create a database in MS Access to store the patient information with the required fields Using access
6. Design a form in MS Access to view, add, delete and modify the patient record in the database
7. Generating report and printing the report from patient database
8. Creating invoice table using – MS Access
9. Drug information storage and retrieval using MS Access
10. Creating and working with queries in MS Access
11. Exporting Tables, Queries, Forms and Reports to web pages
12. Exporting Tables, Queries, Forms and Reports to XML pages

Recommended Books (Latest Editions)

1. Computer Application in Pharmacy – William E.Fassett –Lea and Febiger, 600 South Washington Square, USA, (215) 922-1330.
2. Computer Application in Pharmaceutical Research and Development –Sean Ekins – Wiley-Interscience, A John Willey and Sons, INC., Publication, USA
3. Bioinformatics (Concept, Skills and Applications) – S.C.Rastogi-CBS Publishers and Distributors, 4596/1- A, 11 Darya Gani, New Delhi – 110 002(INDIA)
4. Microsoft office Access - 2003, Application Development Using VBA, SQL Server, DAP and Infopath – Cary N.Prague – Wiley Dreamtech India (P) Ltd., 4435/7, Ansari Road, Daryagani, New Delhi - 110002

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B.Pharm
SEMESTER: II

Subject Name: Environmental Sciences
Subject Code: BP205TT

Scope: Environmental Sciences is the scientific study of the environmental system and the status of its inherent or induced changes on organisms. It includes not only the study of physical and biological characters of the environment but also the social and cultural factors and the impact of man on environment.

Objectives: Upon completion of the course the student shall be able to

1. Create the awareness about environmental problems among learners.
2. Impart basic knowledge about the environment and its allied problems.
3. Develop an attitude of concern for the environment.
4. Motivate learner to participate in environment protection and environment improvement.
5. Acquire skills to help the concerned individuals in identifying and solving environmental problems.
6. Strive to attain harmony with Nature

Sr No	Topics	% weightage
1.	The Multidisciplinary nature of environmental studies Natural Resources Renewable and non-renewable resources: Natural resources and associated problems Forest resources; b) Water resources; c) Mineral resources; d) Food resources; e) Energy resources; f) Land resources: Role of an individual in conservation of natural resources	10
2.	Ecosystems: Concept of an ecosystem. Structure and function of an ecosystem. Introduction, types, characteristic features, structure and function of the ecosystems: Forest ecosystem; Grassland ecosystem; Desert ecosystem; Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)	10
3.	Environmental Pollution: Air pollution; Water pollution; Soil pollution	10

Recommended Books (Latest Editions)

1. Y.K. Sing, Environmental Science, New Age International Pvt, Publishers, Bangalore
2. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
3. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad - 380 013, India,
4. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
5. Clark R.S., Marine Pollution, Clarendon Press Oxford
6. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p
7. De A.K., Environmental Chemistry, Wiley Eastern Ltd.
8. Down of Earth, Centre for Science and Environment



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GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: III

Subject Name: Pharmaceutical Organic Chemistry II
Subject Code: BP301TP

Scope: This subject deals with general methods of preparation and reactions of some organic compounds. Reactivity of organic compounds are also studied here. The syllabus emphasizes on mechanisms and orientation of reactions. Chemistry of fats and oils are also included in the syllabus.

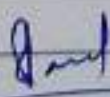
Objectives: Upon completion of the course the student shall be able to

1. Write the structure, name and the type of isomerism of the organic compound
2. Write the reaction, name the reaction and orientation of reactions
3. Account for reactivity/stability of compounds.
4. Prepare organic compounds

Course Content:

General methods of preparation and reactions of compounds superscripted with asterisk (*) to be explained To emphasize on definition, types, classification, principles/mechanisms, applications, examples and differences

Sr No	Topics	% weightage
1.	Benzene and its derivatives: <ul style="list-style-type: none">• Analytical, synthetic and other evidences in the derivation of structure of benzene, Orbital picture, resonance in benzene, aromatic characters, Huckel's rule• Reactions of benzene - nitration, sulphonation, halogenation- reactivity, Friedelcrafts alkylation- reactivity, limitations, Friedelcrafts acylation.• Substituents, effect of substituents on reactivity and orientation of mono substituted benzene compounds towards electrophilic substitution reaction• Structure and uses of DDT, Saccharin, BHC and Chloramine	10
2.	Phenols*: Acidity of phenols, effect of substituents on acidity, qualitative tests, Structure and uses of phenol, cresols, resorcinol, naphthols Aromatic Amines*: Basicity of amines, effect of substituents on basicity, and synthetic uses of aryl diazonium salts Aromatic Acids*: Acidity, effect of substituents on acidity and important reactions of benzoic acid.	10
3.	Fats and Oils: <ul style="list-style-type: none">• Fatty acids - reactions.• Hydrolysis, Hydrogenation, Saponification and Rancidity of oils, Drying oils.• Analytical constants - Acid value, Saponification value, Ester value, Iodine value, Acetyl value, Reichert Meissl (RM) value - significance and principle involved in their determination.	10
4.	Polynuclear hydrocarbons:	8


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	<ul style="list-style-type: none"> Synthesis, reactions Structure and medicinal uses of Naphthalene, Phenanthrene, Anthracene, Diphenylmethane, Triphenylmethane and their derivatives 	
5.	Cyclo alkanes*: <ul style="list-style-type: none"> Stabilities – Baeyer's strain theory, limitation of Baeyer's strain theory, Coulson and Moffitt's modification, Sachse Mohr's theory (Theory of strainless rings), reactions of cyclopropane and cyclobutane only 	7

Practical

Experiments involving laboratory techniques

- Recrystallization
- Steam distillation

Determination of following oil values (including standardization of reagents)

- Acid value
- Saponification value
- Iodine value

Preparation of compounds

- Benzamide/Phenyl benzoate/Acetanilide from Aniline/ Phenol /Aniline by acylation reaction.
- 2,4,6-Tribromo aniline/Para benzo acetanilide from Aniline/
- Acetanilide by halogenation (Bromination) reaction.
- 5-Nitro salicylic acid/Meta di nitro benzene from Salicylic acid / Nitro benzene by nitration reaction
- Benzoic acid from Benzyl chloride by oxidation reaction.
- Benzoic acid/ Salicylic acid from alkyl benzoate/ alkyl salicylate by hydrolysis reaction.
- 1-Phenyl azo-2-naphol from Aniline by diazotization and coupling reactions.
- Benzil from Benzoin by oxidation reaction.
- Dibenzal acetone from Benzaldehyde by Claisen Schmidt reaction
- Cinnamic acid from Benzaldehyde by Perkin reaction
- p-Iodo benzoic acid from p-amino benzoic acid

Recommended Books (Latest Editions)

- Organic Chemistry by Morrison and Boyd
- Organic Chemistry by I.L. Finar, Volume-I
- Textbook of Organic Chemistry by B.S. Bahl & Arun Bahl.
- Organic Chemistry by P.L.Soni
- Practical Organic Chemistry by Mann and Saunders.
- Vogel's text book of Practical Organic Chemistry
- Advanced Practical organic chemistry by N.K.Vishnoi.
- Introduction to Organic Laboratory techniques by Pavia, Lampman and Kriz.

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B.Pharm
SEMESTER: III

Subject Name: PHYSICAL PHARMACEUTICS-I

Subject Code: BP302TP

Scope: The course deals with the various physical and physicochemical properties, and principles involved in dosage forms/formulations. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms.

Objectives: Upon the completion of the course student shall be able to

1. Understand various physicochemical properties of drug molecules in the designing the dosage forms
2. Know the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations
3. Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.

Sr No	Topics	% weightage
1.	Solubility of drugs: Solubility expressions, mechanisms of solute solvent interactions, ideal solubility parameters, solvation & association, quantitative approach to the factors influencing solubility of drugs, diffusion principles in biological systems. Solubility of gas in liquids, solubility of liquids in liquids, (Binary solutions, ideal solutions) Raoult's law, real solutions. Partially miscible liquids, Critical solution temperature and applications. Distribution law, its limitations and applications	10
2.	States of Matter and properties of matter: State of matter, changes in the state of matter, latent heats, vapour pressure, sublimation critical point, eutectic mixtures, gases, aerosols- inhalers, relative humidity, liquid complexes, liquid crystals, glassy states, solid-crystalline, amorphous & polymorphism. Physicochemical properties of drug molecules: Refractive index, optical rotation, dielectric constant, dipole moment, dissociation constant, determinations and applications	10
3.	Surface and interfacial phenomenon: Liquid interface, surface & interfacial tensions, surface free energy, measurement of surface & interfacial tensions, spreading coefficient, adsorption at liquid interfaces, surface active agents, HLB Scale, solubilisation, detergency, adsorption at solid interface.	8
4.	Complexation and protein binding: Introduction, Classification of Complexation, Applications, methods of analysis, protein binding, Complexation and drug action, crystalline structures of complexes and thermodynamic treatment of stability constants.	8
5.	pH, buffers and Isotonic solutions: Sorensen's pH scale, pH determination (electrometric and calorimetric), applications of buffers, buffer equation, buffer capacity, buffers in pharmaceutical and biological systems, buffered isotonic solutions.	7


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Practical

1. Determination the solubility of drug at room temperature
2. Determination of pKa value by Half Neutralization/ Henderson Hasselbalch equation.
3. Determination of Partition co- efficient of benzoic acid in benzene and water
4. Determination of Partition co- efficient of Iodine in CCl₄ and water
5. Determination of % composition of NaCl in a solution using phenol-water system by CST method
6. Determination of surface tension of given liquids by drop count and drop weight method
7. Determination of HLB number of a surfactant by saponification method
8. Determination of Freundlich and Langmuir constants using activated char coal
9. Determination of critical micellar concentration of surfactants
10. Determination of stability constant and donor acceptor ratio of PABA-Caffeine complex by solubility method
11. Determination of stability constant and donor acceptor ratio of Cupric-Glycine complex by pH titration method

Recommended Books: (Latest Editions)

1. Physical Pharmacy by Alfred Martin
2. Experimental Pharmaceutics by Eugene, Parotti.
3. Tutorial Pharmacy by Cooper and Gunn.
4. Stocklosam J. Pharmaceutical Calculations, Lea &Febiger, Philadelphia.
5. Liberman H.A, Lachman C., Pharmaceutical Dosage forms, Tablets, Volume-1 to 3, MarcelDekkar Inc.
6. Liberman H.A, Lachman C, Pharmaceutical Dosage forms. Disperse systems, volume 1, 2, 3. Maroel Dekkar Inc.
7. Physical Pharmaceutics by Ramasamy C and MaravalanR.
8. Laboratory Manual of Physical Pharmaceutics, C.V.S. Subramanyam, J. Thimma settee
9. Physical Pharmaceutics by C.V.S. Subramanyam
10. Test book of Physical Pharmacy, by Gaurav Jain & Roop K. Khar.


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B.Pharm
SEMESTER - III

Subject Name: **BIOCHEMISTRY**

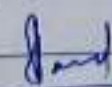
Subject Code: **BP303TP**

Scope: Biochemistry deals with complete understanding of the molecular levels of the chemical process associated with living cells. The scope of the subject is providing biochemical facts and the principles to understand metabolism of nutrient molecules in physiological and pathological conditions. It is also emphasizing on genetic organization of mammalian genome and hetero & autocatalytic functions of DNA.

Objectives: Upon completion of course student shall able to

1. Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.
2. Understand the metabolism of nutrient molecules in physiological and pathological conditions.
3. Understand the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins.

Sr.No	Topics	% weightage
1.	Biomolecules: Introduction, classification, chemical nature and biological role of carbohydrate, lipids, nucleic acids, amino acids and proteins. Bioenergetics: Concept of free energy, endergonic and exergonic reaction, Relationship between free energy, enthalpy and entropy; Redox potential. Energy rich compounds; classification; biological significances of ATP and cyclic AMP	8
2.	Carbohydrate metabolism: Glycolysis – Pathway, energetics and significance Citric acid cycle- Pathway, energetics and significance HMP shunt and its significance, Glucose-6-Phosphate dehydrogenase (G6PD) deficiency Glycogen metabolism Pathways and glycogen storage diseases (GSD) Gluconeogenesis- Pathway and its significance Hormonal regulation of blood glucose level and Diabetes mellitus Biological oxidation: Electron transport chain (ETC) and its mechanism. Oxidative phosphorylation & its mechanism and substrate level phosphorylation Inhibitors ETC and oxidative phosphorylation/Uncouplers	10
3.	Lipid metabolism: β -Oxidation of saturated fatty acid (Palmitic acid) Formation and utilization of ketone bodies; ketoacidosis De novo synthesis of fatty acids (Palmitic acid) Biological significance of cholesterol and conversion of cholesterol into bile acids, steroid hormone and vitamin D Disorders of lipid metabolism: Hypercholesterolemia, atherosclerosis, fatty liver and obesity.	10


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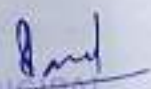
	Amino acid metabolism: General reactions of amino acid metabolism: Transamination, decarboxylation & decarboxylation, urea cycle and its disorders Catabolism of phenylalanine and tyrosine and their metabolic disorders (Phenylketonuria, Albinism, alpeptonuria, tyrosinemia) Synthesis and significance of biological substances; 5-HT, melatonin, dopamine, noradrenaline, adrenaline Catabolism of heme; hyperbilirubinemia and jaundice	
4.	Nucleic acid metabolism and genetic information transfer Biosynthesis of purine and pyrimidine nucleotides Catabolism of purine nucleotides and Hyperuricemia and Gout disease Organization of mammalian genome Structure of DNA and RNA and their functions DNA replication (semi conservative model) Transcription or RNA synthesis Genetic code, Translation or Protein synthesis and inhibitors	10
5.	Enzymes: Introduction, properties, nomenclature and IUB classification of enzymes Enzyme kinetics (Michaelis plot, Line Weaver Burke plot) Enzyme inhibitors with examples Regulation of enzymes: enzyme induction and repression, allosteric enzymes regulation Therapeutic and diagnostic applications of enzymes and isoenzymes Coenzymes -Structure and biochemical functions	7

Practical

1. Qualitative analysis of carbohydrates (Glucose, Fructose, Lactose, Maltose, Sucrose and starch)
2. Identification tests for Proteins (albumin and Casein)
3. Quantitative analysis of reducing sugars (DNSA method) and Proteins (Biuret method)
4. Qualitative analysis of urine for abnormal constituents
5. Determination of blood creatinine
6. Determination of blood sugar
7. Determination of serum total cholesterol
8. Preparation of buffer solution and measurement of pH
9. Study of enzymatic hydrolysis of starch
10. Determination of Salivary amylase activity
11. Study the effect of Temperature on Salivary amylase activity.
12. Study the effect of substrate concentration on salivary amylase activity

Recommended Books (Latest Editions)

1. Principles of Biochemistry by Lehninger.
2. Harper's Biochemistry by Robert K. Murry, Daryl K. Granner and Victor W. Rodwell.
3. Biochemistry by Stryer.
4. Biochemistry by D. Satyanarayan and U.Chakrapani
5. Textbook of Biochemistry by Rama Rao.
6. Textbook of Biochemistry by Deb.
7. Outlines of Biochemistry by Corn and Stumpf
8. Practical Biochemistry by R.C. Gupta and S. Bhargavan
9. Introduction of Practical Biochemistry by David T. Plummer. (3rd Edition)
10. Practical Biochemistry for Medical students by Rajagopal and Ramakrishna.
11. Practical Biochemistry by Harold Varley.


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B.Pharm
SEMESTER: III

Subject Name: PATHOPHYSIOLOGY
Subject Code: BP304TT

Scope: Pathophysiology is the study of causes of diseases and reactions of the body to such disease producing causes. This course is designed to impart a thorough knowledge of the relevant aspects of pathology of various conditions with reference to its pharmacological applications, and understanding of basic pathophysiological mechanisms. Hence it will not only help to study the syllabus of pathology, but also to get baseline knowledge required to practice medicine safely, confidently, rationally and effectively.

Objectives: Upon completion of the subject student shall be able to –

1. Describe the etiology and pathogenesis of the selected disease states;
2. Name the signs and symptoms of the diseases; and
3. Mention the complications of the diseases.

Sr No	Topics	% weightage
1.	<p>Basic principles of Cell injury and Adaptation: Introduction, definitions, Homeostasis, Components and Types of Feedback systems, Causes of cellular injury, Pathogenesis (Cell membrane damage, Mitochondrial damage, Ribosome damage, Nuclear damage). Morphology of cell injury – Adaptive changes (Atrophy, Hypertrophy, hyperplasia, Metaplasia, Dysplasia), Cell swelling, Intra cellular accumulation, Calcification, Enzyme leakage and Cell Death Acidosis & Alkalosis, Electrolyte</p> <p>Mechanism involved in the process of inflammation and repair: Introduction, Clinical signs of inflammation, Different types of Inflammation, Mechanism of Inflammation – Alteration in vascular permeability and blood flow, migration of WBC's, Mediators of inflammation, Basic principles of wound healing in the skin, Pathophysiology of Atherosclerosis</p>	10
2.	<p>Cardiovascular System: Hypertension, congestive heart failure, ischemic heart disease (angina, myocardial infarction, atherosclerosis and arteriosclerosis)</p> <p>Respiratory system: Asthma, Chronic obstructive airways diseases</p> <p>Renal system: Acute and chronic renal failure</p>	10
3.	<p>Haematological Diseases: Iron deficiency, megaloblastic anemia (Vit B12 and folic acid), sickle cell anemia, thalassemia, hereditary acquired anemia, hemophilia</p> <p>Endocrine system: Diabetes, thyroid diseases, disorders of sex hormones</p> <p>Nervous system: Epilepsy, Parkinson's disease, stroke, psychiatric disorders: depression, schizophrenia and Alzheimer's disease.</p>	10
4.	<p>Gastrointestinal system: Peptic Ulcer, Inflammatory bowel diseases, jaundice, hepatitis (A,B,C,D,E,F) alcoholic liver disease</p> <p>Disease of bones and joints: Rheumatoid arthritis, osteoporosis and gout</p> <p>Principles of cancer: classification, etiology and pathogenesis of cancer</p>	8
5.	<p>Infectious diseases: Meningitis, Typhoid, Leprosy, Tuberculosis Urinary tract infections</p> <p>Sexually transmitted diseases: AIDS, Syphilis, Gonorrhoea</p>	7

Recommended Books (Latest Editions):

1. Vinay Kumar, Abul K. Abbas, Jon C. Aster; Robbins & Cotran Pathologic Basis of Disease; South Asia edition; India; Elsevier; 2014.
2. Harsh Mohan; Text book of Pathology; 6th edition; India; Jaypee Publications; 2010.
3. Laurence B, Bruce C, Bjorn K. ; Goodman Gilman's The Pharmacological Basis of Therapeutics; 12th edition; New York; McGraw-Hill; 2011.
4. Best, Charles Herbert 1899-1978; Taylor, Norman Burke 1885-1972; West, John B (John Burnard); Best and Taylor's Physiological basis of medical practice; 12th ed; united states;
5. William and Wilkins, Baltimore; 1991 [1990 printing].
6. Nicki R. Colledge, Brian R. Walker, Stuart H. Ralston; Davidson's Principles and Practice of Medicine; 21st edition; London; ELBS/Churchill Livingstone; 2010.
7. Guyton A, John E Hall; Textbook of Medical Physiology; 12th edition; WB Saunders Company; 2010.
8. Joseph DiPiro, Robert L. Talbert, Gary Yee, Barbara Wells, L. Michael Posey;
9. Pharmacotherapy: A Pathophysiological Approach; 9th edition; London; McGraw-Hill Medical; 2014.
10. V. Kumar, R. S. Cotran and S. L. Robbins; Basic Pathology; 6th edition; Philadelphia; WB Saunders Company; 1997.
11. Roger Walker, Clive Edwards; Clinical Pharmacy and Therapeutics; 3rd edition; London; Churchill Livingstone publication; 2003.

Recommended Journals:

1. The Journal of Pathology. ISSN: 1096-9896 (Online)
2. The American Journal of Pathology. ISSN: 0002-9440
3. Pathology. 1465-3931 (Online)
4. International Journal of Physiology, Pathophysiology and Pharmacology. ISSN: 1944-8171 (Online)
5. Indian Journal of Pathology and Microbiology. ISSN-0377-4929.


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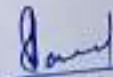
<p>Plant Products: Fibers - Cotton, Jute, Hemp Hallucinogens, Teratogens, Natural allergens</p> <p>Primary metabolites: General introduction, detailed study with respect to chemistry, sources, preparation, evaluation, preservation, storage, therapeutic used and commercial utility as Pharmaceutical Aids and/or Medicines for the following Primary metabolites:</p> <p>Carbohydrates: Acacia, Agar, Tragacanth, Honey, Starch, Sodium alginate, Pectin, Guar gum</p> <p>Proteins and Enzymes : Gelatin, casein, proteolytic enzymes (Papain, bromelain, serratiopeptidase, urokinase, streptokinase, pepsin).</p> <p>Lipids(Waxes, fats, fixed oils) : Castor oil, Chaulmoogra oil, Wool Fat, Bees Wax</p> <p>Marine Drugs: Novel medicinal agents from marine sources</p>	
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Practical

1. Analysis of crude drugs by chemical tests: (i) Tragacanth (ii) Acacia (iii) Agar (iv) Gelatin (v) starch (vi) Honey (vii) Castor oil
2. Determination of stomatal number and index
3. Determination of vein islet number, vein islet termination and palisade ratio.
4. Determination of size of starch grains, calcium oxalate crystals by eye piece micrometer
5. Determination of Fiber length and width
6. Determination of number of starch grains by Lycopodium spore method
7. Determination of Ash value
8. Determination of Extractive values of crude drugs
9. Determination of moisture content of crude drugs
10. Determination of swelling index and foaming

Recommended Books: (Latest Editions):

1. W.C. Evans, Trease and Evans Pharmacognosy, 16th edition, W.B. Saunders & Co., London, 2009.
2. Tyler, V.E., Brady, L.R. and Robbers, J.E., Pharmacognosy, 9th Edn., Lea and Febiger, Philadelphia, 1988.
3. T.E. Wallis, Textbook of Pharmacognosy, 5th edition, CBS Publishers & Distributors, New Delhi, 2005
4. Mohammad Ali, Pharmacognosy, CBS Publishers & Distributors, New Delhi 2008
5. C.K. Kokate, Purohit, Gokhale. Text book of Pharmacognosy, Gokhale (2007), 37th Edition, Nirali Prakashan, Pune, 2007
6. R.D. Choudhary, Herbal Drug Industry 1st Edn, Eastern Publisher, New Delhi, 1996
7. SH. Ansari, Essentials of Pharmacognosy, 11th edition, Birla publications, New Delhi, 2007
8. C.K. Kokate, Practical Pharmacognosy, 5th edition, Vallabh Prakashan, New Delhi, 2016.
9. M.A. Iyengar, Anatomy of Crude Drugs, Manipal Press, Manipal, 2001.
10. Biren Shah & A. K. Seth, Textbook of Pharmacognosy & Phytochemistry, 2nd edition, Elsevier Publication, New Delhi, 2011.
11. Khandelwal K. R. Practical Pharmacognosy, 9th edition, Nirali Prakashan, Pune, 2009
12. Agrawal S.S., Herbal Drug Technology, 2nd edition, Orient Blackswan, New Delhi, 2012.
13. Vyas S. P. and Dixit V. K., Pharmaceutical Biotechnology, 1st edition, CBS Publisher & Distributors, New Delhi, 2016.
14. WHO: Quality Control Methods for Medicinal Plant Materials, World Health ORganisation, Geneva, 1988.


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B.Pharm
SEMESTER: III

Subject Name: PHARMACOGNOSY AND PHYTOCHEMISTRY I

Subject Code: BP305TP

Scope: The subject involves the fundamentals of Pharmacognosy like scope, classification of crude drugs, their identification and evaluation, phytochemicals present in them and their medicinal properties.

Course Learning Outcomes: Upon completion of the course, the student shall be able

1. to understand the techniques in the cultivation and production of crude drugs
2. to describe the crude drugs, their uses and chemical nature
3. to explain the evaluation techniques for the herbal drugs
4. to analyse the microscopic and morphological evaluation of crude drugs

Sr No	Topics	% weightage
1.	Introduction to Pharmacognosy: (a) Definition, history, scope and development of Pharmacognosy (b) Sources of Drugs – Plants, Animals, Marine & Tissue culture Organized drugs, unorganized drugs (dried latex, dried juices, dried extracts, gums and mucilages, oleoresins and oleo-gum-resins). Classification of drugs: Alphabetical, morphological, taxonomical, chemical, pharmacological, chemo and sero taxonomical classification of drugs Quality control of Drugs of Natural Origin: Adulteration of drugs of natural origin. Evaluation by organoleptic, microscopic, physical, chemical and biological methods and properties. Quantitative microscopy of crude drugs including lycopodium spore method, leaf constants, camera lucida and diagrams of microscopic objects to scale with camera lucida.	10
2.	Cultivation, Collection, Processing and Storage of Drugs of Natural Origin: Cultivation and Collection of drugs of natural origin Factors influencing cultivation of medicinal plants. Plant hormones and their applications. Polyploidy, mutation and hybridization with reference to medicinal plants Conservation of Medicinal Plants	10
3.	Plant Tissue Culture: Historical development of plant tissue culture, types of cultures, Nutritional requirements, growth and their maintenance. Applications of plant tissue culture in pharmacognosy. Edible vaccines	7
4.	Pharmacognosy in various systems of medicine: Role of Pharmacognosy in allopathy and traditional systems of medicine namely, Ayurveda, Unani, Siddha, Homeopathy and Chinese systems of medicine. Introduction to secondary metabolites: Definition, classification, properties and test for identification of Alkaloids, Glycosides, Flavonoids, Tannins, Volatile oil and Resins	10
5.	Study of biological source, chemical nature and uses of drugs of natural origin containing following drugs	8

<p>Plant Products: Fibers - Cotton, Jute, Hemp Hallucinogens, Teratogens, Natural allergens</p> <p>Primary metabolites: General introduction, detailed study with respect to chemistry, sources, preparation, evaluation, preservation, storage, therapeutic used and commercial utility as Pharmaceutical Aids and/or Medicines for the following Primary metabolites:</p> <p>Carbohydrates: Acacia, Agar, Tragacanth, Honey, Starch, Sodium alginate, Pectin, Guar gum</p> <p>Proteins and Enzymes : Gelatin, casein, proteolytic enzymes (Papain, bromelain, serratiopeptidase, urokinase, streptokinase, pepsin).</p> <p>Lipids(Waxes, fats, fixed oils) : Castor oil, Chauymoogra oil, Wool Fat, Bees Wax</p> <p>Marine Drugs: Novel medicinal agents from marine sources</p>	
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Practical

1. Analysis of crude drugs by chemical tests: (i)Tragacanth (ii) Acacia (iii)Agar (iv) Gelatin (v) starch (vi) Honey (vii) Castor oil
2. Determination of stomatal number and index
3. Determination of vein islet number, vein islet termination and palisade ratio.
4. Determination of size of starch grains, calcium oxalate crystals by eye piece micrometer
5. Determination of Fiber length and width
6. Determination of number of starch grains by Lycopodium spore method
7. Determination of Ash value
8. Determination of Extractive values of crude drugs
9. Determination of moisture content of crude drugs
10. Determination of swelling index and foaming

Recommended Books: (Latest Editions):

1. W.C.Evans, Trease and Evans Pharmacognosy, 16th edition, W.B. Saunders & Co., London, 2009.
2. Tyler, V.E., Brady, L.R. and Robbers, J.E., Pharmacognosy, 9th Edn., Lea and Febiger, Philadelphia, 1988.
3. T.E. Wallis, Textbook of Pharmacognosy, 5th edition, CBS Publishers & Distributors, New Delhi, 2005
4. Mohammad Ali. Pharmacognosy, CBS Publishers & Distributors, New Delhi 2008
5. C.K. Kokate, Purohit, Gokhale. Text book of Pharmacognosy, Gokhale (2007), 37th Edition, Nirali Prakashan, Pune, 2007
6. R.D. Choudhary, Herbal Drug Industry 1st Edn, Eastern Publisher, New Delhi, 1996
7. SHAnsari, Essentials of Pharmacognosy, IInd edition, Birla publications, New Delhi, 2007
8. C.K. Kokate, Practical Pharmacognosy, 5th edition, Vallabh Prakashan, New Delhi, 2016.
9. M.A. Iyengar, Anatomy of Crude Drugs, Manipal Press, Manipal, 2001.
10. Biren Shah & A. K. Seth, Textbook of Pharmacognosy & Phytochemistry, 2nd edition, Elsevier Publication, New Delhi, 2011.
11. Khandelwal K. R. Practical Pharmacognosy, 9th edition, Nirali Prakashan, Pune, 2009
12. Agrawal S.S., Herbal Drug Technology, 2nd edition, Orient Blackswan, New Delhi, 2012.
13. Vyas S. P. and Dixit V. K., Pharmaceutical Biotechnology, 1st edition, CBS Publisher & Distributors, New Delhi, 2016.
14. WHO: Quality Control Methods for Medicinal Plant Materials, World Health Organisation, Geneva, 1988.



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP401TT

SEMESTER- IV

Subject Name: Pharmaceutical Organic Chemistry III

Scope: This subject imparts knowledge on stereo-chemical aspects of organic compounds and organic reactions, important named reactions, chemistry of important hetero cyclic compounds. It also emphasizes on medicinal and other uses of organic compounds.

Objectives: Upon completion of the course the student shall be able to

1. understand the methods of preparation and properties of organic compounds
2. explain the stereo chemical aspects of organic compounds and stereo chemical reactions
3. know the medicinal uses and other applications of organic compounds

Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	1	0	4	80	20	0	0

Sr No	Topics	% weightage
1.	Stereo isomerism Optical isomerism – Optical activity, enantiomerism, diastereoisomerism, meso compounds Elements of symmetry, chiral and achiral molecules DL system of nomenclature of optical isomers, sequence rules, RS system of nomenclature of optical isomers Reactions of chiral molecules Racemic modification and resolution of racemic mixture. Asymmetric synthesis: partial and absolute	10
2.	Geometrical isomerism Nomenclature of geometrical isomers (Cis Trans, EZ, Syn Anti systems) Methods of determination of configuration of geometrical isomers Conformational isomerism in Ethane, n-Butane and Cyclohexane. Stereo isomerism in biphenyl compounds (Atropisomerism) and conditions for optical activity. Stereospecific and stereoselective reactions	10
3.	Heterocyclic compounds: Nomenclature and classification Synthesis, reactions and medicinal uses of following compounds/derivatives Pyrrole, Furan, and Thiophene Relative aromaticity and reactivity of Pyrrole, Furan and Thiophene	10
4.	Synthesis, reactions and medicinal uses of following compounds/derivatives Pyrazole, Imidazole, Oxazole and Thiazole Pyridine, Quinoline, Isoquinoline, Acridine and Indole. Basicity of pyridine Synthesis and medicinal uses of Pyrimidine, Purine, azepines and their derivatives	8
5.	Reactions of synthetic importance Metal hydride reduction (NaBH ₄ and LiAlH ₄), Clemmensen reduction, Birch reduction, Wolff Kishner reduction. Oppenauer-oxidation and Dakin reaction. Beckmanns rearrangement and Schmidt rearrangement.	7

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
Bachelor of Pharmacy

Subject Code: BP401TT

Claisen-Schmidt condensation	
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Recommended Books (Latest Editions)

1. Organic chemistry by I.L. Finar, Volume-I & II.
2. A text book of organic chemistry - Arun Bahl, B.S. Bahl
3. Heterocyclic Chemistry by Raj K. Bansal
4. Organic Chemistry by Morrison and Boyd
5. Heterocyclic Chemistry by T.L. Gilchrist


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GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP402TP

SEMESTER: IV

Subject Name: Medicinal Chemistry I

Scope: This subject is designed to impart fundamental knowledge on the structure chemistry and therapeutic value of drugs. The subject emphasizes on structure activity relationships of drugs, importance of physicochemical properties and metabolism of drugs. The syllabus also emphasizes on chemical synthesis of important drugs under each class.

Objectives: Upon completion of the course the student shall be able to

1. understand the chemistry of drugs with respect to their pharmacological activity
2. understand the drug metabolic pathways, adverse effect and therapeutic value of drugs
3. know the Structural Activity Relationship (SAR) of different class of drugs
4. write the chemical synthesis of some drugs

Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	1	4	6	80	20	80	20

Course Content:

Study of the development of the following classes of drugs, Classification, mechanism of action, uses of drugs mentioned in the course. Structure activity relationship of selective class of drugs as specified in the course and synthesis of drugs superscripted (*)

Sr No	Topics	% weightage
1.	Introduction to Medicinal Chemistry History and development of medicinal chemistry Physicochemical properties in relation to biological action Ionization, Solubility, Partition Coefficient, Hydrogen bonding, Protein binding, Chelation, Biososterism, Optical and Geometrical isomerism. Drug metabolism Drug metabolism principles- Phase I and Phase II. Factors affecting drug metabolism including stereo chemical aspects	10
2.	Drugs acting on Autonomic Nervous System Adrenergic Neurotransmitters: Biosynthesis and catabolism of catecholamine. Adrenergic receptors (Alpha & Beta) and their distribution. Sympathomimetic agents: SAR of Sympathomimetic agents Direct acting: Nor-epinephrine, Epinephrine, Phenylephrine*, Dopamine Methyl dopa, Clonidine, Dobutamine, Isoproterenol, Terbutaline, Salbutamol*, Bitolterol, Naphazoline, Oxymetazoline and Xylometazoline. <input type="checkbox"/> Indirect acting agents: Hydroxyamphetamine, Pseudoephedrine, Propylhexedrine. <input type="checkbox"/> Agents with mixed mechanism: Ephedrine, Metaraminol. Adrenergic Antagonists: Alpha adrenergic blockers: Tolazoline*, Phentolamine, Phenoxybenzamine, Prazosin, Dihydroergotamine, Methysergide. Beta adrenergic blockers: SAR of beta blockers, Propranolol*, Metibranolol, Atenolol, Betazolol, Bisoprolol, Esmolol, Metoprolol, Labetolol, Carvedilol.	10
3.	Cholinergic neurotransmitters:	10



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP402TP

	<p>Biosynthesis and catabolism of acetylcholine. Cholinergic receptors (Muscarinic & Nicotinic) and their distribution. Parasympathomimetic agents: SAR of Parasympathomimetic agents Direct acting agents: Acetylcholine, Carbachol*, Bethanechol, Methacholine, Pilocarpine. Indirect acting/ Cholinesterase inhibitors (Reversible & Irreversible): Physostigmine, Neostigmine*, Pyridostigmine, Edrophonium chloride, Tacrine hydrochloride, Amibenonium chloride, Isofluorophate, Echothiophate iodide, Parathion, Malathion. Cholinesterase reactivator: Pralidoxime chloride. Cholinergic Blocking agents: SAR of cholinolytic agents Solanaceous alkaloids and analogues: Atropine sulphate, Hyoscyamine sulphate, Scopolamine hydrobromide, Homatropine hydrobromide, Ipratropium bromide*. Synthetic cholinergic blocking agents: Tropicamide, Cyclopentolate hydrochloride, Clidinium bromide, Dicyclanil hydrochloride*, Glycopyrrolate, Methantheline bromide, Propantheline bromide, Benztropine mesylate, Orphenadrine citrate, Biperidine hydrochloride, Procyclidine hydrochloride*, Tridihexethyl chloride, Isopropamide iodide, Ethopropazine hydrochloride.</p>	
4.	<p>Drugs acting on Central Nervous System A. Sedatives and Hypnotics: Benzodiazepines: SAR of Benzodiazepines, Chlordiazepoxide, Diazepam*, Oxazepam, Chlorazepate, Lorazepam, Alprazolam, Zolpidem Barbiturates: SAR of barbiturates, Barbitol*, Phenobarbital, Mephobarbital, Amobarbital, Butobarbital, Pentobarbital, Secobarbital Miscellaneous: Amides & imides: Glutethimide. Alcohol & their carbamate derivatives: Meprobamate, Ethchlorvynol. Aldehyde & their derivatives: Triclofos sodium, Paraldehyde. B. Antipsychotics Phenothiazines: SAR of Phenothiazines - Promazine hydrochloride, Chlorpromazine hydrochloride*, Triflupromazine, Thioridazine hydrochloride, Piperacetazine hydrochloride, Prochlorperazine maleate, Trifluoperazine hydrochloride. Ring Analogues of Phenothiazines: Chlorprothixene, Thiothixene, Loxapine succinate, Clozapine. Fluro buterophenones: Haloperidol, Droperidol, Risperidone. Beta amino ketones: Molindone hydrochloride. Benzamides: Sulpiride. C. Anticonvulsants: SAR of Anticonvulsants, mechanism of anticonvulsant action Barbiturates: Phenobarbitone, Methobarbital. Hydantoins: Phenytoin*, Mephentyoin, Ethoin Oxazolindione diones: Trimethadione, Paramethadione Succinimides: Phensuximide, Methsuximide, Ethosuximide* Urea and monoacylureas: Phenacetamide, Carbamazepine* Benzodiazepines: Clonazepam Miscellaneous: Primidone, Valproic acid, Gabapentin, Felbamate</p>	8
5.	<p>Drugs acting on Central Nervous System General anesthetics: Inhalation anesthetics: Halothane*, Methoxyflurane, Enflurane, Sevoflurane, Isoflurane, Desflurane. Ultra short acting barbiturates: Methohexital sodium*, Thiomytal</p>	7



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP402TP

<p>sodium, Thiopental sodium.</p> <p>Dissociative anesthetics: Ketamine hydrochloride *</p> <p>Narcotic and non-narcotic analgesics</p> <p>Morphine and related drugs: SAR of Morphine analogues, Morphine sulphate, Codeine, Meperidine hydrochloride, Anileridine hydrochloride, Diphenoxylate hydrochloride, Loperamide hydrochloride, Fentanyl citrate*, Methadone hydrochloride*, Propoxyphene hydrochloride, Pentazocine, Levorphanol tartarate.</p> <p>Narcotic antagonists: Nalorphine hydrochloride, Levallorphan tartarate, Naloxone hydrochloride.</p> <p>Anti-inflammatory agents: Sodium salicylate, Aspirin, Mefenamic acid*, Meclofenamate, Indomethacin, Salindac, Tolmetin, Zomeprisa, Diclofenac, Ketorolac, Ibuprofen*, Naproxen, Piroxicam, Phenacetin, Acetaminophen, Antipyrine, Phenylbutazone.</p>	
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MEDICINAL CHEMISTRY – I (Practical)

I Preparation of drugs/ intermediates

- 1 1,3-pyrazole
- 2 1,3-oxazole
- 3 Benzimidazole
- 4 Benzotriazole
- 5 2,3- diphenyl quinoxaline
- 6 Benzocaine
- 7 Phenytoin
- 8 Phenothiazine
- 9 Barbiturate

II Assay of drugs

- 1 Chlorpromazine
- 2 Phenobarbitone
- 3 Atropine
- 4 Ibuprofen
- 5 Aspirin
- 6 Furosemide

III Determination of Partition coefficient for any two drugs

Recommended Books (Latest Editions)

1. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry.
2. Foye's Principles of Medicinal Chemistry.
3. Burger's Medicinal Chemistry, Vol I to IV
4. Introduction to principles of drug design- Smith and Williams.
5. Remington's Pharmaceutical Sciences.
6. Martindale's extra pharmacopoeia.
7. Organic Chemistry by I.L. Finar, Vol. II.
8. The Organic Chemistry of Drug Synthesis by Lednicer, Vol. 1-5.
9. Indian Pharmacopoeia.
10. Text book of practical organic chemistry- A.I.Vogel.


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GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP403TP

SEMESTER: IV

Subject Name: Physical Pharmaceutics II

Scope: The course deals with the various physical and physicochemical properties, and principles involved in dosage forms/formulations. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms.

Objectives: Upon completion of the course the student shall be able to

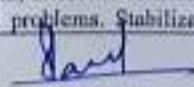
1. Understand various physicochemical properties of drug molecules in the designing the dosage forms
2. Know the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations
3. Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms

Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	1	4	6	80	20	80	20

Course Content:

Sr No	Topics	% weightage
1.	Colloidal dispersions: Classification of dispersed systems & their general characteristics, size & shapes of colloidal particles, classification of colloids & comparative account of their general properties. Optical, kinetic & electrical properties. Effect of electrolytes, coacervation, peptization & protective action	7
2.	Rheology: Newtonian systems, law of flow, kinematic viscosity, effect of temperature, non-Newtonian systems, pseudoplastic, dilatant, plastic, thixotropy, thixotropy in formulation, determination of viscosity, capillary, falling Sphere, rotational viscometers Deformation of solids: Plastic and elastic deformation, Heckel equation, Stress, Strain, Elastic Modulus	10
3.	Coarse dispersion: Suspension, interfacial properties of suspended particles, settling in suspensions, formulation of flocculated and deflocculated suspensions. Emulsions and theories of emulsification, microemulsion and multiple emulsions; Stability of emulsions, preservation of emulsions, rheological properties of emulsions and emulsion formulation by HLB method	10
4.	Micromeritics: Particle size and distribution, mean particle size, number and weight distribution, particle number, methods for determining particle size by different methods, counting and separation method, particle shape, specific surface, methods for determining surface area, permeability, adsorption, derived properties of powders, porosity, packing arrangement, densities, bulkiness & flow properties.	10
5.	Drug stability: Reaction kinetics: zero, pseudo-zero, first & second order, units of basic rate constants, determination of reaction order. Physical and chemical factors influencing the chemical degradation of pharmaceutical product: temperature, solvent, ionic strength, dielectric constant, specific & general acid base catalysis, Simple numerical problems. Stabilization of medicinal agents	10


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Bachelor of Pharmacy

Subject Code: BP403TP

against common reactions like hydrolysis & oxidation. Accelerated stability testing in expiration dating of pharmaceutical dosage forms. Photolytic degradation and its prevention	
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PHYSICAL PHARMACEUTICS- II (Practical)

1. Determination of particle size, particle size distribution using sieving method
2. Determination of particle size, particle size distribution using Microscopic method
3. Determination of bulk density, true density and porosity
4. Determine the angle of repose and influence of lubricant on angle of repose
5. Determination of viscosity of liquid using Ostwald's viscometer
6. Determination sedimentation volume with effect of different suspending agent
7. Determination sedimentation volume with effect of different concentration of single suspending agent
8. Determination of viscosity of semisolid by using Brookfield viscometer
9. Determination of reaction rate constant first order
10. Determination of reaction rate constant second order
11. Accelerated stability studies

Recommended Books: (Latest Editions)

1. Physical Pharmacy by Alfred Martin, Sixth edition
2. Experimental pharmaceutics by Eugene, Parot.
3. Tutorial pharmacy by Cooper and Gunn.
4. Stocklosan J. Pharmaceutical calculations, Lea & Febiger, Philadelphia.
5. Liberman H.A, Lachman C., Pharmaceutical Dosage forms, Tablets, Volume-1 to 3, Marcel Dekkar Inc.
6. Liberman H.A, Lachman C, Pharmaceutical dosage forms. Disperse systems, volume 1, 2, 3. Marcel Dekkar Inc.
7. Physical Pharmaceutics by Ramasamy C, and Manavalan R.

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GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP404TP

SEMESTER: IV

Subject Name: PHARMACOLOGY-I

Scope: The main purpose of the subject is to understand what drugs do to the living organisms and how their effects can be applied to therapeutics. The subject covers the information about the drugs like, mechanism of action, physiological and biochemical effects (pharmacodynamics) as well as absorption, distribution, metabolism and excretion (pharmacokinetics) along with the adverse effects, clinical uses, interactions, doses, contraindications and routes of administration of different classes of drugs.

Objectives: Upon completion of the course the student shall be able to


1. Understand the pharmacological actions of different categories of drugs
2. Explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels
3. Apply the basic pharmacological knowledge in the prevention and treatment of various diseases.
4. Observe the effect of drugs on animals by simulated experiments
5. Appreciate correlation of pharmacology with other bio-medical sciences

Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	1	4	6	80	20	80	20

Course Content:

Sr No	Topics	% weightage
1.	General Pharmacology a. Introduction to Pharmacology- Definition, historical landmarks and scope of pharmacology, nature and source of drugs, essential drugs concept and routes of drug administration, Agonists, antagonists(competitive and noncompetitive), spare receptors, addiction, tolerance, dependence, tachyphylaxis, idiosyncrasy, allergy. b. Pharmacokinetics- Membrane transport, absorption, distribution, metabolism and excretion of drugs .Enzyme induction, enzyme inhibition, kinetics of elimination	8
2.	General Pharmacology a. Pharmacodynamics- Principles and mechanisms of drug action. Receptor theories and classification of receptors, regulation of receptors. drug receptors interactions signal transduction mechanisms, G-protein-coupled receptors, ion channel receptor, transmembrane enzyme linked receptors, transmembrane JAK-STAT binding receptor and receptors that regulate transcription factors, dose response relationship, therapeutic index, combined effects of drugs and factors modifying drug action. b. Adverse drug reactions. c. Drug interactions (pharmacokinetic and pharmacodynamic) d. Drug discovery and clinical evaluation of new drugs -Drug discovery phase, preclinical evaluation phase, clinical trial phase, phases of clinical trials and pharmacovigilance.	12
3.	Pharmacology of drugs acting on peripheral nervous system a. Organization and function of ANS, b. Neurohumoral transmission, co-transmission and classification of neurotransmitters.	10


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	c. Parasympathomimetics, Parasympatholytics, Sympathomimetics, sympatholytics. d. Neuromuscular blocking agents and skeletal muscle relaxants (peripheral). e. Local anesthetic agents. f. Drugs used in myasthenia gravis and glaucoma	
4.	Pharmacology of drugs acting on central nervous system a. Neurohumoral transmission in the CNS, special emphasis on importance of various neurotransmitters like with GABA, Glutamate, Glycine, serotonin, dopamine. b. General anesthetics and pre-anesthetics. c. Sedatives, hypnotics and centrally acting muscle relaxants. d. Anti-epileptics e. Alcohols and disulfiram	8
5.	Pharmacology of drugs acting on central nervous system a. Psychopharmacological agents: Antipsychotics, antidepressants, anti-anxiety agents, anti-manics and hallucinogens. b. Drugs used in Parkinson's disease and Alzheimer's disease. c. CNS stimulants and nootropics. d. Opioid analgesics and antagonists e. Drug addiction, drug abuse, tolerance and dependence.	7

PHYSICAL PHARMACEUTICS- II (Practical)

1. Introduction to experimental pharmacology.
2. Commonly used instruments in experimental pharmacology.
3. Study of common laboratory animals.
4. Maintenance of laboratory animals as per CPCSEA guidelines.
5. Common laboratory techniques. Blood withdrawal, serum and plasma separation, anesthetics and euthanasia used for animal studies.
6. Study of different routes of drugs administration in mice/rats.
7. Study of effect of hepatic microsomal enzyme inducers on the phenobarbitone sleeping time in mice.
8. Effect of drugs on ciliary motility of frog oesophagus
9. Effect of drugs on rabbit eye.
10. Effects of skeletal muscle relaxants using rota-rod apparatus.
11. Effect of drugs on locomotor activity using actophotometer.
12. Anticonvulsant effect of drugs by MES and PTZ method
13. Study of stereotypic and anti-catatonic activity of drugs on rats/mice.
14. Study of anxiolytic activity of drugs using rats/mice.
15. Study of local anesthetics by different methods

Note: All laboratory techniques and animal experiments are demonstrated by simulated experiments by softwares and videos

Recommended Books (Latest Editions)

1. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchill Livingstone Elsevier
2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill
3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics
4. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs, The Point Lippincott Williams & Wilkins
5. Mycek M.J, Gelinet S.B and Perper M.M. Lippincott's Illustrated Reviews Pharmacology/Physical Pharmaceutics by Ramasamy C, and Manavalan R.

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


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Bachelor of Pharmacy

Subject Code: BP404TP

6. K.D.Tripathi, Essentials of Medical Pharmacology, JAYTEE Brothers Medical Publishers (P) Ltd, New Delhi.
7. Sharma H. L., Sharma K. K., Principles of Pharmacology, Paras medical publisher
8. Modern Pharmacology with clinical Applications, by Charles R.Craig & Robert,
9. Ghosh MN, Fundamentals of Experimental Pharmacology, Hilton & Company, Kolkata.
10. Kulkarni SK, Handbook of experimental pharmacology, VallabhPrakashan


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GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP405TT

SEMESTER: IV

Subject Name: PHARMACEUTICAL JURISPRUDENCE

Scope: This course is designed to impart basic knowledge on important legislations related to the profession of pharmacy in India

Objectives: Upon completion of the course the student shall be able to

1. The Pharmaceutical legislations and their implications in the development and marketing of pharmaceuticals
2. Various Indian pharmaceutical Acts and Laws
3. The regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals
4. The code of ethics during the pharmaceutical practice

Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	1	0	4	80	20	0	0

Course Content:

Sr No	Topics	% weightage
1.	Drugs and Cosmetics Act, 1940 and its rules 1945: Objectives, Definitions, Legal definitions of schedules to the Act and Rules Import of drugs – Classes of drugs and cosmetics prohibited from import, import under license or permit. Offences and penalties. Manufacture of drugs – Prohibition of manufacture and sale of certain drugs, Conditions for grant of license and conditions of license for manufacture of drugs, Manufacture of drugs for test, examination and analysis, manufacture of new drug, loan license and repacking license.	10
2.	Drugs and Cosmetics Act, 1940 and its rules 1945. Detailed study of Schedule G, H, M, N, P,T,U, V, X, Y, Part XII B, Sch F & DMR (OA) Sale of Drugs – Wholesale, Retail sale and Restricted license, Offences and penalties Labeling & Packing of drugs- General labeling requirements and specimen labels for drugs and cosmetics, List of permitted colors. Offences and penalties. Administration of the Act and Rules – Drugs Technical Advisory Board, Central drugs Laboratory, Drugs Consultative Committee, Government drug analysts, Licensing authorities, controlling authorities, Drugs Inspectors	10
3.	<ul style="list-style-type: none"> • Pharmacy Act –1948: Objectives, Definitions, Pharmacy Council of India; its constitution and functions, Education Regulations, State and Joint state pharmacy councils; constitution and functions, Registration of Pharmacists, Offences and Penalties. • Medicinal and Toilet Preparation Act –1955: Objectives, Definitions, Licensing, Manufacture in bond and Outside bond, Export of alcoholic preparations; Manufacture of Ayurvedic, Homeopathic, Patent & Proprietary Preparations. Offences and Penalties. 	10

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Bachelor of Pharmacy

Subject Code: BP405TT

	<ul style="list-style-type: none">• Narcotic Drugs and Psychotropic substances Act-1985 and Rules: Objectives, Definitions, Authorities and Officers, Constitution and Functions of narcotic & Psychotropic Consultative Committee, National Fund for Controlling the Drug Abuse, Prohibition, Control and Regulation, opium poppy cultivation and production of poppy straw, manufacture, sale and export of opium, Offences and Penalties	
4.	<ul style="list-style-type: none">• Study of Salient Features of Drugs and Magic Remedies Act and its rules: Objectives, Definitions, Prohibition of certain advertisements, Classes of Exempted advertisements, Offences and Penalties• Prevention of Cruelty to animals Act-1960: Objectives, Definitions, Institutional Animal Ethics Committee, CPCSEA guidelines for Breeding and Stocking of Animals, Performance of Experiments, Transfer and acquisition of animals for experiment, Records, Power to suspend or revoke registration, Offences and Penalties• National Pharmaceutical Pricing Authority: Drugs Price Control Order (DPCO)- 2013. Objectives, Definitions, Sale prices of bulk drugs, Retail price of formulations, Retail price and ceiling price of scheduled formulations, National List of Essential Medicines (NLEM)	8
5.	<ul style="list-style-type: none">• Pharmaceutical Legislations – A brief review. Introduction, Study of drugs enquiry committee, Health survey and development committee, Hathi committee and Mudaliar committee• Code of Pharmaceutical ethics Definition, Pharmacist in relation to his job, trade, medical profession and his profession, Pharmacist's oath• Medical Termination of Pregnancy Act• Right to Information Act• Introduction to Intellectual Property Rights (IPR)	7

Recommended books: (Latest Edition)

1. Forensic Pharmacy by B. Suresh 123
2. Text book of Forensic Pharmacy by B.M. Mithal
3. Hand book of drug law-by M.L. Mehra
4. A text book of Forensic Pharmacy by N.K. Jain
5. Drugs and Cosmetics Act/Rules by Govt. of India publications.
6. Medicinal and Toilet preparations act 1955 by Govt. of India publications.
7. Narcotic drugs and psychotropic substances act by Govt. of India publications
8. Drugs and Magic Remedies act by Govt. of India publication
9. Bare Acts of the said laws published by Government. Reference books (Theory)

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Dr. D.M. Bilalnia College of Pharmacy Page 2 of 2

w.e.f. AY 2017-18

VAPL



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy
Subject Code: BP5011T
SEMESTER: V

Subject Name: Medicinal Chemistry II

Scope: This subject is designed to impart fundamental knowledge on the structure, chemistry and therapeutic value of drugs. The subject emphasizes on structure activity relationships of drugs, importance of physicochemical properties and metabolism of drugs. The syllabus also emphasizes on chemical synthesis of important drugs under each class.

Objectives: Upon completion of the course the student shall be able to

1. Understand the chemistry of drugs with respect to their pharmacological activity
2. Understand the drug metabolic pathways, adverse effect and therapeutic value of drugs
3. Know the Structural Activity Relationship of different class of drugs
4. Study the chemical synthesis of selected drugs

Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	1	0	4	80	20	0	0

Sr No	Topics	% weightage
1.	<p>Antihistaminic agents: Histamine, receptors and their distribution in the human body</p> <p>H1-antagonists: Diphenhydramine hydrochloride*, Dimenhydrinate, Doxylamine succinate, Clemastine fumarate, Diphenylpyraline hydrochloride, Tripelenamine hydrochloride, Chlorcyclizine hydrochloride, Meclizine hydrochloride, Baclozine hydrochloride, Chlorpheniramine maleate, Triprolidine hydrochloride*, Phenidamine tartrate, Promethazine hydrochloride*, Trimeprazine tartrate, Cyproheptadine hydrochloride, Azatidine maleate, Astemizole, Loratadine, Cetirizine, Levocetirizine Cromoglycyl sodium</p> <p>H2-antagonists: Cimetidine*, Famotidine, Ranitidine</p> <p>Gastric Proton pump inhibitors: Omeprazole, Lansoprazole, Rabeprazole, Pantoprazole</p> <p>Anti-neoplastic agents:</p> <p>Alkylating agents: Mechlorothamine*, Cyclophosphamide, Melphalan, Chlorambucil, Busulfan, Thiopeta</p> <p>Antimetabolites: Mercaptopurine*, Thioguanine, Fluorouracil, Floxuridine, Cytarabine, Methotrexate*, Azathioprine</p> <p>Antibiotics: Dactinomycin, Daunorubicin, Doxorubicin, Bleomycin</p> <p>Plant products: Etoposide, Vinblastin sulphate, Vincristin sulphate</p> <p>Miscellaneous: Cisplatin, Mitotane</p>	10
2.	<p>Anti-anginal:</p> <p>Vasodilators: Amyl nitrite, Nitroglycerin*, Pentaerythritol tetranitrate, Isosorbide dinitrate*, Dipyridamole</p> <p>Calcium channel blockers: Verapamil, Bepridil hydrochloride, Diltiazem hydrochloride, Nifedipine, Amlodipine, Felodipine, Nicardipine, Nimodipine.</p> <p>Diuretics:</p> <p>Carbonic anhydrase inhibitors: Acetazolamide*, Methazolamide, Dichlorphenamide. Thiazides: Chlorthiazide*, Hydrochlorothiazide, Hydroflumethiazide, Cyclothiazide, Loop diuretics: Furosemide*, Bumetanide,</p>	10



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP501TT

	<p>Ethacrynic acid, Potassium sparing Diuretics: Spironolactone, Triamterene, Amiloride, Osmotic Diuretics: Mannitol</p> <p>Anti-hypertensive Agents: Timolol, Captopril, Lisinopril, Eralapril, Benazepril hydrochloride, Quinapril hydrochloride, Methyldopate hydrochloride,* Clonidine hydrochloride, Guanethidine monosulphate, Guanabenz acetate, Sodium nitroprusside, Diazoxide, Minoxidil, Reserpine, Hydralazine hydrochloride.</p>	
3.	<p>Anti-arrhythmic Drugs: Quinidine sulphate, Procainamide hydrochloride, Disopyramide phosphate*, Phenytein sodium, Lidocaine hydrochloride, Tocainide hydrochloride, Mexiletine hydrochloride, Lorcanide hydrochloride, Amiodarone, Sotalol</p> <p>Anti-hyperlipidemic agents: Clofibrate, Lovastatin, Cholesteramine and Cholestipol</p> <p>Coagulant & Anticoagulants: Menadione, Acetomenadione, Warfarin*, Anisindione, clopidogrel</p> <p>Drugs used in Congestive Heart Failure: Digoxin, Digitoxin, Nesiritide, Bosentan, Tezosentan.</p>	10
4.	<p>Drugs acting on Endocrine system</p> <p>Nomenclature, Stereochemistry and metabolism of steroids</p> <p>Sex hormones: Testosterone, Nandrolone, Progesterones, Oestriol, Oestradiol, Oestrione, Diethyl stilbestrol.</p> <p>Drugs for erectile dysfunction: Sildenafil, Tadalafil.</p> <p>Oral contraceptives: Mifepristone, Norgestrel, Levonorgestrel</p> <p>Corticosteroids: Cortisone, Hydrocortisone, Prednisolone, Betamethasone, Dexamethasone</p> <p>Thyroid and antithyroid drugs: L-Thyroxine, L-Thyronine, Propylthiouracil, Methimazole.</p>	8
5.	<p>Antidiabetic agents:</p> <p>Insulin and its preparations Sulfonyl ureas: Tolbutamide*, Chlorpropamide, Glipizide, Glimpiride. Biguanides: Metformin. Thiazolidinediones: Pioglitazone, Rosiglitazone. Meglitinides: Repaglinide, Nateglinide. Glucosidase inhibitors: Acarbose, Voglibose.</p> <p>Local Anesthetics: SAR of Local anesthetics</p> <p>Benzoic Acid derivatives; Cocaine, Hexylcaine, Mepylcaine, Cyclomethycaine, Piperocaine.</p> <p>Amino Benzoic acid derivatives: Benzocaine*, Butamben, Procaine*, Butacaine, Propoxycaine, Tetracaine, Benoxinate.</p> <p>Lidocaine/Anilide derivatives: Lignocaine, Mepivacaine, Priocaine, Etidocaine.</p> <p>Miscellaneous: Pheacaine, Dipeperdon, Dibucaine.*</p>	7

Study of the development of the following classes of drugs, Classification, mechanism of action, uses of drugs mentioned in the course, Structure activity relationship of selective class of drugs as specified in the course and synthesis of drugs superscripted (*)

Recommended Books (Latest Editions)

1. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry.
2. Foye's Principles of Medicinal Chemistry.
3. Burger's Medicinal Chemistry, Vol I to IV.
4. Introduction to principles of drug design- Smith and Williams.
5. Remington's Pharmaceutical Sciences.
6. Martindale's extra pharmacopoeia.
7. Organic Chemistry by I.L. Finar, Vol. II.
8. The Organic Chemistry of Drug Synthesis by Lednicer, Vol. I to 5.
9. Indian Pharmacopoeia.
10. Text book of practical organic chemistry- A.I.Vogel.

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GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP501TP

SEMESTER: V

Subject Name: Pharmacology II

Scope: This subject is intended to impart the fundamental knowledge on various aspects (classification, mechanism of action, therapeutic effects, clinical uses, side effects and contraindications) of drugs acting on different systems of body and in addition, emphasis on the basic concepts of bioassay.

Objectives: Upon completion of the course the student shall be able to

1. Understand the mechanism of drug action and its relevance in the treatment of different diseases
2. Demonstrate isolation of different organs/tissues from the laboratory animals by simulated experiments
3. Demonstrate the various receptor actions using isolated tissue preparation
4. Appreciate correlation of pharmacology with related medical sciences

Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	1	4	6	80	20	80	20

Sr No	Topics	% weightage
1.	Pharmacology of drugs acting on cardio vascular system a. Introduction to hemodynamic and electrophysiology of heart. b. Drugs used in congestive heart failure c. Anti-hypertensive drugs. d. Anti-anginal drugs. e. Anti-arrhythmic drugs. f. Anti-hyperlipidemic drugs.	10
2.	Pharmacology of drugs acting on cardio vascular system a. Drug used in the therapy of shock. b. Hematinics, coagulants and anticoagulants. c. Fibrinolytics and anti-platelet drugs d. Plasma volume expanders 2. Pharmacology of drugs acting on urinary system a. Diuretics b. Anti-diuretics.	10
3.	Autocoids and related drugs a. Introduction to autocoids and classification b. Histamine, 5-HT and their antagonists. c. Prostaglandins, Thromboxanes and Leukotrienes. d. Angiotensin, Bradykinin and Substance P. e. Non-steroidal anti-inflammatory agents f. Anti-gout drugs g. Antirheumatic drugs	10
4.	Pharmacology of drugs acting on endocrine system a. Basic concepts in endocrine pharmacology. b. Anterior Pituitary hormones- analogues and their inhibitors. c. Thyroid hormones- analogues and their inhibitors. d. Hormones regulating plasma calcium level- Parathormone, Calcitonin and Vitamin-D.	8

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Bachelor of Pharmacy
Subject Code: BP502TP

	d. Insulin, Oral Hypoglycemic agents and glucagon. e. ACTH and corticosteroids.	
5.	Pharmacology of drugs acting on endocrine system a. Androgens and Anabolic steroids. b. Estrogens, progesterone and oral contraceptives. c. Drugs acting on the uterus Bioassay a. Principles and applications of bioassay. b. Types of bioassay c. Bioassay of insulin, oxytocin, vasopressin, ACTH, d-tubocurarine, digitalis, histamine and 5-HT	7.

Practical

1. Introduction to *in-vitro* pharmacology and physiological salt solutions.
2. Effect of drugs on isolated frog heart.
3. Effect of drugs on blood pressure and heart rate of dog.
4. Study of diuretic activity of drugs using rats/mice.
5. DRC of acetylcholine using frog rectus abdominis muscle.
6. Effect of physostigmine and atropine on DRC of acetylcholine using frog rectus abdominis muscle and rat ileum respectively.
7. Bioassay of histamine using guinea pig ileum by matching method.
8. Bioassay of oxytocin using rat uterine horn by interpolation method.
9. Bioassay of serotonin using rat fundus strip by three point bioassay.
10. Bioassay of acetylcholine using rat ileum/colon by four point bioassay.
11. Determination of PA_2 value of prazosin using rat anococcygeus muscle (by Schild's plot method).
12. Determination of PD_2 value using guinea pig ileum.
13. Effect of spasmogens and spasmolytics using rabbit jejunum.
14. Anti-inflammatory activity of drugs using carrageenan induced paw-edema model.
15. Analgesic activity of drug using central and peripheral methods.

Note: All laboratory techniques and animal experiments are demonstrated by simulated experiments by softwares and videos

Recommended Books (Latest Editions)

1. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchill Livingstone Elsevier
2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata McGraw-Hill
3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics
4. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs, The Point Lippincott Williams & Wilkins
5. Mycek M.J., Gefaet S.B and Perper M.M. Lippincott's Illustrated Reviews Pharmacology
6. K.D.Tripathi. Essentials of Medical Pharmacology, JAYPEE Brothers Medical Publishers (P) Ltd, New Delhi
7. Sharma H. L., Sharma K. K., Principles of Pharmacology, Paras medical publisher
8. Modern Pharmacology with clinical Applications, by Charles R. Craig & Robert
9. Ghosh MN, Fundamentals of Experimental Pharmacology, Hilton & Company Kolkata.
10. Kulkarni SK, Handbook of experimental pharmacology, Vallabh Prakashan


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GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP503TP

SEMESTER: V

Subject Name: Pharmacognosy and Phytochemistry II

Scope: The main purpose of subject is to impart the students the knowledge of how the secondary metabolites are produced in the crude drugs, how to isolate and identify and produce them industrially. Also this subject involves the study of producing the plants and phytochemicals through plant tissue culture, drug interactions and basic principles of traditional systems of medicine.

Objectives: Upon completion of the course the student shall be able to

1. to know the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents
2. to understand the preparation and development of herbal formulation
3. to understand the herbal drug interactions
4. to carryout isolation and identification of phytoconstituents
- 5.

Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	1	4	6	80	20	80	20

Sr No	Topics	% weightage
1.	Metabolic pathways in higher plants and their determination a) Brief study of basic metabolic pathways and formation of different secondary metabolites through these pathways- Shikimic acid pathway, Acetate pathways and Amino acid pathway. b) Study of utilization of radioactive isotopes in the investigation of Biogenetic studies.	7
2.	General introduction, composition, chemistry & chemical classes, biosources, therapeutic uses and commercial applications of following secondary metabolites: Alkaloids: Vinca, Rauwolfia, Belladonna, Opium, Phenylpropanoids and Flavonoids: Lignans, Tea, Ruta Steroids, Cardiac Glycosides & Triterpenoids: Liquorice, Dioscorea, Digitalis Volatile oils: Mentha, Clove, Cinnamon, Fennel, Coriander, Tannins: Catechu, Pterocarpus Resins: Benzoin, Guggul, Ginger, Asafoetida, Myrrh, Colophony Glycosides: Senna, Aloes, Bitter Almond Iridoids, Other terpenoids & Naphthaquinones: Gentian, Artemisia, taxus, carotenoids	14
3.	Isolation, Identification and Analysis of Phytoconstituents a) Terpenoids: Menthol, Citral, Artemisin b) Glycosides: Glycyrrhetic acid & Rutin c) Alkaloids: Atropine, Quinine, Reserpine, Caffeine d) Resins: Podophyllotoxin, Curcumin	6
4.	Industrial production, estimation and utilization of the following phytoconstituents: Forskolin, Sennoside, Artemisinin, Diosgenin, Digoxin, Atropine, Podophyllotoxin, Caffeine, Taxol, Vincristine and Vinblastine	10

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Bachelor of Pharmacy

Subject Code: BP503TP

5.	Basics of Phytochemistry Modern methods of extraction, application of latest techniques like Spectroscopy, chromatography and electrophoresis in the isolation, purification and identification of crude drugs.	8
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Practical List:

1. Morphology, histology and powder characteristics & extraction & detection of: Cinchona, Cinnamon, Senna, Clove, Ephedra, Fennel and Coriander
2. Exercise involving isolation & detection of active principles
 - a. Caffeine - from tea dust.
 - b. Diosgenin from Dioscorea
 - c. Atropine from Belladonna
 - d. Sennosides from Senna
3. Separation of sugars by Paper chromatography
4. TLC of herbal extract
5. Distillation of volatile oils and detection of phytoconstituents by TLC
6. Analysis of crude drugs by chemical tests: (i) Asafoetida (ii) Benzoin (iii) Colophony (iv) Aloe (v) Myrrh

Recommended Books: (Latest Editions)

1. W.C.Evans, Trease and Evans Pharmacognosy, 16th edition, W.B. Saunders & Co., London, 2009.
2. Mohammad Ali. Pharmacognosy and Phytochemistry, CBS Publishers & Distribution, New Delhi.
3. Text book of Pharmacognosy by C.K. Kokate, Purohit, Gokhale (2007), 37th Edition, Nirali Prakashan, New Delhi.
4. Herbal drug industry by R.D. Choudhary (1996), 1st Edn, Eastern Publisher, New Delhi.
5. Essentials of Pharmacognosy, Dr.SH.Ansari, 1st edition, Birla publications, New Delhi, 2007
6. Herbal Cosmetics by H.Pande, Asia Pacific Business press, Inc, New Delhi.
7. A.N. Kalia, Textbook of Industrial Pharmacognosy, CBS Publishers, New Delhi, 2005
8. R Endress, Plant cell Biotechnology, Springer-Verlag, Berlin, 1994
9. Pharmacognosy & Pharmacobiotechnology. James Bobbers, Marilyn KS, VE Tylor.
10. The formulation and preparation of cosmetic, fragrances and flavours.
11. Remington's Pharmaceutical sciences.
12. Text Book of Biotechnology by Vyas and Dixit
13. Text Book of Biotechnology by R.C. Dubey.


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VAPI,



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP504TP

SEMESTER: V

Subject Name: Pharmaceutical Microbiology

Scope: Study of all categories of microorganisms especially for the production of alcohol antibiotics, vaccines, vitamins enzymes etc...

Objectives: Upon completion of the course the student shall be able to

1. Understand methods of identification, cultivation and preservation of various microorganisms
2. To understand the importance and implementation of sterilization in pharmaceutical processing and industry
3. Learn sterility testing of pharmaceutical products.
4. Carried out microbiological standardization of Pharmaceuticals.
5. Understand the cell culture technology and its applications in pharmaceutical industries.

Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	1	4	6	80	20	80	20

Sr No	Topics	% weightage
1.	Introduction, history of microbiology, its branches, scope and its importance. Introduction to Prokaryotes and Eukaryotes : Study of ultra-structure and morphological classification of bacteria, nutritional requirements, raw materials used for culture media and physical parameters for growth, growth curve, isolation and preservation methods for pure cultures, cultivation of anaerobes, quantitative measurement of bacterial growth (total & viable count). Study of different types of phase contrast microscopy, dark field microscopy and electron microscopy	10
2.	Identification of bacteria using staining techniques (simple, Gram's & Acid fast staining) and biochemical tests (IMViC). Study of principle, procedure, merits, demerits and applications of physical, chemical gaseous, radiation and mechanical method of sterilization. Evaluation of the efficiency of sterilization methods. Equipments employed in large scale sterilization. Sterility indicators.	10
3.	Study of morphology, classification, reproduction/replication and cultivation of Fungi and Viruses. Classification and mode of action of disinfectants Factors influencing disinfection, antiseptics and their evaluation. For bacteriostatic and bactericidal actions. Evaluation of bactericidal & Bacteriostatic. Sterility testing of products (solids, liquids, ophthalmic and other sterile products) according to IP, BP and USP.	10
4.	Designing of aseptic area, laminar flow equipments; study of different sources of contamination in an aseptic area and methods of prevention, clean area classification. Principles and methods of different microbiological assay. Methods for standardization of antibiotics, vitamins and amino acids. Assessment of a new antibiotic.	8
5.	Types of spoilage, factors affecting the microbial spoilage of pharmaceutical products, sources and types of microbial contaminants, assessment of microbial contamination and spoilage. Preservation of pharmaceutical products using antimicrobial agents, evaluation of microbial stability of formulations.	7


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GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BPS04TP

Growth of animal cells in culture, general procedure for cell culture, Primary, established and transformed cell cultures. Application of cell cultures in pharmaceutical industry and research.

Practical List

1. Introduction and study of different equipments and processing, e.g., B.O.D. incubator, laminar flow, aseptic hood, autoclave, hot air sterilizer, deep freezer, refrigerator, microscopes used in experimental microbiology.
2. Sterilization of glassware, preparation and sterilization of media.
3. Sub culturing of bacteria and fungus. Nutrient stabs and slants preparations.
4. Staining methods- Simple, Grams staining and acid fast staining (Demonstration with practical).
5. Isolation of pure culture of micro-organisms by multiple streak plate technique and other techniques.
6. Microbiological assay of antibiotics by cup plate method and other methods
7. Motility determination by Hanging drop method.
8. Sterility testing of pharmaceuticals.
9. Bacteriological analysis of water
10. Biochemical test.

Recommended books: (Latest Edition)

1. W.B. Hugo and A.D. Russel: Pharmaceutical Microbiology, Blackwell Scientific publications, Oxford London.
2. Prescott and Dunn., Industrial Microbiology, 4th edition, CBS Publishers & Distributors, Delhi
3. Pelczar, Chan Kreig, Microbiology, Tata McGraw Hill edn.
4. Malcolm Harris, Balliere Tindall and Cox: Pharmaceutical Microbiology.
5. Rose: Industrial Microbiology.
6. Probisher, Hinsdill et al: Fundamentals of Microbiology, 9th ed. Japan
7. Cooper and Gunn's: Tutorial Pharmacy, CBS Publisher and Distribution.
8. Pepler: Microbial Technology.
9. I.P., B.P., U.S.P.- latest editions.
10. Ananthnarayan : Text Book of Microbiology, Orient-Longman, Chennai
11. Edward: Fundamentals of Microbiology.
12. N.K.Jain: Pharmaceutical Microbiology, Vallabh Prakashan, Delhi
13. Bergeys manual of systematic bacteriology, Williams and Wilkins- A Waverly company


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GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy
Subject Code: BP505TT
SEMESTER: V

Subject Name: Pharmaceutical Biotechnology

Scope:

- Biotechnology has a long promise to revolutionize the biological sciences and technology.
- Scientific application of biotechnology in the field of genetic engineering, medicine and fermentation technology makes the subject interesting.
- Biotechnology is leading to new biological revolutions in diagnosis, prevention and cure of diseases, new and cheaper pharmaceutical drugs.
- Biotechnology has already produced transgenic crops and animals and the future promises lot more.
- It is basically a research-based subject.


Objectives: Upon completion of the course the student shall be able to

1. Understanding the importance of Immobilized enzymes in Pharmaceutical Industries
2. Genetic engineering applications in relation to production of pharmaceuticals
3. Importance of Monoclonal antibodies in Industries
4. Appreciate the use of microorganisms in fermentation technology

Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	1	0	4	80	20	0	0

Sr No	Topics	% weightage
1.	a) Brief introduction to Biotechnology with reference to Pharmaceutical Sciences. b) Enzyme Biotechnology- Methods of enzyme immobilization and applications. c) Biosensors- Working and applications of biosensors in Pharmaceutical Industries. d) Brief introduction to Protein Engineering. e) Use of microbes in industry. Production of Enzymes- General consideration -Amylase, Catalase, Peroxidase, Lipase, Protease, Penicillinase. f) Basic principles of genetic engineering.	10
2.	a) Study of cloning vectors, restriction endonucleases and DNA ligase. b) Recombinant DNA technology. Application of genetic engineering in medicine. c) Application of r DNA technology and genetic engineering in the production of: i) Interferon ii) Vaccines- hepatitis- B iii) Hormones- Insulin. d) Brief introduction to PCR	10
3.	Types of immunity- humoral immunity, cellular immunity a) Structure of Immunoglobulins b) Structure and Function of MHC c) Hypersensitivity reactions, Immune stimulation and Immune suppressions. d) General method of the preparation of bacterial vaccines, toxoids, viral vaccine, antitoxins, serum-immune blood derivatives and other products relative to immunity. e) Storage conditions and stability of official vaccines	10


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Bachelor of Pharmacy

Subject Code: BP505TT

	f) Hybridoma technology- Production, Purification and Applications g) Blood products and Plasma Substitutes.	
4.	a) Immuno blotting techniques- ELISA, Western blotting, Southern blotting. b) Genetic organization of Eukaryotes and Prokaryotes c) Microbial genetics including transformation, transduction, conjugation, plasmids and transposons. d) Introduction to Microbial biotransformation and applications. e) Mutation: Types of mutation/mutants.	8
5.	a) Fermentation methods and general requirements, study of media, equipments, sterilization methods, aeration process, stirring. b) Large scale production fermenter design and its various controls. c) Study of the production of - penicillins, citric acid, Vitamin B12, Glutamic acid, Griseofulvin, d) Blood Products: Collection, Processing and Storage of whole human blood, dried human plasma, plasma Substitutes.	7

Recommended Books (Latest edition):

1. B.R. Glick and J.J. Pasternak: Molecular Biotechnology: Principles and Applications of Recombinant DNA: ASM Press Washington D.C.
2. RA Goldsby et. al., : Kuby Immunology.
3. J.W. Goding: Monoclonal Antibodies.
4. J.M. Walker and E.B. Gingold: Molecular Biology and Biotechnology by Royal Society of Chemistry.
5. Zaborsky: Immobilized Enzymes, CRC Press, Degradand, Ohio.
6. S.B. Primrose: Molecular Biotechnology (Second Edition) Blackwell Scientific Publication.
7. Stanbury F., P., Whitakar A., and Hall J., S., Principles of fermentation technology, 2nd edition, Aditya books Ltd., New Delhi

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GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP601TP

SEMESTER VI

Subject Name: Medicinal Chemistry III

Scope: This subject is designed to impart fundamental knowledge on the structure, chemistry and therapeutic value of drugs. The subject emphasis on modern techniques of rational drug design like quantitative structure activity relationship (QSAR), Prodrug concept, combinatorial chemistry and Computer aided drug design (CADD). The subject also emphasizes on the chemistry, mechanism of action, metabolism, adverse effects, Structure Activity Relationships (SAR), therapeutic uses and synthesis of important drugs.

Objectives: Upon completion of the course the student shall be able to

1. Understand the importance of drug design and different techniques of drug design.
2. Understand the chemistry of drugs with respect to their biological activity
3. Know the metabolism, adverse effects and therapeutic value of drugs.
4. Know the importance of SAR of drugs

Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	1	4	6	30	20	30	20

Sr No	Topics	% weightage
1.	Antibiotics Historical background, Nomenclature, Stereochemistry, Structure activity relationship, Chemical degradation classification and important products of the following classes β-Lactam antibiotics: Penicillin, Cephalosporins, β -Lactamase inhibitors, Monobactams Aminoglycosides: Streptomycin, Neomycin, Kanamycin Tetracyclines: Tetracycline, Oxytetracycline, Chlortetracycline, Minocycline, Doxycycline	10
2.	Antibiotics Historical background, Nomenclature, Stereochemistry, Structure activity relationship, Chemical degradation classification and important products of the following classes Macrolide: Erythromycin, Clarithromycin, Azithromycin Miscellaneous: Chloramphenicol*, Clindamycin Prodrugs: Basic concepts and application of prodrugs design Antimalarials: Etiology of malaria Quinolines: SAR, Quinine sulphate, Chloroquine*, Amodiaquine, Primaquine phosphate, Pamaquine*, Quinacrine hydrochloride, Mefloquine Biguanides and dihydro triazines: Cycloguanil pamoate, Proguanil Miscellaneous: Pyrimethamine, Artesunate, Artemether, Atovaquone.	10
3.	Anti-tubercular Agents Synthetic anti tubercular agents: Isoniazid*, Ethionamide, Ethambutol, Pyrazinamide, Para amino salicylic acid.* Anti tubercular antibiotics: Rifampicin, Rifabutin, Cycloserine Streptomycin, Capreomycin sulphate Urinary tract anti-infective agents Quinolones: SAR of quinolones, Nalidixic Acid, Norfloxacin, Enoxacin.	10

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ROFEL No. G. AP 2017-18

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GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP601 TP

	<p>Ciprofloxacin*, Ofloxacin, Lomefloxacin, Sparfloxacin, Gatifloxacin, Moxifloxacin</p> <p>Miscellaneous: Furazolidine, Nitrofurantoin*, Methanamine</p> <p>Antiviral agents: Amantadine hydrochloride, Rimantadine hydrochloride, Idoxuridine trifluoride, Acyclovir*, Gancyclovir, Zidovudine, Didanosine, Zalcitabine, Lamivudine, Loviride, Delavirding, Ribavirin, Saquinavir, Indinavir, Ritonavir</p>	
4.	<p>Antifungal agents: Antifungal antibiotics: Amphotericin-B, Nystatin, Natamycin, Griseofulvin Synthetic Antifungal agents: Clotrimazole, Econazole, Butoconazole, Oxiconazole, Tioconazole, Miconazole*, Ketoconazole, Terconazole, Itraconazole, Fluconazole, Naftifine hydrochloride, Tolnaftate* Anti-Protozoal Agents: Metronidazole*, Tinidazole, Ornidazole, Diloxanide, Iodoquinol, Pentamidine Isethionate, Atovaquone, Eflornithine Anthelmintics: Diethylcarbamazine citrate*, Thiabendazole, Mebendazole*, Albendazole, Niclosamide, Oxamniquine, Praziquantel, Ivermectin Sulphonamides and Sulfones Historical development, chemistry, classification and SAR of Sulfonamides: Sulphamethizole, Sulfisoxazole, Sulphamethizine, Sulfacetamide*, Sulphapyridine, Sulfamethoxazole*, Sulphadiazine, Mefenide acetate, Sulfasalazine Folate reductase inhibitors: Trimethoprim*, Cotrimoxazole Sulfones: Dapsone*</p>	8
5.	<p>Introduction to Drug Design Various approaches used in drug design. Physicochemical parameters used in quantitative structure activity relationship (QSAR) such as partition coefficient, Hammett's electronic parameter, Taft's steric parameter and Hansch analysis Pharmacophore modeling and docking techniques Combinatorial Chemistry: Concept and applications of Combinatorial chemistry: solid phase and solution phase synthesis.</p>	7

Study of the development of the following classes of drugs. Classification, mechanism of action, uses of drugs mentioned in the course, Structure activity relationship of selective class of drugs as specified in the course and synthesis of drugs superscripted by (*)

Practical

I Preparation of drugs and intermediates

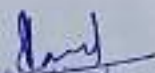
1. 1 Sulphanilamide
2. 2 7-Hydroxy, 4-methyl coumarin
3. 3 Chlorobutanol
4. 4 Triphenyl imidazole
5. 5 Tolbutamide
6. 6 Hexamine

II Assay of drugs

1. 1 Isonicotinic acid hydrazide
2. 2 Chloroquine
3. 3 Metronidazole
4. 4 Dapsone
5. 5 Chlorpheniramine maleate
6. 6 Benzyl penicillin

III Preparation of medicinally important compounds or intermediates by Microwave irradiation technique

IV Drawing structures and reactions using chem draw®


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Bachelor of Pharmacy

Subject Code: BP601TP

V Determination of physicochemical properties such as $\log P$, $c\log P$, MR, Molecular weight, Hydrogen bond donors and acceptors for class of drugs course content using drug design software Drug likeliness screening (Lipinski's RO5)

Recommended Books (Latest Editions)

1. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry.
2. Foye's Principles of Medicinal Chemistry.
3. Burger's Medicinal Chemistry, Vol I to IV.
4. Introduction to principles of drug design- Smith and Williams.
5. Remington's Pharmaceutical Sciences.
6. Martindale's extra pharmacopoeia.
7. Organic Chemistry by I.L. Finar, Vol. II.
8. The Organic Chemistry of Drug Synthesis by Lednicher, Vol. 1-5.
9. Indian Pharmacopoeia.
10. Text book of practical organic chemistry- A.I.Vogel.

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GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP602TP

SEMESTER: VI

Subject Name: Pharmacology III

Scope: This subject is intended to impart the fundamental knowledge on various aspects (classification, mechanism of action, therapeutic effects, clinical uses, side effects and contraindications) of drugs acting on respiratory and gastrointestinal system, infectious diseases, immuno-pharmacology and in addition, emphasis on the principles of toxicology and chronopharmacology.

Objectives: Upon completion of this course the student should be able to:

1. understand the mechanism of drug action and its relevance in the treatment of different infectious diseases
2. comprehend the principles of toxicology and treatment of various poisonings and
3. appreciate correlation of pharmacology with related medical sciences.

Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	1	4	6	80	20	80	20

Sr No	Topics	% weightage
1.	Pharmacology of drugs acting on Respiratory system a. Anti-asthmatic drugs b. Drugs used in the management of COPD c. Expectorants and antitussives d. Nasal decongestants e. Respiratory stimulants	10
2.	Pharmacology of drugs acting on the Gastrointestinal Tract a. Antiulcer agents. b. Drugs for constipation and diarrhoea. c. Appetite stimulants and suppressants. d. Digestants and carminatives. e. Emetics and anti-emetics.	
3.	Chemotherapy a. General principles of chemotherapy. b. Sulfonamides and cotrimoxazole. c. Antibiotics- Penicillins, cephalosporins, chloramphenicol, macrolides, quinolones and fluoroquinolones, tetracycline and aminoglycosides	10
4.	Chemotherapy a. Antitubercular agents b. Antileprotic agents c. Antifungal agents d. Antiviral drugs e. Anthelmintics f. Antimalarial drugs g. Antiamoebic agents	10
5.	Chemotherapy l. Urinary tract infections and sexually transmitted diseases. m. Chemotherapy of malignancy	8
	Immunopharmacology a. Immunostimulants	


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GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP602TP

	b. Immunosuppressant Protein drugs, monoclonal antibodies, target drugs to antigen, biosimilars	
6	Principles of toxicology a. Definition and basic knowledge of acute, subacute and chronic toxicity. b. Definition and basic knowledge of genotoxicity, carcinogenicity, teratogenicity and mutagenicity c. General principles of treatment of poisoning d. Clinical symptoms and management of barbiturates, morphine, organophosphorus compound and lead, mercury and arsenic poisoning	7
7	Chronopharmacology a. Definition of rhythm and cycles. b. Biological clock and their significance leading to chronotherapy.	

Practical

1. Dose calculation in pharmacological experiments
 2. Antiallergic activity by mast cell stabilization assay
 3. Study of anti-ulcer activity of a drug using pylorus ligand (SHAY) rat model and NSAIDS induced ulcer model.
 4. Study of effect of drugs on gastrointestinal motility
 5. Effect of agonist and antagonists on guinea pig ileum
 6. Estimation of serum biochemical parameters by using semi- autoanalyser
 7. Effect of saline purgative on frog intestine
 8. Insulin hypoglycemic effect in rabbit
 9. Test for pyrogens (rabbit method)
 10. Determination of acute oral toxicity (LD50) of a drug from a given data
 11. Determination of acute skin irritation / corrosion of a test substance
 12. Determination of acute eye irritation / corrosion of a test substance
 13. Calculation of pharmacokinetic parameters from a given data
 14. Biostatistics methods in experimental pharmacology(student's t test, ANOVA)
 15. Biostatistics methods in experimental pharmacology (Chi square test, Wilcoxon Signed Rank test)
- *Experiments are demonstrated by simulated experiments/videos*

Recommended Books (Latest Editions)

1. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchill Livingstone Elsevier
2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill
3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics
4. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs. The Point Lippincott Williams & Wilkins
5. Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews- Pharmacology
6. K.D.Tripathi. Essentials of Medical Pharmacology, JAYPEE Brothers Medical Publishers (P) Ltd, New Delhi.
7. Sharma H. L., Sharma K. K., Principles of Pharmacology, Paras medical publisher
8. Modern Pharmacology with clinical Applications, by Charles R.Craig & Robert, Ghosh MN. Fundamentals of Experimental Pharmacology. Hilton & Company, Kolkata,
9. Kulkarni SK. Handbook of experimental pharmacology. VallabhPrakashan,
10. N.Udupa and P.D. Gupta, Concepts in Chronopharmacology.


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GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy
Subject Code: BP663TP
SEMESTER VI

Subject Name: Herbal Drug Technology

Scope: This subject gives the student the knowledge of basic understanding of herbal drug industry, the quality of raw material, guidelines for quality of herbal drugs, herbal cosmetics, natural sweeteners, nutraceutical etc. The subject also emphasizes on Good Manufacturing Practices (GMP), patenting and regulatory issues of herbal drugs

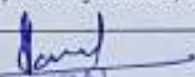
Objectives: Upon completion of this course the student should be able to:

1. understand raw material as source of herbal drugs from cultivation to herbal drug product
2. know the WHO and ICH guidelines for evaluation of herbal drugs
3. know the herbal cosmetics, natural sweeteners, nutraceuticals
4. appreciate patenting of herbal drugs, GMP.

Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	1	4	6	80	20	80	20

Sr No	Topics	% weightage
1.	<p>Herbs as raw materials Definition of herb, herbal medicine, herbal medicinal product, herbal drug preparation Source of Herbs Selection, identification and authentication of herbal materials Processing of herbal raw material</p> <p>Biodynamic Agriculture Good agricultural practices in cultivation of medicinal plants including Organic farming. Pest and Pest management in medicinal plants: Biopesticides/Bioinsecticides.</p> <p>Indian Systems of Medicine a) Basic principles involved in Ayurveda, Siddha, Unani and Homeopathy b) Preparation and standardization of Ayurvedic formulations viz Aristas and Asawas, Ghutika, Churna, Lehya and Bhasma.</p>	11
2.	<p>Nutraceuticals General aspects, Market, growth, scope and types of products available in the market. Health benefits and role of Nutraceuticals in ailments like Diabetes, CVS diseases. Cancer, Irritable bowel syndrome and various Gastro intestinal diseases. Study of following herbs as health food: Alfaalfa, Chicory, Ginger, Fenugreek, Garlic, Honey, Amla, Ginseng, Ashwagandha, Spirulina</p> <p>Herbal-Drug and Herb-Food Interactions: General introduction to interaction and classification. Study of following drugs and their possible side effects and interactions: Hypercium, kava-kava, Ginkobileba, Ginseng, Garlic, Pepper & Eppedra.</p>	7
3.	<p>Herbal Cosmetics Sources and description of raw materials of herbal origin used via, fixed oils, waxes, gums colours, perfumes, protective agents, bleaching agents, antioxidants in products such as skin care, hair care and oral hygiene products.</p> <p>Herbal excipients: Herbal Excipients – Significance of substances of natural origin as excipients – colorants, sweeteners, binders, diluents, viscosity builders, disintegrants, flavors & perfumes.</p>	10


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GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP603TP

	Herbal formulations : Conventional herbal formulations like syrups, mixtures and tablets and Novel dosage forms like phytosomes	
4.	Evaluation of Drugs WHO & ICH guidelines for the assessment of herbal drugs Stability testing of herbal drugs. Patenting and Regulatory requirements of natural products: a) Definition of the terms: Patent, IPR, Farmers right, Breeder's right, Bioprospecting and Biopiracy b) Patenting aspects of Traditional Knowledge and Natural Products. Case study of Curcuma & Neem. Regulatory Issues - Regulations in India (ASU DTAB, ASU DCC), Regulation of manufacture of ASU drugs - Schedule Z of Drugs & Cosmetics Act for ASU drugs	10
5.	General Introduction to Herbal Industry Herbal drugs industry: Present scope and future prospects. A brief account of plant based industries and institutions involved in work on medicinal and aromatic plants in India. Schedule T - Good Manufacturing Practice of Indian systems of medicine Components of GMP (Schedule - T) and its objectives Infrastructural requirements, working space, storage area, machinery and equipments, standard operating procedures, health and hygiene, documentation and records	7

Practical

1. To perform preliminary phytochemical screening of crude drugs.
2. Determination of the alcohol content of Asava and Arista
3. Evaluation of excipients of natural origin
4. Incorporation of prepared and standardized extract in cosmetic formulations like creams, lotions and shampoos and their evaluation.
5. Incorporation of prepared and standardized extract in formulations like syrups, mixtures and tablets and their evaluation as per Pharmacopoeial requirements.
6. Monograph analysis of herbal drugs from recent Pharmacopoeias
7. Determination of Aldehyde content
8. Determination of Phenol content
9. Determination of total alkaloids

Recommended Books (Latest Editions)

1. Textbook of Pharmacognosy by Trease & Evans.
2. Textbook of Pharmacognosy by Tyler, Brady & Robber.
3. Pharmacognosy by Kokate, Purohit and Gokhale
4. Essential of Pharmacognosy by Dr. S.H. Ansari
5. Pharmacognosy & Phytochemistry by V.D. Rangari
6. Pharmacopoeal standards for Ayurvedic Formulation (Council of Research in
7. Indian Medicine & Homoeopathy)
8. Mukherjee, P.W. Quality Control of Herbal Drugs: An Approach to Evaluation of Botanicals. Business Horizons Publishers, New Delhi, India, 2002.


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Shri C. S. Bhatia College of Pharmacy
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GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy
Subject Code: BP604TT
SEMESTER: VI

Subject Name: Biopharmaceutics and Pharmacokinetics

Scope: This subject is designed to impart knowledge and skills of Biopharmaceutics and pharmacokinetics and their applications in pharmaceutical development, design of dose and dosage regimen and in solving the problems arising therein

Objectives: Upon completion of the course the student shall be able to

1. Understand the basic concepts in biopharmaceutics and pharmacokinetics and their significance.
2. Use of plasma drug concentration-time data to calculate the pharmacokinetic parameters to describe the kinetics of drug absorption, distribution, metabolism, excretion, elimination.
3. To understand the concepts of bioavailability and bioequivalence of drug products and their significance.
4. Understand various pharmacokinetic parameters, their significance & applications.

Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	1	0	4	80	20	0	0

Sr No	Topics	% weightage
1.	Introduction Biopharmaceutics To Absorption; Mechanisms of drug absorption through GIT, factors influencing drug absorption through GIT, absorption of drug from Non per oral extra-vascular routes. Distribution Tissue permeability of drugs, binding of drugs, apparent, volume of drug distribution, plasma and tissue protein binding of drugs, factors affecting protein-drug binding. Kinetics of protein binding. Clinical significance of protein binding of drugs.	10
2.	Elimination: Drug metabolism and basic understanding metabolic pathways renal excretion of drugs, factors affecting renal excretion of drugs, renal clearance, Non renal routes of drug excretion of drugs Bioavailability and Bioequivalence: Definition and Objectives of bioavailability, absolute and relative bioavailability, measurement of bioavailability, <i>in-vitro</i> drug dissolution models, <i>in-vitro-in vivo</i> correlations, bioequivalence studies, methods to enhance the dissolution rates and bioavailability of poorly soluble drugs.	10
3.	Pharmacokinetics: Definition and introduction to Pharmacokinetics, Compartment models, Non compartment models, physiological models, One compartment open model. (a) Intravenous Injection (Bolus) (b) Intravenous infusion and (c) Extra vascular administrations. Pharmacokinetics parameters - KE , $t_{1/2}$, V_d , AUC , K_a , Cl_t and CLR - definitions methods of eliminations, understanding of their significance and Application	10
4.	Multicompartment models: Two compartment open model. IV bolus Kinetics of multiple dosing, steady state drug levels, calculation of loading and maintenance doses and their significance in clinical settings	8
5.	Nonlinear Pharmacokinetics: a. Introduction, b. Factors causing Non-linearity. c. Michaelis-menton method of estimating parameters, Explanation with example of drugs.	7


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GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP604TT

Recommended Books (Latest Editions)

1. Biopharmaceutics and Clinical Pharmacokinetics by, Milo Gibaldi.
2. Biopharmaceutics and Pharmacokinetics; By Robert F Notari
3. Applied biopharmaceutics and pharmacokinetics, Leon Shargel and Andrew B.C.YU 4th edition, Prentice-Hall International edition, USA
4. Bio pharmaceutics and Pharmacokinetics-A Treatise, By D. M. Brahmankar and Sunil B. Jaiswal, Vallabh Prakashan Pitampura, Delhi
5. Pharmacokinetics: By Milo Gibaldi Donald, R. Marcel Dekker Inc.
6. Hand Book of Clinical Pharmacokinetics, By Milo Gibaldi and Laurie Prescott by ADIS Health Science Press.
7. Biopharmaceutics; By Swarbrick
8. Clinical Pharmacokinetics, Concepts and Applications. By Malcolm Rowland and
9. Thomas, N. Tozen, Lea and Febrger, Philadelphia, 1995.
10. Dissolution, Bioavailability and Bioequivalence, By Abdou H.M, Mack, Publishing Company, Pennsylvania 1989.
11. Biopharmaceutics and Clinical Pharmacokinetics-An introduction 4th edition Revised and expanded by Robert F Notari Marcel Dekker Inc, New York and Basel. 1987.
12. Remington's Pharmaceutical Sciences, By Mack Publishing Company, Pennsylvania


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Shri M. Bhalodia College of Pharmacy
VAPI



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP665TP

SEMESTER VI

Subject Name: Industrial Pharmacy I

Scope: Course enables the student to understand and appreciate the influence of pharmaceutical additives and various pharmaceutical dosage forms on the performance of the drug product.

Objectives: Upon completion of this course the student should be able to:

1. Know the various pharmaceutical dosage forms and their manufacturing Techniques
2. Know various considerations in development of pharmaceutical dosage forms
3. Formulate solid, liquid and semisolid dosage forms and evaluate them for their quality.

Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	1	4	6	80	20	80	20

Sr No	Topics	% weightage
1.	Preformulation Studies: Introduction to preformulation, goals and objectives, study of physicochemical characteristics of drug substances. a. Physical properties: Physical form (crystal & amorphous), particle size, shape, flow properties, solubility profile (pKa, pH, partition coefficient), polymorphism b. Chemical Properties: Hydrolysis, oxidation, reduction, racemisation, polymerization BCS classification of drugs & its significant. Application of preformulation considerations in the development of solid, liquid oral and parenteral dosage forms and its impact on stability of dosage forms.	7
2.	Tablets: a. Introduction, ideal characteristics of tablets, classification of tablets. Excipients, Formulation of tablets, granulation methods, compression and processing problems. Equipments and tablet tooling. b. Tablet coating: Types of coating, coating materials, formulation of coating composition, methods of coating, equipment employed and defects in coating. c. Quality control tests: In process and finished product tests Liquid orals: Formulation and manufacturing consideration of syrups and elixirs suspensions and emulsions; Filling and packaging, evaluation of liquid orals official in pharmacopoeia	10
3.	Capsules: a. Hard gelatin capsules: Introduction, Production of hard gelatin capsule shells. Size of capsules, Filling, finishing and special techniques of formulation of hard gelatin capsules, manufacturing defects. In process and final product quality control tests for capsules. b. Soft gelatin capsules: Nature of shell and capsule content, size of capsules, importance of base adsorption and minim/gram factors, production, in process and final product quality control tests. Packing, storage and stability testing of soft gelatin capsules and their applications. Pellets: Introduction, formulation requirements, pelletization process, equipments for manufacture of pellets	8
4.	Parenteral Products: a. Definition, types, advantages and limitations. Preformulation factors and essential requirements, vehicles, additives, importance of isotonicity	10

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GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP605TP

	<p>b. Production procedure, production facilities and controls, aseptic processing</p> <p>c. Formulation of injections, sterile powders, large volume parenterals and lyophilized products.</p> <p>d. Containers and closures selection, filling and sealing of ampoules, vials and infusion fluids. Quality control tests of parenteral products.</p> <p>Ophthalmic Preparations: Introduction, formulation considerations; formulation of eye drops, eye ointments and eye lotions; methods of preparation; labeling, containers; evaluation of ophthalmic preparations</p>	
5.	<p>Cosmetics: Formulation and preparation of the following cosmetic preparations: lipsticks, shampoos, cold cream and vanishing cream, tooth pastes, hair dyes and sunscreens.</p> <p>Pharmaceutical Aerosols: Definition, propellants, containers, valves, types of aerosol systems; formulation and manufacture of aerosols; Evaluation of aerosols; Quality control and stability studies.</p> <p>Packaging Materials Science: Materials used for packaging of pharmaceutical products, factors influencing choice of containers, legal and official requirements for containers, stability aspects of packaging materials, quality control tests.</p>	10

Practical

1. Preformulation studies on paracetamol/aspirin/or any other drug
2. Preparation and evaluation of Paracetamol tablets
3. Preparation and evaluation of Aspirin tablets
4. Coating of tablets- film coating of tablets/granules
5. Preparation and evaluation of Tetracycline capsules
6. Preparation of Calcium Gluconate injection
7. Preparation of Ascorbic Acid injection
8. Quality control test of (as per IP) marketed tablets and capsules
9. Preparation of Eye drops/ and Eye ointments
10. Preparation of Creams (cold / vanishing cream)
11. Evaluation of Glass containers (as per IP)

Recommended Books (Latest Editions)

1. Pharmaceutical dosage forms - Tablets, volume 1 -3 by H.A. Liberman, Leon Lachman & J.B. Schwartz
2. Pharmaceutical dosage form - Parenteral medication vol- 1&2 by Liberman & Lachman
3. Pharmaceutical dosage form disperse system VOL-1 by Liberman & Lachman
4. Modern Pharmaceutics by Gilbert S. Banker & C.T. Rhodes, 3rd Edition
5. Remington: The Science and Practice of Pharmacy, 20th edition Pharmaceutical Science (RPS)
6. 6. Theory and Practice of Industrial Pharmacy by Liberman & Lachman
7. Pharmaceutics- The science of dosage form design by M.E.Aulton, Churchill livingstone, Latest edition
8. Introduction to Pharmaceutical Dosage Forms by H. C. Ansel, Lea & Febiger, Philadelphia, 5th edition, 2005
9. Drug stability - Principles and practice by Cartensen & C.J. Rhodes, 3rd Edition, Marcel Dekker Series, Vol 107.

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GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy
Subject Code: BP701TP
SEMESTER: VII

Subject Name: Instrumental Methods of Analysis

Scope: This subject deals with the application of instrumental methods in qualitative and quantitative analysis of drugs. This subject is designed to impart a fundamental knowledge on the principles and instrumentation of spectroscopic and chromatographic technique. This also emphasizes on theoretical and practical knowledge on modern analytical instruments that are used for drug testing.

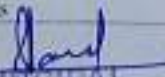
Objectives: Upon completion of the course the student shall be able to

1. Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis.
2. Understand the chromatographic separation and analysis of drugs
3. Perform quantitative & qualitative analysis of drugs using various analytical instruments.

Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	1	4	6	80	20	80	20

Sr No	Topics	% weightage
1.	<p>UV Visible spectroscopy Electronic transitions, chromophores, auxochromes, spectral shifts, solvent effect on absorption spectra, Beer and Lambert's law, Derivation and deviations. Instrumentation - Sources of radiation, wavelength selectors, sample cells, detectors- Photo tube, Photomultiplier tube, Photo voltaic cell, Silicon Photodiode. Applications - Spectrophotometric titrations, Single component and multi component analysis</p> <p>Fluorimetry Theory, Concepts of singlet, doublet and triplet electronic states, internal and external conversions, factors affecting fluorescence, quenching, instrumentation and applications</p>	10
2.	<p>IR spectroscopy Introduction, fundamental modes of vibrations in poly atomic molecules, sample handling, factors affecting vibrations Instrumentation - Sources of radiation, wavelength selectors, detectors - Golay cell, Bolometer, Thermocouple, Thermister, Pyroelectric detector and applications Flame Photometry-Principle, interferences, instrumentation and applications Atomic absorption spectroscopy-Principle, interferences, instrumentation and Applications Nepheloturbidometry- Principle, instrumentation and applications</p>	10
3.	<p>Introduction to chromatography Adsorption and partition column chromatography-Methodology, advantages, disadvantages and applications Thin layer chromatography- Introduction, Principle, Methodology, Rf values, advantages, disadvantages and applications Paper chromatography-Introduction, methodology, development techniques, advantages, disadvantages and applications</p>	10


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Bachelor of Pharmacy
Subject Code: BP701TP

	Electrophoresis - Introduction, factors affecting electrophoretic mobility, Techniques of paper, gel, capillary electrophoresis, applications	
4.	Gas chromatography - Introduction, theory, instrumentation, derivatization, temperature programming, advantages, disadvantages and applications High performance liquid chromatography (HPLC) -Introduction, theory, instrumentation, advantages and applications	8
5.	Ion exchange chromatography - Introduction, classification, ion exchange resins, properties, mechanism of ion exchange process, factors affecting ion exchange, methodology and applications Gel chromatography - Introduction, theory, instrumentation and applications Affinity chromatography - Introduction, theory, instrumentation and applications	7

Practical

1. Determination of absorption maxima and effect of solvents on absorption maxima of organic compounds
2. Estimation of dextrose by colorimetry
3. Estimation of sulfanilamide by colorimetry
4. Simultaneous estimation of ibuprofen and paracetamol by UV spectroscopy
5. Assay of paracetamol by UV- Spectrophotometry
6. Estimation of quinine sulfate by fluorimetry
7. Study of quenching of fluorescence
8. Determination of sodium by flame photometry
9. Determination of potassium by flame photometry
10. Determination of chlorides and sulphates by nephelo turbidometry
11. Separation of amino acids by paper chromatography
12. Separation of sugars by thin layer chromatography
13. Separation of plant pigments by column chromatography
14. Demonstration experiment on HPLC
15. Demonstration experiment on Gas Chromatography

Recommended Books (Latest Editions)

1. Instrumental Methods of Chemical Analysis by B.K. Sharma
2. Organic spectroscopy by Y.R. Sharma
3. Text book of Pharmaceutical Analysis by Kenneth A. Connors
4. Vogel's Text book of Quantitative Chemical Analysis by A.I. Vogel
5. Practical Pharmaceutical Chemistry by A.H. Beckett and J.B. Stenlake
6. Organic Chemistry by I. L. Finar
7. Organic spectroscopy by William Kemp
8. Quantitative Analysis of Drugs by D. C. Garrett
9. Quantitative Analysis of Drugs in Pharmaceutical Formulations by P. D. Sethi
10. Spectrophotometric identification of Organic Compounds by Silverstein


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Bachelor of Pharmacy
Subject Code: BP702TT
SEMESTER: VII

Subject Name: Industrial Pharmacy II

Scope: This course is designed to impart fundamental knowledge on pharmaceutical product development and translation from laboratory to market.

Objectives: Upon completion of the course the student shall be able to

1. Know the process of pilot plant and scale up of pharmaceutical dosage forms
2. Understand the process of technology transfer from lab scale to commercial hatch
3. Know different Laws and Acts that regulate pharmaceutical industry
4. Understand the approval process and regulatory requirements for drug products.

Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	1	0	4	80	20	0	0

Sr No	Topics	% weightage
1.	Pilot plant scale up techniques: General considerations - including significance of personnel requirements, space requirements, raw materials, Pilot plant scale up considerations for solids, liquid orals, semi solids and relevant documentation, SUPAC guidelines, Introduction to platform technology	10
2.	Technology development and transfer: WHO guidelines for Technology Transfer(TT): Terminology, Technology transfer protocol, Quality risk management, Transfer from R & D to production (Process, packaging and cleaning), Granularity of TT Process (API, excipients, finished products, packaging materials) Documentation, Premises and equipments, qualification and validation, quality control, analytical method transfer, Approved regulatory bodies and agencies, Commercialization - practical aspects and problems (case studies), TT agencies in India - APCTD, NRDC, TIFAC, BCIL, TBSE / SIDBI; TT related documentation - confidentiality agreement, licensing, MoUs, legal issues	10
3.	Regulatory affairs: Introduction, Historical overview of Regulatory Affairs, Regulatory authorities, Role of Regulatory affairs department, Responsibility of Regulatory Affairs Professionals Regulatory requirements for drug approval: Drug Development Teams, Non-Clinical Drug Development, Pharmacology, Drug Metabolism and Toxicology, General considerations of Investigational New Drug (IND) Application, Investigator's Brochure (IB) and New Drug Application (NDA), Clinical research / BE studies, Clinical Research Protocols, Biostatistics in Pharmaceutical Product Development, Data Presentation for FDA Submissions, Management of Clinical Studies.	10
4.	Quality management systems: Quality management & Certifications: Concept of Quality, Total Quality Management, Quality by Design (QbD), Six Sigma concept, Out of Specifications (OOS), Change control, Introduction to ISO 9000 series of quality systems standards, ISO 14000, NABL, GLP	8
5.	Indian Regulatory Requirements: Central Drug Standard Control Organization (CDSCO) and State Licensing Authority: Organization, Responsibilities, Certificate of Pharmaceutical Product (COPP), Regulatory requirements and approval procedures for New Drugs.	7

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Bachelor of Pharmacy

Subject Code: BP702TT

Recommended Books (Latest Editions)

1. Regulatory Affairs from Wikipedia, the free encyclopedia modified on 7th April available at http://en.wikipedia.org/wiki/Regulatory_Affairs.
2. International Regulatory Affairs Updates, 2005, available at <http://www.iraup.com/about.php>
3. Douglas J Pisano and David S. Mantus. Text book of FDA Regulatory Affairs A Guide for Prescription Drugs, Medical Devices, and Biologics' Second Edition.
4. Regulatory Affairs brought by learning plus, inc. available at <http://www.cgmp.com/ra.htm>.


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GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP703TT

SEMESTER: VII

Subject Name: Pharmacy Practice

Scope: In the changing scenario of pharmacy practice in India, for successful practice of Hospital Pharmacy, the students are required to learn various skills like drug distribution, drug information, and therapeutic drug monitoring for improved patient care. In community pharmacy, students will be learning various skills such as dispensing of drugs, responding to minor ailments by providing suitable safe medication, patient counselling for improved patient care in the community set up.

Objectives: Upon completion of the course the student shall be able to

1. know various drug distribution methods in a hospital
2. appreciate the pharmacy stores management and inventory control
3. monitor drug therapy of patient through medication chart review and clinical review
4. obtain medication history interview and counsel the patients
5. identify drug related problems
6. detect and assess adverse drug reactions
7. interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states
8. know pharmaceutical care services
9. do patient counseling in community pharmacy;
10. appreciate the concept of Rational drug therapy

Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	1	0	4	80	20	0	0

Sr No	Topics	% weightage
1.	<p>a) Hospital and it's organization Definition, Classification of hospital- Primary, Secondary and Tertiary hospitals, Classification based on clinical and non-clinical basis, Organization Structure of a Hospital, and Medical staffs involved in the hospital and their functions.</p> <p>b) Hospital pharmacy and its organization Definition, functions of hospital pharmacy, Organization structure, Location, Layout and staff requirements, and Responsibilities and functions of hospital pharmacists.</p> <p>c) Adverse drug reaction Classifications - Excessive pharmacological effects, secondary pharmacological effects, idiosyncrasy, allergic drug reactions, genetically determined toxicity, toxicity following sudden withdrawal of drugs, Drug interaction- beneficial interactions, adverse interactions, and pharmacokinetic drug interactions. Methods for detecting drug interactions, spontaneous case reports and record linkage studies, and Adverse drug reaction reporting and management.</p> <p>d) Community Pharmacy Organization and structure of retail and wholesale drug store, types and design. Legal requirements for establishment and maintenance of a drug store. Dispensing of proprietary products, maintenance of records of retail and wholesale drug store.</p>	10
2.	a) Drug distribution system in a hospital	10

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Bachelor of Pharmacy

Subject Code: BP703TT

	<p>Dispensing of drugs to inpatients, types of drug distribution systems, charging policy and labelling, Dispensing of drugs to ambulatory patients, and Dispensing of controlled drugs.</p> <p>b) Hospital formulary Definition, contents of hospital formulary, Differentiation of hospital formulary and Drug list, preparation and revision, and addition and deletion of drug from hospital formulary.</p> <p>c) Therapeutic drug monitoring Need for Therapeutic Drug Monitoring, Factors to be considered during the Therapeutic Drug Monitoring, and Indian scenario for Therapeutic Drug Monitoring.</p> <p>d) Medication adherence Causes of medication non-adherence, pharmacist role in the medication adherence, and monitoring of patient medication adherence.</p> <p>e) Patient medication history interview Need for the patient medication history interview, medication interview forms.</p> <p>f) Community pharmacy management Financial, materials, staff, and infrastructure requirements.</p>	
3.	<p>Pharmacy and therapeutic committee Organization, functions, Policies of the pharmacy and therapeutic committee in including drugs into formulary, inpatient and outpatient prescription, automatic stop order, and emergency drug list preparation.</p> <p>b) Drug information services Drug and Poison information centre, Sources of drug information, Computerised services, and storage and retrieval of information.</p> <p>c) Patient counseling Definition of patient counseling, steps involved in patient counseling, and Special cases that require the pharmacist</p> <p>d) Education and training program in the hospital Role of pharmacist in the education and training program, Internal and external training program, Services to the nursing homes/clinics, Code of ethics for community pharmacy, and Role of pharmacist in the interdepartmental communication and community health education.</p> <p>e) Prescribed medication order and communication skills Prescribed medication order- interpretation and legal requirements, and Communication skills- communication with prescribers and patients.</p>	10
4.	<p>a) Budget preparation and implementation Budget preparation and implementation</p> <p>b) Clinical Pharmacy Introduction to Clinical Pharmacy, Concept of clinical pharmacy, functions and responsibilities of clinical pharmacist, Drug therapy monitoring - medication chart review, clinical review, pharmacist intervention, Ward round participation, Medication history and Pharmaceutical care. Dosing pattern and drug therapy based on Pharmacokinetic & disease pattern.</p> <p>c) Over the counter (OTC) sales Introduction and sale of over the counter, and Rational use of common over the counter medications.</p>	8
5.	<p>a) Drug store management and inventory control Organisation of drug store, types of materials stocked and storage conditions, Purchase and inventory control: principles, purchase procedure, purchase order, procurement and stocking, Economic order quantity, Reorder quantity level, and Methods used for the analysis of the drug expenditure</p> <p>b) Investigational use of drugs</p>	7



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP703TT

Description, principles involved, classification, control, identification, role of hospital pharmacist, advisory committee.

c) Interpretation of Clinical Laboratory Tests

Blood chemistry, hematology, and urinalysis

Recommended Books (Latest Editions)

1. Merchant S.H. and Dr. J.S. Quadry. *A textbook of hospital pharmacy*, 4th ed. Ahmadabad: B.S. Shah Prakashan, 2001.
2. Parthasarathi G, Karin Nyfort-Hansen, Milap C Nahata. *A textbook of Clinical Pharmacy Practice- essential concepts and skills*, 1st ed. Chennai: Orient Longman Private Limited, 2004.
3. William E. Hassan. *Hospital pharmacy*, 5th ed. Philadelphia: Lea & Febiger, 1986.
4. Tipnis Bajaj. *Hospital Pharmacy*, 1st ed. Maharashtra: Career Publications, 2008.
5. Scott L.T. *Basic skills in interpreting laboratory data*, 4th ed. American Society of Health System Pharmacists Inc, 2009.
6. Parmar N.S. *Health Education and Community Pharmacy*, 18th ed. India: CBS Publishers & Distributors, 2008.

Journals:

1. Therapeutic drug monitoring. ISSN: 0163-4356
2. Journal of pharmacy practice. ISSN: 0974-8326
3. American journal of health system pharmacy. ISSN: 1535-2900 (online)
4. Pharmacy times (Monthly magazine)

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GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP7041T

SEMESTER VII

Subject Name: NOVEL DRUG DELIVERY SYSTEMS

Scope: This subject is designed to impart basic knowledge on the area of novel drug delivery systems.


Objectives: Upon completion of the course the student shall be able to

1. To understand various approaches for development of novel drug delivery systems.
2. To understand the criteria for selection of drugs and polymers for the development of Novel drug delivery systems, their formulation and evaluation.

Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	1	4	8	80	20	0	0

Sr No	Topics	% weightage
1.	Controlled drug delivery systems: Introduction, terminology/definitions and rationale, advantages, disadvantages, selection of drug candidates. Approaches to design controlled release formulations based on diffusion, dissolution and ion exchange principles. Physicochemical and biological properties of drugs relevant to controlled release formulations Polymers: Introduction, classification, properties, advantages and application of polymers in formulation of controlled release drug delivery systems.	10
2.	Microencapsulation: Definition, advantages and disadvantages, microspheres /microcapsules, microparticles, methods of microencapsulation, applications Mucosal Drug Delivery system: Introduction, Principles of bioadhesion / mucoadhesion, concepts, advantages and disadvantages, transmucosal permeability and formulation considerations of buccal delivery systems Implantable Drug Delivery Systems: Introduction, advantages and disadvantages, concept of implants and osmotic pump	10
3.	Transdermal Drug Delivery Systems: Introduction, Permeation through skin, factors affecting permeation, permeation enhancers, basic components of TDDS, formulation approaches Gastroretentive drug delivery systems: Introduction, advantages, disadvantages, approaches for GRDDS – Floating, high density systems, inflatable and gastroadhesive systems and their applications Nasopulmonary drug delivery system: Introduction to Nasal and Pulmonary routes of drug delivery, Formulation of Inhalers (dry powder and metered dose), nasal sprays, nebulizers	10
4.	Targeted drug Delivery: Concepts and approaches advantages and disadvantages, introduction to liposomes, niosomes, nanoparticles, monoclonal antibodies and their applications	8
5.	Ocular Drug Delivery Systems: Introduction, intra ocular barriers and methods to overcome –Preliminary study, ocular formulations and ocuserts Intrauterine Drug Delivery Systems: Introduction, advantages and disadvantages, development of intra uterine devices (IUDs) and applications	7


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GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy
Subject Code: BP704TT

Recommended Books (Latest Editions)

1. Y. W. Chien, Novel Drug Delivery Systems, 2nd edition, revised and expanded, Marcel Dekker, Inc., New York, 1992.
2. Robinson, J. R., Lee V. H. L., Controlled Drug Delivery Systems, Marcel Dekker, Inc., New York, 1992.
3. Encyclopedia of Controlled Delivery, Edith Mathiowitz, Published by Wiley Interscience Publication, John Wiley and Sons, Inc, New York. Chichester/Weinheim
4. N.K. Jain, Controlled and Novel Drug Delivery, CBS Publishers & Distributors, New Delhi, First edition 1997 (reprint in 2001).
5. S.P. Vyas and R.K. Khar, Controlled Drug Delivery -concepts and advances, Vallabh Prakashan, New Delhi, First edition 2002.

Journals

1. Indian Journal of Pharmaceutical Sciences (IPA)
2. Indian Drugs (IDMA)
3. Journal of Controlled Release (Elsevier Sciences)
4. Drug Development and Industrial Pharmacy (Marcel & Decker)
5. International Journal of Pharmaceutics (Elsevier Sciences)

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GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy
Subject Code: BP705PP
SEMESTER: VII
Subject Name: Practice School

Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
0	0	12	6	0	0	0	100

Guidelines:

In the VII semester, every candidate shall undergo practice school for a period of 150 hours during the semester. The student shall opt any one of the following activity for practice school:

- Hospital training (Hospital having minimum 10 bed facilities)
- Training in Drug store/ CHC/ PHC
- Training in a R & D organization/ CRO/ Manufacturing organization/ QA & QC Laboratory/ Public testing laboratory/ Drug regulatory body
- Successfully pass MOOCS course equivalent to 6 credits through SWAYAM Platform
- Detailed literature review on any technical topic (At least 50 references should be included in the report to be submitted)

At the end of the practice school, every student shall submit a printed report (in triplicate) on the practice school he/she attended (about 25 pages). Along with the exams of semester VII, the report submitted by the student, knowledge and skills acquired by the student through practice school shall be evaluated by the subject experts at college level and grade point shall be awarded.

The students can opt for Practice School and can perform the activities for Practice school after completion of Semester IV onwards (during the vacation/ official Holidays). Those who are doing Practice school during this period must complete the prescribed days or hours for practice School as per the guidelines. Institute should maintain documentation regarding Practice school for each student with requisite evidence.

* Certificate of training should be incorporated in the report.


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GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP706TT

SEMESTER: VII

Subject Name: Quality Assurance

Scope: This course deals with the various aspects of quality control and quality assurance aspects of pharmaceutical industries. It deals with the important aspects like cGMP, QC tests, documentation, quality certifications and regulatory affairs.

Objectives: Upon completion of the course the student shall be able to

1. understand the cGMP aspects in a pharmaceutical industry
2. appreciate the importance of documentation
3. understand the scope of quality certifications applicable to pharmaceutical industries
4. understand the responsibilities of QA & QC departments.

Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
1	1	0	4	80	20	0	0

Sr No	Topics	% weightage
1.	<p>Quality Assurance and Quality Management concepts: Definition and concept of Quality control, Quality assurance and GMP</p> <p>Total Quality Management (TQM): Definition, elements, philosophies</p> <p>ICH Guidelines: purpose, participants, process of harmonization, Brief overview of QSEM, with special emphasis on Q-series guidelines, ICH stability testing guidelines</p> <p>Quality by design (QbD): Definition, overview, elements of QbD program, tools</p> <p>ISO 9000 & ISO14000: Overview, Benefits, Elements, steps for registration</p> <p>NABL accreditation: Principles and procedures</p>	10
2.	<p>Organization and personnel: Personnel responsibilities, training, hygiene and personal records.</p> <p>Premises: Design, construction and plant layout, maintenance, sanitation, environmental control, utilities and maintenance of sterile areas, control of contamination.</p> <p>Equipments and raw materials: Equipment selection, purchase specifications, maintenance, purchase specifications and maintenance of stores for raw materials.</p>	10
3.	<p>Quality Control: Quality control test for containers, rubber closures and secondary packing materials.</p> <p>Good Laboratory Practices: General Provisions, Organization and Personnel, Facilities, Equipment, Testing Facilities Operation, Test and Control Articles, Protocol for Conduct of a Nonclinical Laboratory Study, Records and Reports, Disqualification of Testing Facilities</p>	10
4.	<p>Complaints: Complaints and evaluation of complaints, Handling of return good, recalling and waste disposal</p> <p>Document maintenance in pharmaceutical industry: Batch Formula Record, Master Formula Record, SOP, Quality audit, Quality Review and Quality documentation, Reports and documents, distribution records</p>	8
5.	<p>Calibration and Validation: Introduction, definition and general principles of calibration, qualification and validation, importance and scope of validation,</p>	7

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Bachelor of Pharmacy

Subject Code: BP706TT

types of validation, validation master plan, Calibration of pH meter, Qualification of UV-Visible spectrophotometer, General principles of Analytical method Validation.	
Warehousing: Good warehousing practice, materials management	

Recommended Books (Latest Editions)

1. Quality Assurance Guide by organization of Pharmaceutical Products of India.
2. Good Laboratory Practice Regulations, 2nd Edition, Sandy Weinberg Vol. 69.
3. Quality Assurance of Pharmaceuticals- A compendium of Guide lines and Related materials Vol I WHO Publications.
4. A guide to Total Quality Management- Kushik Maitra and Sedhan K Ghosh
5. How to Practice GMP's - P P Sharma.
6. ISO 9000 and Total Quality Management - Sadhan G Ghosh
7. The International Pharmacopoeia - Vol I, II, III, IV- General Methods of Analysis and Quality specification for Pharmaceutical Substances, Excipients and Dosage forms
8. Good laboratory Practices - Marcel Dekker Series
9. ICH guidelines, ISO 9000 and 14000 guidelines


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A.M. Bhatia College of Pharmacy
VAPL



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP801TT

SEMESTER: VIII

Subject Name: Biostatistics and Research Methodology

Scope: To understand the applications of Biostatistics in Pharmacy. This subject deals with descriptive statistics, Graphics, Correlation, Regression, logistic regression Probability theory, Sampling technique, Parametric tests, Non Parametric tests, ANOVA, Introduction to Design of Experiments, Phases of Clinical trials and Observational and Experimental studies, SPSS, R and MINITAB statistical software's, analyzing the statistical data using Excel

Objectives: Upon completion of the course the student shall be able to

1. Know the operation of M.S. Excel, SPSS, R and MINITAB®, DoE (Design of Experiment)
2. Know the various statistical techniques to solve statistical problems
3. Appreciate statistical techniques in solving the problems

Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	1	0	4	80	20	0	0

Sr No	Topics	% weightage
1.	Introduction: Statistics, Biostatistics, Frequency distribution Measures of central tendency: Mean, Median, Mode- Pharmaceutical examples Measures of dispersion: Dispersion, Range, standard deviation, Pharmaceutical Problems Correlation: Definition, Karl Pearson's coefficient of correlation, Multiple correlation - Pharmaceuticals examples	10
2.	Regression: Curve fitting by the method of least squares, fitting the lines $y = a + bx$ and $x = a + by$, Multiple regression, standard error of regression-Pharmaceutical Examples Probability: Definition of probability, Binomial distribution, Normal distribution Poisson's distribution, properties - problems Sample, Population, large sample, small sample, Null hypothesis, alternative hypothesis, sampling, essence of sampling, types of sampling, Error-I type, Error-II type, Standard error of mean (SEM) - Pharmaceutical examples Parametric test: t-test(Sample, Pooled or Unpaired or Paired) , ANOVA, (One way and Two way), Least Significance difference	10
3.	Non Parametric tests: Wilcoxon Rank Sum Test, Mann-Whitney U test, Kruskal-Wallis test, Friedman Test Introduction to Research: Need for research, Need for design of Experiments, Experimental Design Technique, plagiarism Graphs: Histogram, Pie Chart, Cubic Graph, response surface plot, Counter Plot graph Designing the methodology: Sample size determination and Power of a study, Report writing and presentation of data, Protocol, Cohorts studies, Observational studies, Experimental studies, Designing clinical trial, various phases.	10
4.	Blocking and confounding system for Two-level factorials Regression modeling: Hypothesis testing in Simple and Multiple regression models	8

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GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP801TT

	Introduction to Practical components of Industrial and Clinical Trials Problems. Statistical Analysis Using Excel, SPSS, MINITAB®, DESIGN OF EXPERIMENTS, R - Online Statistical Software's to Industrial and Clinical trial approach	
5.	Design and Analysis of experiments: Factorial Design: Definition, 22, 23 design. Advantage of factorial design Response Surface methodology: Central composite design, Historical design, Optimization Techniques	7

Recommended Books (Latest edition):

1. Pharmaceutical statistics- Practical and clinical applications, Sanford Bolton, publisher Marcel Dekker Inc, New York.
2. Fundamental of Statistics – Himalaya Publishing House- S.C.Guptha
3. Design and Analysis of Experiments – PHI Learning Private Limited, R. Pannerselvam
4. Design and Analysis of Experiments – Wiley Students Edition, Douglas and C. Montgomery


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GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy
Subject Code: BP802TT
SEMESTER: VIII

Subject Name: Social and Preventive Pharmacy

Scope: The purpose of this course is to introduce to students a number of health issues and their challenges. This course also introduced a number of national health programmes. The roles of the pharmacist in these contexts are also discussed.

Objectives: Upon completion of the course the student shall be able to

1. Acquire high consciousness/realization of current issues related to health and pharmaceutical problems within the country and worldwide
2. Have a critical way of thinking based on current healthcare development
3. Evaluate alternative ways of solving problems related to health and pharmaceutical issues.

Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	1	0	4	80	20	0	0

Sr No	Topics	% weightage
1.	Concept of health and disease: Definition, concepts and evaluation of public health. Understanding the concept of prevention and control of disease, social causes of diseases and social problems of the sick. Social and health education: Food in relation to nutrition and health, Balanced diet, Nutritional deficiencies, Vitamin deficiencies, Malnutrition and its prevention. Sociology and health: Socio cultural factors related to health and disease, Impact of urbanization on health and disease, Poverty and health Hygiene and health: personal hygiene and health care; avoidable habits	10
2.	Preventive medicine: General principles of prevention and control of diseases such as cholera, SARS, Ebola virus, influenza, acute respiratory infections, malaria, chicken guinea, dengue, lymphatic filariasis, pneumonia, hypertension, diabetes mellitus, cancer, drug addiction-drug substance abuse	10
3.	National health programs, its objectives, functioning and outcome of the following: HIV AND AIDS control programme, TB, Integrated disease surveillance program (IDSP), National leprosy control programme, National mental health program, National programme for prevention and control of deafness, Universal immunization programme, National programme for control of blindness, Pulse polio programme	10
4.	National health intervention programme for mother and child, National family welfare programme, National tobacco control programme, National Malaria Prevention Program, National programme for the health care for the elderly, Social health programme; role of WHO in Indian national program	8
5.	Community services in rural, urban and school health; Functions of PHC. Improvement in rural sanitation, national urban health mission, Health promotion and education in school.	7


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GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP8021T

Recommended Books (Latest edition):

1. Short Textbook of Preventive and Social Medicine, Prabhakara GN, 2nd Edition, 2010, ISBN: 9789380704104, JAYPEE Publications
2. Textbook of Preventive and Social Medicine (Mahajan and Gupta), Edited by Roy Rabindra Nath, Saha Indrani, 4th Edition, 2013, ISBN: 9789350901878, JAYPEE Publications
3. Review of Preventive and Social Medicine (Including Biostatistics), Jain Vivek, 6th Edition, 2014, ISBN: 9789351522331, JAYPEE Publications
4. Essentials of Community Medicine—A Practical Approach, Hiremath Lalita D, Hiremath Dhananjaya A, 2nd Edition, 2012, ISBN: 9789350250440, JAYPEE Publications
5. Park Textbook of Preventive and Social Medicine, K Park, 21st Edition, 2011, ISBN-14: 9788190128285, BANARSIDAS BHANOT PUBLISHERS
6. Community Pharmacy Practice, Ramesh Adepu, BSP publishers, Hyderabad

Recommended Journals:

1. Research in Social and Administrative Pharmacy, Elsevier, Ireland

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GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy
Subject Code: BP803TT
SEMESTER: VIII

Subject Name: Pharma Marketing Management

Scope: The pharmaceutical industry not only needs highly qualified researchers, chemists and, technical people, but also requires skilled managers who can take the industry forward by managing and taking the complex decisions which are imperative for the growth of the industry. The Knowledge and Know-how of marketing management groom the people for taking a challenging role in Sales and Product management.

Objectives: The course aims to provide an understanding of marketing concepts and techniques and their applications in the pharmaceutical industry.

Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	1	0	4	80	20	0	0

Sr No	Topics	% weightage
1.	Marketing: Definition, general concepts and scope of marketing; Distinction between marketing & selling; Marketing environment; Industry and competitive analysis; Analyzing consumer buying behavior; industrial buying behavior. Pharmaceutical market: Quantitative and qualitative aspects; size and composition of the market; demographic descriptions and socio-psychological characteristics of the consumer; market segmentation & targeting. Consumer profile; Motivation and prescribing habits of the physician; patients' choice of physician and retail pharmacist. Analyzing the Market; Role of market research.	10
2.	Product decision: Classification, product line and product mix decisions, product life cycle, product portfolio analysis; product positioning; New product decisions; Product branding, packaging and labeling decisions, Product management in pharmaceutical industry.	10
3.	Promotion: Methods, determinants of promotional mix, promotional budget; An overview of personal selling, advertising, direct mail, journals, sampling, retailing, medical exhibition, public relations, online promotional techniques for OTC Products.	10
4.	Pharmaceutical marketing channels: Designing channel, channel members, selecting the appropriate channel, conflict in channels, physical distribution management. Strategic importance, tasks in physical distribution management. Professional sales representative (PSR): Duties of PSR, purpose of detailing, selection and training, supervising, norms for customer calls, motivating, evaluating, compensation and future prospects of the PSR.	10
5.	Pricing: Meaning, importance, objectives, determinants of price; pricing methods and strategies, issues in price management in pharmaceutical industry. An overview	10

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GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP803TT

of DPCO (Drug Price Control Order) and NPPA (National Pharmaceutical Pricing Authority). Emerging concepts in marketing: Vertical & Horizontal Marketing; Rural Marketing; Consumerism; Industrial Marketing; Global Marketing.	
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Recommended Books: (Latest Editions)

1. Philip Kotler and Kevin Lane Keller: Marketing Management, Prentice Hall of India, New Delhi
2. Walker, Boyd and Larreche : Marketing Strategy- Planning and Implementation, Tata MC GrawHill, New Delhi.
3. Dhruv Grewal and Michael Levy: Marketing, Tata MC Graw Hill
4. Arun Kumar and N Menakshi: Marketing Management, Vikas Publishing, India
5. Rajan Saxena: Marketing Management; Tata MC Graw-Hill (India Edition)
6. Ramaswamy, U.S & Nanakamari, S; Marketing Managemnt:Global Perspective, IndianContext,Macmilan India, New Delhi.
7. Shanker, Ravi: Service Marketing, Excell Books, New Delhi
8. Subba Rao Changanti, Pharmaceutical Marketing in India (GIFT – Excel series) Excel Publications.

PRINCIPAL

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GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy
Subject Code: BP804TT
SEMESTER: VIII

Subject Name: Pharmaceutical Regulatory science

Scope: This course is designed to impart the fundamental knowledge on the regulatory requirements for approval of new drugs, and drug products in regulated markets of India & other countries like US, EU, Japan, Australia, UK etc. It prepares the students to learn in detail on the regulatory requirements, documentation requirements, and registration procedures for marketing the drug products.

Objectives: Upon completion of the subject student shall be able to:

1. Know about the process of drug discovery and development
2. Know the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals
3. Know the regulatory approval process and their registration in Indian and international markets

Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	1	0	4	80	20	0	0

Sr No	Topics	% weightage
1.	New Drug Discovery and development Stages of drug discovery, Drug development process, pre-clinical studies, non-clinical activities, clinical studies, Innovator and generics, Concept of generics, Generic drug product development.	10
2.	Regulatory Approval Process Approval processes and timelines involved in Investigational New Drug (IND), New Drug Application (NDA), Abbreviated New Drug Application (ANDA). Changes to an approved NDA / ANDA. Regulatory authorities and agencies Overview of regulatory authorities of India, United States, European Union, Australia, Japan, Canada (Organization structure and types of applications)	10
3.	Registration of Indian drug product in overseas market Procedure for export of pharmaceutical products, Technical documentation, Drug Master Files (DMF), Common Technical Document (CTD), electronic Common Technical Document (eCTD), ASEAN Common Technical Document (ACTD) research.	10
4.	Clinical trials Developing clinical trial protocols, Institutional Review Board / Independent Ethics committee - formation and working procedures, Informed consent process and procedures, GCP obligations of Investigators, sponsors & Monitors, Managing and Monitoring clinical trials, Pharmacovigilance - safety monitoring in clinical trials	8
5.	Regulatory Concepts Basic terminology, guidance, guidelines, regulations, Laws and Acts, Orange book, Federal Register, Code of Federal Regulatory, Purple book	7

Principal

ROFEL

Shri G.M. Dhamli College of Pharmacy

VAPI,

v.v.f. AY 2017-18



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP804TT

Recommended Books: (Latest Editions)

1. Drug Regulatory Affairs by Sachin Itkar, Dr. N.S. Vyawahare, Nirali Prakashan.
2. The Pharmaceutical Regulatory Process, Second Edition Edited by Ira R. Berry and Robert P. Martin, Drugs and the Pharmaceutical Sciences, Vol.185. Informa Health care Publishers.
3. New Drug Approval Process: Accelerating Global Registrations By Richard A Guarino, MD, 5th edition, Drugs and the Pharmaceutical Sciences, Vol.190.
4. Guidebook for drug regulatory submissions / Sandy Weinberg. By John Wiley & Sons, Inc.
5. FDA Regulatory Affairs: a guide for prescription drugs, medical devices, and biologics /edited by Douglas J. Pisano, David Mantus.
6. Generic Drug Product Development, Solid Oral Dosage forms, Leon Shargel and Isader Kaufer, Marcel Dekker series, Vol.143
7. Clinical Trials and Human Research: A Practical Guide to Regulatory Compliance By Fay A. Rozovsky and Rodney K. Adams
8. Principles and Practices of Clinical Research, Second Edition Edited by John L. Gallin and Frederick P. Ognibene
9. Drugs: From Discovery to Approval, Second Edition By Rick Ng

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GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP805TT

SEMESTER: VIII

Subject Name: PHARMACOVIGILANCE

Scope: This paper will provide an opportunity for the student to learn about development of pharmacovigilance as a science, basic terminologies used in pharmacovigilance, global scenario of Pharmacovigilance, train students on establishing pharmacovigilance programme in an organization, various methods that can be used to generate safety data and signal detection. This paper also develops the skills of classifying drugs, diseases and adverse drug reactions.

Objectives: At completion of this paper it is expected that students will be able to (know, do, and appreciate)

1. Why drug safety monitoring is important?
2. History and development of pharmacovigilance
3. National and international scenario of pharmacovigilance
4. Dictionaries, coding and terminologies used in pharmacovigilance
5. Detection of new adverse drug reactions and their assessment
6. International standards for classification of diseases and drugs
7. Adverse drug reaction reporting systems and communication in pharmacovigilance
8. Methods to generate safety data during pre clinical, clinical and post approval phases of drugs' life cycle
9. Drug safety evaluation in paediatrics, geriatrics, pregnancy and lactation
10. Pharmacovigilance Program of India (PvPI) requirement for ADR reporting in India
11. ICH guidelines for ICSR, PSUR, expedited reporting, pharmacovigilance planning
12. CIOMS requirements for ADR reporting
13. Writing case narratives of adverse events and their quality.

Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	1	0	4	80	20	0	0

Sr No	Topics	% weightage
1.	Introduction to Pharmacovigilance History and development of Pharmacovigilance Importance of safety monitoring of Medicine WHO international drug monitoring programme Pharmacovigilance Program of India(PvPI) Introduction to adverse drug reactions Definitions and classification of ADRs Detection and reporting Methods in Causality assessment Severity and seriousness assessment Predictability and preventability assessment Management of adverse drug reactions Basic terminologies used in pharmacovigilance Terminologies of adverse medication related events Regulatory terminologies	10
2.	Drug and disease classification Anatomical, therapeutic and chemical classification of drugs International classification of diseases	10

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GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP8051T

	Daily defined doses International Non proprietary Names for drugs Drug dictionaries and coding in pharmacovigilance WHO adverse reaction terminologies MedDRA and Standardised MedDRA queries WHO drug dictionary Eudravigilance medicinal product dictionary Information resources in pharmacovigilance Basic drug information resources Specialised resources for ADRs Establishing pharmacovigilance programme Establishing in a hospital Establishment & operation of drug safety department in industry Contract Research Organisations (CROs) Establishing a national programme	
3.	Vaccine safety surveillance Vaccine Pharmacovigilance Vaccination failure Adverse events following immunization Pharmacovigilance methods Passive surveillance – Spontaneous reports and case series Stimulated reporting Active surveillance – Sentinel sites, drug event monitoring and registries Comparative observational studies – Cross sectional study, case control study and cohort study Targeted clinical investigations Communication in pharmacovigilance Effective communication in Pharmacovigilance Communication in Drug Safety Crisis management Communicating with Regulatory Agencies, Business Partners, Healthcare facilities & Media	10
4.	Safety data generation Pre clinical phase Clinical phase Post approval phase (PMS) ICH Guidelines for Pharmacovigilance Organization and objectives of ICH Expedited reporting Individual case safety reports Periodic safety update reports Post approval expedited reporting Pharmacovigilance planning Good clinical practice in pharmacovigilance studies	8
5.	Pharmacogenomics of adverse drug reactions Genetics related ADR with example focusing PK parameters. Drug safety evaluation in special population Paediatrics Pregnancy and lactation Geriatrics CIOMS CIOMS Working Groups CIOMS Form CDSCO (India) and Pharmacovigilance D&C Act and Schedule Y	7


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GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP805TT

Differences in Indian and global pharmacovigilance requirements

Recommended Books (Latest edition):

1. Textbook of Pharmacovigilance: S.K. Gupta, Jaypee Brothers, Medical Publishers.
2. Practical Drug Safety from A to Z By Barton Cobert, Pierre Bron, Jones and Bartlett Publishers.
3. Mann's Pharmacovigilance: Elizabeth B. Andrews, Nicholas, Wiley Publishers.
4. Stephens' Detection of New Adverse Drug Reactions: John Talbot, Patrick Waller, Wiley Publishers.
5. An Introduction to Pharmacovigilance: Patrick Waller, Wiley Publishers.
6. Cobert's Manual of Drug Safety and Pharmacovigilance: Barton Cobert, Jones & Bartlett Publishers.
7. Textbook of Pharmacoepidemiology edited by Brian L. Strom, Stephen E. Kimmel, Sean Hennessy, Wiley Publishers.
8. A Textbook of Clinical Pharmacy Practice -Essential Concepts and Skills:G. Parthasarathi, Karim Nyford Hansen, Milap C. Nahata
9. National Formulary of India
10. Text Book of Medicine by Yashpal Munjal
11. Text book of Pharmacovigilance: concept and practice by GP Mohanta and PK Manna
12. <http://www.who.int/dynPage.aspx?id=105825&mn1=7347&mn2=7259&mn3=7297>
13. <http://www.ich.org/>
14. <http://www.cjoms.ch/>
15. <http://cdsco.nic.in/>
16. http://www.who.int/vaccine_safety/en/
17. http://www.tpc.gov.in/PvPI/ps_home.html

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Shri G.M. Bhabha College of Pharmacy
VAPL



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy
Subject Code: BP806TT
SEMESTER: VIII

Subject Name: Quality Control and standardization of Herbs

Scope: In this subject the student learns about the various methods and guidelines for evaluation and standardization of herbs and herbal drugs. The subject also provides an opportunity for the student to learn cGMP, GAP and GLP in traditional system of medicines.

Objectives: Upon completion of the subject student shall be able to,

1. know WHO guidelines for quality control of herbal drugs
2. know Quality assurance in herbal drug industry
3. know the regulatory approval process and their registration in Indian and international markets
4. appreciate EU and ICH guidelines for quality control of herbal drugs.

Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	1	0	4	80	20	0	0

Sr No	Topics	% weightage
1.	Basic tests for drugs – Pharmaceutical substances, Medicinal plants materials and dosage forms WHO guidelines for quality control of herbal drugs. Evaluation of commercial crude drugs intended for use	10
2.	Quality assurance in herbal drug industry of cGMP, GAP, GMP and GLP in traditional system of medicine. WHO Guidelines on current good manufacturing Practices (cGMP) for Herbal Medicines WHO Guidelines on GACP for Medicinal Plants.	10
3.	EU and ICH guidelines for quality control of herbal drugs. Research Guidelines for Evaluating the Safety and Efficacy of Herbal Medicines	10
4.	Stability testing of herbal medicines. Application of various chromatographic techniques in standardization of herbal products. Preparation of documents for new drug application and export registration GMP requirements and Drugs & Cosmetics Act provisions.	8
5.	Regulatory requirements for herbal medicines. WHO guidelines on safety monitoring of herbal medicines in pharmacovigilance systems. Comparison of various Herbal Pharmacopoeias. Role of chemical and biological markers in standardization of herbal products	7

Recommended Books: (Latest Editions)

1. Pharmacognosy by Trease and Evans
2. Pharmacognosy by Kokate, Purohit and Gokhale
3. Rangari, V.D., Text book of Pharmacognosy and Phytochemistry Vol. 1, Carrier Pub., 2006
4. Aggrawal, S.S., Herbal Drug Technology, Universities Press, 2002.
5. EMEA. Guidelines on Quality of Herbal Medicinal Products/Traditional Medicinal Products.
6. Mukherjee, P.W. Quality Control of Herbal Drugs: An Approach to Evaluation of Botanicals. Business Horizons Publishers, New Delhi, India, 2002.

HOPEL

Dr. M. Bisshia College of Pharmacy
w.e.f. 01/01/2017



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP80611

7. Shinde M.V., Dhalwal K., Potdar K., Mahalik K. Application of quality control principles to herbal drugs. *International Journal of Phytomedicine* 1(2009): p. 4-8.
8. WHO. Quality Control Methods for Medicinal Plant Materials, World Health Organization, Geneva, 1998. WHO. Guidelines for the Appropriate Use of Herbal Medicines. WHO Regional Publications, Western Pacific Series No 3, WHO Regional office for the Western Pacific, Manila, 1998.
9. WHO. The International Pharmacopeia, Vol. 2: Quality Specifications, 3rd edn. World Health Organization, Geneva, 1981.
10. WHO. Quality Control Methods for Medicinal Plant Materials. World Health Organization, Geneva, 1999.
11. WHO. WHO Global Atlas of Traditional, Complementary and Alternative Medicine. 2 vol. set. Vol. 1 contains text and Vol. 2, maps. World Health Organization, Geneva, 2005.
12. WHO. Guidelines on Good Agricultural and Collection Practices (GACP) for Medicinal Plants. World Health Organization, Geneva, 2004.

PRINCIPAL

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21- JA Bhabhus College of Pharmacy

VVL



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP80711

SEMESTER: VIII

Subject Name: Computer Aided Drug Design

Scope: This subject is designed to provide detailed knowledge of rational drug design process and various techniques used in rational drug design process.

Objectives: Upon completion of the course, the student shall be able to understand

- Design and discovery of lead molecules
- The role of drug design in drug discovery process
- The concept of QSAR and docking
- Various strategies to develop new drug like molecules.
- The design of new drug molecules using molecular modeling software

Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	1	0	4	70	30	0	0

Sr No	Topics	% weightage
1.	Introduction to Drug Discovery and Development Stages of drug discovery and development Lead discovery and Analog Based Drug Design Rational approaches to lead discovery based on traditional medicine, Random screening, Non-random screening, serendipitous drug discovery, lead discovery based on drug metabolism, lead discovery based on clinical observation. Analog Based Drug Design: Bioisosterism, Classification, Bioisosteric replacement. Any three case studies.	10
2.	Quantitative Structure Activity Relationship (QSAR) SAR versus QSAR, History and development of QSAR, Types of physicochemical parameters, experimental and theoretical approaches for the determination of physicochemical parameters such as Partition coefficient, Hammett's substituent constant and Taft's steric constant. Hansch analysis, Free Wilson analysis, 3D-QSAR approaches like COMFA and COMSIA.	10
3.	Molecular Modeling and virtual screening techniques Virtual Screening techniques: Drug likeness screening, Concept of pharmacophore mapping and pharmacophore based Screening, Molecular docking: Rigid docking, flexible docking, manual docking, Docking based screening. <i>De novo</i> drug design.	10
4.	Informatics & Methods in drug design Introduction to Bioinformatics, chemoinformatics. ADME databases, chemical, biochemical and pharmaceutical databases.	8
5.	Molecular Modeling: Introduction to molecular mechanics and quantum mechanics. Energy Minimization methods and Conformational Analysis, global conformational minima determination.	7

Recommended Books (Latest Editions)

1. Robert GCK, ed., "Drug Action at the Molecular Level" University Park Press Baltimore.
2. Martin YC. "Quantitative Drug Design" Dekker, New York.


PRINCIPAL




GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BPR07TT

3. Delgado JN, Remers WA eds "Wilson & Gisvold's Text Book of Organic Medicinal & Pharmaceutical Chemistry" Lippincott, New York.
4. Foye WO "Principles of Medicinal chemistry" Lea & Febiger.
5. Kuro Ikuya A, Burckhalter JH. "Essentials of Medicinal Chemistry" Wiley Interscience.
6. Wolf ME, ed "The Basis of Medicinal Chemistry, Burger's Medicinal Chemistry" JohnWiley& Sons, New York.
7. Patrick Graham, L., An Introduction to Medicinal Chemistry, Oxford University Press.
8. Smith HJ, Williams H, eds, "Introduction to the principles of Drug Design" Wright Boston.
9. Silverman R.R. "The organic Chemistry of Drug Design and Drug Action" Academic Press New York.


PPR07TT
Gujarat Technological University
College of Pharmacy
Vadodra



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP8081T

SEMESTER: VIII

Subject Name: Cell and Molecular Biology

Scope:

- Cell biology is a branch of biology that studies cells – their physiological properties, their structure, the organelles they contain, interactions with their environment, their life cycle, division, death and cell function.
- This is done both on a microscopic and molecular level.
- Cell biology research encompasses both the great diversity of single-celled organisms like bacteria and protozoa, as well as the many specialized cells in multi-cellular organisms such as humans, plants, and sponges.

Objectives: Upon completion of the subject student shall be able to;

- Summarize cell and molecular biology history.
- Summarize cellular functioning and composition.
- Describe the chemical foundations of cell biology.
- Summarize the DNA properties of cell biology.
- Describe protein structure and function.
- Describe cellular membrane structure and function.
- Describe basic molecular genetic mechanisms.
- Summarize the Cell Cycle

Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	1	0	4	80	20	0	0

Sr No	Topics	% weightage
1.	a) Cell and Molecular Biology: Definitions theory and basics and Applications. b) Cell and Molecular Biology: History and Summation. c) Properties of cells and cell membrane. d) Prokaryotic versus Eukaryotic e) Cellular Reproduction f) Chemical Foundations – an Introduction and Reactions (Types)	10
2.	a) DNA and the Flow of Molecular Information b) DNA Functioning c) DNA and RNA d) Types of RNA e) Transcription and Translation	10
3.	a) Proteins: Defined and Amino Acids b) Protein Structure 173 c) Regularities in Protein Pathways d) Cellular Processes e) Positive Control and significance of Protein Synthesis	10
4.	a) Science of Genetics b) Transgenics and Genomic Analysis c) Cell Cycle analysis d) Mitosis and Meiosis e) Cellular Activities and Checkpoints	8

Principal



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP808TT

5.	a) Cell Signals: Introduction b) Receptors for Cell Signals c) Signaling Pathways: Overview d) Misregulation of Signaling Pathways e) Protein-Kinases: Functioning	7
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Recommended Books (latest edition):

1. W.B. Hugo and A.D. Russel: Pharmaceutical Microbiology, Blackwell Scientific publications, Oxford London.
2. Prescott and Dunn., Industrial Microbiology, 4th edition, CBS Publishers & Distributors, Delhi.
3. Pelczar, Chan Kreig, Microbiology, Tata McGraw Hill edn.
4. Malcolm Harris, Balliere Tindall and Cox: Pharmaceutical Microbiology.
5. Rose: Industrial Microbiology
6. Probisher, Hingsdill et al: Fundamentals of Microbiology, 9th ed. Japan
7. Cooper and Gunn's: Tutorial Pharmacy, CBS Publisher and Distribution.
8. Pepler: Microbial Technology.
9. Edward: Fundamentals of Microbiology.
10. N.K.Jain: Pharmaceutical Microbiology, Vallabh Prakashan, Delhi
11. Bergeys manual of systematic bacteriology, Williams and Wilkins- A Waverly company
12. B.R. Glick and J.J. Pasternak: Molecular Biotechnology. Principles and Applications of RecombinantDNA: ASM Press Washington D.C.
13. RA Goldshy et. al., : Kuby Immunology.


PRINCIPAL

TEL
S.T.A. Gujarat College of Pharmacy
VAP



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy
 Subject Code: BP809TT
 SEMESTER: VIII
 Subject Name: Cosmetic Science

Scope: To understand the classification of cosmetics and cosmeceutical products as per Indian and EU regulations. This subject deals with principles of formulation and the building blocks of skin care products, classification of sunscreens and sun protection factor, the role of herbs in cosmetics with their analytical methods, principles of cosmetic evaluation. The subject also includes about oily and dry skin, causes leading to dry skin, skin miniaturization as well as a basic understanding of the terms covering cosmetics.

Objectives: Upon completion of the course the student shall be able to

1. To know and explain about cosmetics, and related sciences, cosmeceuticals (cosmetics with skin, hair and oral care benefits) and personal care and hygiene products.
2. To demonstrate practical skills in the area of biology, formulation science and analytical techniques required to scientifically design and develop various cosmetic products.
3. To describe about basic cosmetic problems associated with skin, hair and oral care etc.

Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	1	0	4	80	20	0	0

Sr No	Topics	% weightage
1.	Classification of cosmetic and cosmeceutical products Definition of cosmetics as per Indian and EU regulations, Evolution of cosmeceuticals from cosmetics, cosmetics as quasi and OTC drugs Cosmetic excipients: Surfactants, rheology modifiers, humectants, emollients, preservatives. Classification and application Skin: Basic structure and function of skin. Hair: Basic structure of hair. Hair growth cycle. Oral Cavity: Common problem associated with teeth and gums.	10
2.	Principles of formulation and building blocks of skin care products: Face wash, Moisturizing cream, Cold Cream, Vanishing cream and their advantages and disadvantages. Application of these products in formulation of cosmeceuticals. Antiperspirants & deodorants: Actives & mechanism of action. Principles of formulation and building blocks of Hair care products: Conditioning shampoo, Hair conditioner, anti-dandruff shampoo. Hair oils. Chemistry and formulation of Para-phenylene diamine based hair dye. Principles of formulation and building blocks of oral care products: Toothpaste for bleeding gums, sensitive teeth. Teeth whitening, Mouthwash.	10
3.	Sun protection, Classification of Sunscreens and SPF. Role of herbs in cosmetics: Skin Care: Aloe and turmeric Hair care: Henna and amla. Oral care: Neem and clove Analytical cosmetics: BIS specification and analytical methods for shampoo, skincream and toothpaste.	10

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GUJARAT TECHNOLOGICAL UNIVERSITY


Bachelor of Pharmacy

Subject Code: BP8091T

4.	Principles of Cosmetic Evaluation: Principles of sebumeter, corneometer. Measurement of TEWL, Skin Color, Hair tensile strength, Hair combing properties Soaps, and syndet bars. Evolution and skin benefits.	8
5.	Oily and dry skin, causes leading to dry skin, skin moisturisation. Basic understanding of the terms Comedogenic, dermatitis. Cosmetic problems associated with Hair and scalp: Dandruff, Hair fall causes Cosmetic problems associated with skin: blemishes, wrinkles, acne, prickly heat and body odor Antiperspirants and Deodorants- Actives and mechanism of action.	7

References

- 1) Harry's Cosmetology, Wilkinson, Moore, Seventh Edition, George Godwin.
- 2) Cosmetics - Formulations, Manufacturing and Quality Control, P.P. Sharma, 4th Edition, Vandana Publications Pvt. Ltd., Delhi.
- 3) Drugs and Cosmetic act/rules by govt. of India Publication
- 4) European Union regulation for cosmetics
- 5) Poucher's Perfumes, Cosmetics and Soaps, Hilda Butler, 10th Edition, Kluwer Academic Publishers
- 6) Handbook of Cosmetic Science and Technology, 3rd Edition, André O. Barel, Marc Paye, Howard
- 7) Purohit K. Mukherjee. Quality Control Herbal Drugs Business Horizons; Reprint 2012 edition
- 8) Trease, G.E. and Evans, W.C. "Trease and Evans' Pharmacognosy" WB Saunders Co.


P. Patel
Head of Department
J.M. Institute of Pharmacy
V.P.



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP810TT

SEMESTER: VIII

Subject Name: Experimental Pharmacology

Scope: This subject is designed to impart the basic knowledge of preclinical studies in experimental animals including design, conduct and interpretations of results.

Objectives

Upon completion of the course the student shall be able to,

- Appreciate the applications of various commonly used laboratory animals.
- Appreciate and demonstrate the various screening methods used in preclinical research
- Appreciate and demonstrate the importance of biostatistics and research methodology
- Design and execute a research hypothesis independently

Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	1	0	4	80	20	0	0

Sr No	Topics	Teaching Hrs
1.	<p>Laboratory Animals: Study of CPCSEA and OECD guidelines for maintenance, breeding and conduct of experiments on laboratory animals</p> <p>Common lab animals: Description and applications of different species and strains of animals. Popular transgenic and mutant animals.</p> <p>Techniques for collection of blood and common routes of drug administration in laboratory animals, Techniques of blood collection and euthanasia.</p>	7
2.	<p>Introduction to preclinical studies: Dose selection, calculation and conversions, preparation of drug solution/suspensions, grouping of animals and importance of sham negative and positive control groups. Rationale for selection of animal species and sex for the study</p>	3
3.	<p>Preclinical screening models</p> <p>Preclinical screening models for drugs acting on CNS :- analgesic, antipyretic, anti-inflammatory, general anesthetics, sedative and hypnotics, antipsychotic, antidepressant, antiepileptic, nootropics anti Parkinsonism drugs, anti-Alzheimer drug</p> <p>Preclinical screening models for drugs acting on eye and local anesthetics</p>	12
4.	<p>Preclinical screening models for drugs acting on ANS :- sympathomimetics, sympatholytics, parasympathomimetics, parasympatholytics, skeletal muscle relaxants</p>	5
5.	<p>Preclinical screening models for drugs acting on CVS :- antihypertensives, diuretics, antiarrhythmic, antidysepidemic, anti aggregatory, coagulants, and anticoagulants</p> <p>Preclinical screening models for antiulcer, antidiabetic, anticancer and antiasthmatic activities</p>	13

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GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP810TT

6.	Research methodology and Bio-statistics Selection of research topic, review of literature, research hypothesis and study design Pre-clinical data analysis and interpretation using Students' t' test and One-way ANOVA. Graphical representation of data	5
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Recommended Books (latest edition):

1. Fundamentals of experimental Pharmacology-by M.N. Ghosh
2. Hand book of Experimental Pharmacology-S.K. Kulakarni
3. CPCSEA guidelines for laboratory animal facility.
4. Drug discovery and Evaluation by Vogel H.G.
5. Drug Screening Methods by Suresh Kumar Gupta and S. K. Gupta
6. Introduction to biostatistics and research methods by PSS Sundar Rao and J Richard


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VFL



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy
Subject Code: BP811TT
SEMESTER: VIII

Subject Name: Advanced Instrumentation Techniques

Scope: This subject deals with the application of instrumental methods in qualitative and quantitative analysis of drugs. This subject is designed to impart advanced knowledge on the principles and instrumentation of spectroscopic and chromatographic hyphenated techniques. This also emphasizes on theoretical and practical knowledge on modern analytical instruments that are used for drug testing

Objectives

Upon completion of the course the student shall be able to

- understand the advanced instruments used and its applications in drug analysis
- understand the chromatographic separation and analysis of drugs.
- understand the calibration of various analytical instruments
- know analysis of drugs using various analytical instruments.


Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	1	0	4	80	20	0	0

Sr No	Topics	% weightage
1.	Nuclear Magnetic Resonance spectroscopy Principles of H-NMR and C-NMR, chemical shift, factors affecting chemical shift, coupling constant, Spin - spin coupling, relaxation, instrumentation and applications Mass Spectrometry - Principles, Fragmentation, Ionization techniques – Electron impact, chemical ionization, MALDI, FAB, Analyzers-Time of flight and Quadrupole, instrumentation, applications	10
2.	Thermal Methods of Analysis: Principles, instrumentation and applications of Thermogravimetric Analysis (TGA), Differential Thermal Analysis (DTA), Differential Scanning Calorimetry (DSC) X-Ray Diffraction Methods: Origin of X-rays, basic aspects of crystals, Xray Crystallography, rotating crystal technique, single crystal diffraction, powder diffraction, structural elucidation and applications.	10
3.	Calibration and validation -as per ICH and USFDA guidelines Calibration of following Instruments Electronic balance, UV-Visible spectrophotometer, IR spectrophotometer, Fluorimeter, Flame Photometer, HPLC and GC	10
4.	Radio immune assay: Importance, various components, Principle, different methods, Limitation and Applications of Radio immune assay Extraction techniques: General principle and procedure involved in the solid phase extraction and liquid-liquid extraction	8
5.	Hyphenated techniques -LC-MS/MS, GC-MS/MS, HPTLC-MS.	5

Recommended Books (Latest Editions)

1. Instrumental Methods of Chemical Analysis by B.K Sharma
2. Organic spectroscopy by Y.R Sharma
3. Text book of Pharmaceutical Analysis by Kenneth A. Connors
4. Vogel's Text book of Quantitative Chemical Analysis by A.I. Vogel


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GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP811TT

5. Practical Pharmaceutical Chemistry by A.H. Beckett and J.B. Stenlake
6. Organic Chemistry by I. L. Finar
7. Organic spectroscopy by William Kemp
8. Quantitative Analysis of Drugs by D. C. Garrett
9. Quantitative Analysis of Drugs in Pharmaceutical Formulations by P. D. Sethi
10. Spectrophotometric identification of Organic Compounds by Silverstein

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Dr. H. B. Dastane College of Pharmacy,
VAPL



GUJARAT TECHNOLOGICAL UNIVERSITY

Bachelor of Pharmacy

Subject Code: BP812TT

SEMESTER: VIII

Subject Name: Dietary Supplements and Nutraceuticals

Scope: This subject covers foundational topics that are important for understanding the need and requirements of dietary supplements among different groups in the population.

Objectives

This module aims to provide an understanding of the concepts behind the theoretical applications of dietary supplements. By the end of the course, students should be able to:

1. Understand the need of supplements by the different group of people to maintain healthy life.
2. Understand the outcome of deficiencies in dietary supplements.
3. Appreciate the components in dietary supplements and the application.
4. Appreciate the regulatory and commercial aspects of dietary supplements including health claims.

Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	1	0	4	80	20	0	0

Sr No	Topics	% weightage
1.	a. Definitions of Functional foods, Nutraceuticals and Dietary supplements. Classification of Nutraceuticals, Health problems and diseases that can be prevented or cured by Nutraceuticals i.e. weight control, diabetes, cancer, heart disease, stress, osteoarthritis, hypertension etc. b. Public health nutrition, maternal and child nutrition, nutrition and ageing, nutrition education in community. c. Source, Name of marker compounds and their chemical nature, Medicinal uses and health benefits of following used as nutraceuticals/functional foods: Spirulina, Soybean, Ginseng, Garlic, Broccoli, Ginkgo, Flaxseeds	7
2.	Phytochemicals as nutraceuticals: Occurrence and characteristic features (chemical nature medicinal benefits) of following a) Carotenoids- α and β -Carotene, Lycopene, Xanthophylls, lutein b) Sulfides: Diallyl sulfides, Allyl trisulfide. c) Polyphenolics: Resveratrol d) Flavonoids- Rutin, Naringin, Quercetin, Anthocyanidins, catechins, Flavones e) Prebiotics / Probiotics: Fructo oligosaccharides, Lacto bacillum f) Phyto estrogens : Isoflavones, daidzein, Geobustin, lignans g) Tocopherols h) Proteins, vitamins, minerals, cereal, vegetables and beverages as functional foods: oats, wheat bran, rice bran, sea foods, coffee, tea and the like.	15
3.	a) Introduction to free radicals: Free radicals, reactive oxygen species, production of free radicals in cells, damaging reactions of free radicals on lipids, proteins, Carbohydrates, nucleic acids. b) Dietary fibres and complex carbohydrates as functional food ingredients..	7
4.	a) Free radicals in Diabetes mellitus, Inflammation, Ischemic reperfusion injury, Cancer, Atherosclerosis, Free radicals in brain metabolism and pathology, kidney damage, muscle damage. Free radicals involvement in other disorders. Free radicals theory of ageing. b) Antioxidants: Endogenous antioxidants – enzymatic and nonenzymatic antioxidant defence, Superoxide dismutase, catalase, Glutathione peroxidase,	10

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Bachelor of Pharmacy
Subject Code: BP813PP
SEMESTER: VIII
Subject Name: Project Work

Guidelines:

All the students shall undertake a project under the supervision of a teacher and submit a report. The area of the project shall directly relate any one of the elective subject opted by the student in semester VIII or Minor research project at R & D organization/ CRO/ Manufacturing organization/QA & QC Laboratory/ Public testing laboratory/ Drug regulatory body/Hospital/ Community Pharmacy/ Help Centre or at Institute. The project shall be carried out in group not exceeding 5 in number. The project report shall be submitted in triplicate (typed & bound copy not less than 25 pages).

The students can perform the activities for project work after completion of Semester VI onwards (during the vacation/ official Holidays) but the credit of project work will be transferred in Semester VIII. Those who are doing Project work during this period must complete the prescribed days or hours for Project work as per the guidelines. Institute should maintain documentation regarding project Work for each student with requisite evidence.


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Bachelor of Pharmacy
Subject Code: BP814TT
SEMESTER: VIII

Subject Name: Pharmaceutical Product Development

Scope: To understand the regulations related to preformulation, formulation development, stability assessment, manufacturing and quality control testing of different types of dosage forms. The subject also includes an advanced study of pharmaceutical excipients in pharmaceutical product development. It also covers optimization techniques to be used in pharmaceutical product development.

Objectives: Upon completion of the course the student shall be able to -

1. To know and explain about the basic concepts of product development and right selection of excipients for the conventional and novel formulation.
2. To describe Quality by design, Optimization technique and experimental design pharmaceutical product development for the conventional and novel formulation.
3. To explain the GRAS listing & inactive ingredient guide (IIG) limit for the excipients
4. To discuss Regulatory requirement for Selection of packaging material and Quality control of various dosage form.

Teaching scheme and examination scheme:

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	1	0	4	80	20	0	0

Sr No	Topics	Teaching Hrs
1.	Introduction to pharmaceutical product development, objectives, regulations related to preformulation, formulation development, stability assessment, manufacturing and quality control testing of different types of dosage forms.	7
2.	An advanced study of Pharmaceutical Excipients in pharmaceutical product development with a special reference to the following categories i. Solvents and solubilizers ii. Cyclodextrins and their applications iii. Non - ionic surfactants and their applications iv. Polyethylene glycols and sorbitol's v. Suspending and emulsifying agents vi. Semi solid excipients	10
3.	An advanced study of Pharmaceutical Excipients in pharmaceutical product development with a special reference to the following categories i. Tablet and capsule excipients ii. Directly compressible vehicles iii. Coat materials iv. Excipients in parenteral and aerosols products v. Excipients for formulation of NDDS, Selection and application of excipients in pharmaceutical formulations with specific industrial applications	10
4.	Optimization techniques in pharmaceutical product development. A study of various optimization techniques for pharmaceutical product development with specific examples. Optimization by factorial designs and their applications. A study of QbD and its application in pharmaceutical product development.	8

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Bachelor of Pharmacy
Subject Code: BP814TT

5.	Selection and quality control testing of packaging materials for pharmaceutical product development- regulatory considerations.	7
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References:

1. Pharmaceutical dosage forms - Tablets, volume 1 -3 by H.A. Liberman, Leon Lachman & J.B. Schwartz.
2. Pharmaceutical dosage form - Parenteral medication vol- 1&2 by Liberman & Lachman.
3. Theory and Practice of Industrial Pharmacy by Liberman & Lachman.
4. Pharmaceutics- The science of dosage form design by M.E. Aulton, Churchill livingstone, Latest edition.
5. Introduction to Pharmaceutical Dosage Forms by H. C. Ansel, Lea & Febiger, Philadelphia, 5th edition, 2005.
6. Drug stability - Principles and practice by Cartensen & C.J. Rhodes, 3rd Edition, Marcel Dekker Series, Vol 107.
7. Gennaro, Alfonso R., Remington: The Science and Practice of Pharmacy, Vol-I & II, Lippincott Williams & Wilkins, New York.
8. Bolton S. Optimization techniques. In: Pharmaceutical Statistics: Practical and Clinical Applications. 3rd ed. New York: Marcel Dekker, 1997.


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Bachelor of Pharmacy

Semester - I

w.e.f June 2012

Subject Code	Subject Name	Teaching Scheme (Hours)			Credits	Theory			Practical		Total Marks
		Theory	Tutorial	Practical		External	Internal	External	Internal		
2210001	Unit Operation-I	4	0	3	7	80	20	80	20	200	
2210002	Pharm Chem-I (Inorganic Chemistry)	4	0	3	7	80	20	80	20	200	
2210003	Pharmaceutical Analysis-I	4	0	3	7	80	20	80	20	200	
2210004	Human Anatomy Physiology - I	4	0	3	7	80	20	80	20	200	
2210005	Basics of Computer Applications - I	2	0	3	5	80	20	80	20	200	
	Total	18	0	15	33						

Semester - II

w.e.f Dec 2012

Subject Code	Subject Name	Teaching Scheme (Hours)			Credits	Theory			Practical		Total Marks
		Theory	Tutorial	Practical		External	Internal	External	Internal		
2220001	Physical Pharmacy	3	0	3	6	80	20	80	20	200	
2220002	Pharmaceutical Chemistry-II (Physical Chemistry)	3	0	3	6	80	20	80	20	200	
2220003	Pharmaceutical Analysis-II	4	0	3	7	80	20	80	20	200	
2220004	Human Anatomy Physiology-II	4	0	3	7	80	20	80	20	200	
2220005	Basics of computer application- II	0	0	3	3	0	0	0	0	100	
1990001	Contributor Personality Development	4	0	0	4	80	20	80	0	100	
2220006	Environmental Studies	3	0	0	3	80	20	80	0	100	
	Total	21	0	15	36						


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Semester - III

w.e.f June 2013

Subject Code	Subject Name	Teaching Scheme (Hours)			Credits	Theory			Total Marks
		Theory	Tutorial	Practical		External	Internal	External	
2230001	Dispensing Pharmacy I and Drug Store Management	3	0	3	6	80	20	80	200
2230002	Pharmaceutical Engineering	3	0	3	6	80	20	80	200
2230003	Pharmaceutical Chemistry-II (Biochemistry - I)	3	0	3	6	80	20	80	200
2230004	Pharmaceutical Chemistry-IV (Organic Chemistry - II)	3	0	3	6	80	20	80	200
2230005	Health Education & Community Health	3	0	0	3	80	20	0	100
2230006	Pharmacognosy-I	3	0	3	6	80	20	80	200
	Total	18	0	15	33				

Semester - IV

w.e.f Dec 2013

Subject Code	Subject Name	Teaching Scheme (Hours)			Credits	Theory			Total Marks
		Theory	Tutorial	Practical		External	Internal	External	
2240001	Unit Operations-II	3	0	3	6	80	20	80	200
2240002	Dispensing Pharmacy II and Pharma Industrial Management	3	0	3	6	80	20	80	200
2240003	Pharmaceutical Chemistry - V (Biochemistry - II)	3	0	3	6	80	20	80	200
2240004	Pharmaceutical Chemistry - VI (Organic Chemistry - II)	3	0	3	6	80	20	80	200
2240005	Basic Concepts of Pharmacology and Clinical Pharmacy Practice	3	0	0	3	80	20	0	100
2240006	Pharmacognosy-II	3	0	3	6	80	20	80	200
	Total	18	0	15	33				

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w.e.f June 2014

Semester - V	Subject Code	Subject Name	Teaching Scheme (Hours)			Credits	Theory		Practical		Total Marks
			Theory	Tutorial	Practical		External	Internal	External	Internal	
	2250001	Hospital and Community Pharmacy	3	0	0	3	80	20	0	0	100
	2250002	Pharmaceutical Microbiology & Biotechnology - I	3	0	3	6	80	20	80	20	200
	2250003	Pharmaceutical Analysis III	3	0	3	6	80	20	80	20	200
	2250004	Pharmaceutical Chemistry - VII (Medicinal Chemistry - D)	3	0	3	6	80	20	80	20	200
	2250005	Pharmacology and Pharmacotherapeutics-I	3	0	3	6	80	20	80	20	200
	2250006	Pharmacognosy-III	3	0	3	6	80	20	80	20	200
		Total	18	0	15	33					

w.e.f Dec 2014

Semester - VI	Subject Code	Subject Name	Teaching Scheme (Hours)			Credits	Theory		Practical		Total Marks
			Theory	Tutorial	Practical		External	Internal	External	Internal	
	2260001	Forensic Pharmacy	3	0	0	3	80	20	0	0	100
	2260002	Pharmaceutical Microbiology & Biotechnology - II	3	0	3	6	80	20	80	20	200
	2260003	Pharmaceutical Analysis IV	3	0	3	6	80	20	80	20	200
	2260004	Pharmaceutical Chemistry - VIII (Medicinal Chemistry - II)	3	0	3	6	80	20	80	20	200
	2260005	Pharmacology and Pharmacotherapeutics-II	3	0	3	6	80	20	80	20	200
	2260006	Pharmacognosy-IV	3	0	3	6	80	20	80	20	200
		Total	18	0	15	33					

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Semester - VII

w.e.f June 2015

Subject Code	Subject Name	Teaching Scheme (Hours)			Credits	Theory		Practical		Total Marks
		Theory	Tutorial	Practical		External	Internal	External	Internal	
2270001	Dosage form Design I	3	0	3	6	80	20	80	20	200
2270002	Pharmaceutical Technology I	3	0	3	6	80	20	80	20	200
2270003	Pharmaceutical Chemistry - IX (Medicinal Chemistry - III)	3	0	3	6	80	20	80	20	200
2270004	Pharmacology and Pharmacotherapeutics - III	3	0	3	6	80	20	80	20	200
2270005	Pharmacognosy-V	3	0	3	6	80	20	80	20	200
	Elective - I	3	0	0	3	80	20	0	0	100
	Total	18	0	15	33					

Subject code	Elective - I
2270006	Cyber Security
2270007	Environmental Toxicology and Green Audit
2270008	Nutraceuticals
2270009	Pharmaceutical Marketing Management
2270010	Pharmacovigilance
2270011	Herbal Cosmetics
2270012	Green Chemistry
2270013	Agronomy and Forestry of Medicinal Plants
2270014	Instrumental and Process Validation
2270015	Quality by Design (QbD) and Process Analytical Technology (PAT)
2270016	Innovations in Conventional Drug Delivery System
2270017	Disaster Management

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Semester - VIII

w.e.f Dec 2015

Subject Code	Subject Name	Teaching Scheme (Hours)			Credits	Theory		Practical		Total Marks
		Theory	Tutorial	Practical		External	Internal	External	Internal	
2280001	Dosage form Design II	3	0	3	6	80	20	80	20	200
2280002	Pharmaceutical Technology II	3	0	3	6	80	20	80	20	200
2280003	Pharmaceutical Chemistry - X (Medicinal Chemistry - III)	3	0	3	6	80	20	80	20	200
2280004	Pharmacology and Pharmacotherapeutics - IV	3	0	3	6	80	20	80	20	200
2280005	Pharmacognosy-VI	3	0	3	6	80	20	80	20	200
	Elective - II	3	0	0	3	80	20	80	20	200
	Total	18	0	15	33	80	20	0	0	100

Subject Code	Elective - II
2280006	Computer Applications in drug discovery
2280007	Pharmacy Practice
2280008	Bioavailability and Therapeutic Drug Monitoring
2280009	Food Analysis
2280010	Hospital Management and Medical Tourism
2280011	Drug Approval Process
2280012	Intellectual Property Rights and Patents
2280013	Medical Writing and Coding
2280014	Conscience of herbs and Phytoconstituents
2280015	Genetic engineering and gene therapy
2280016	Current advances in Novel Drug Delivery Systems
2280017	Elementary Mathematics



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GUJARAT TECHNOLOGICAL UNIVERSITY

B.PHARM SEMESTER-I

UNIT OPERATION-I

Subject code: 2210001

Theory (4 Hours / Week; 4 Credits, 60 Hours)

Sr. No.	Course Contents	Hours
1.	Size reduction Objectives, importance and theory of size reduction. Factors affecting, energy requirements, mechanisms and methods (dry/wet grinding) of size reductions. Principle, material of construction, applications, advantages and disadvantages of various mills like cutter mill, hammer mill, roller mill, ball mill, fluid energy mill, colloid mill. Study of latest industrial mills used in manufacturing of various dosage forms and their application.	11
2.	Size separation Principles of size separation, screen and its standards as per pharmacopoeia, screening equipments including shaking & vibrating screens, gyratory screens, sedimentation type industrial separators etc. Methods of determining size distribution. Fluid classification methods like sedimentation and elutriation, Principle, material of construction, applications, advantages and disadvantages of cyclone separator, sedimentation tank, etc.	8
3.	Mixing Definition, objectives, mechanism and theory of mixing. Type of mixtures: liquid mixing, powder mixing, semi solids mixing. Principle, material of construction, applications, advantages and disadvantages of shaker mixer, propeller mixer, turbine mixer, paddle mixer, planetary mixer, double cone mixer, V mixer, sigma mixer and colloid mill, ultrasonic mixer, etc.	9
4.	Crystallization Objectives, crystal lattice, types of crystal, crystal form, size and habit, formation of crystals, super saturation theory, factors affecting crystallization process and crystal growth. Study of various types of crystallizers including Swenson walker, tanks, agitated & batch, circulating magma, vaccum and crystal crystallizer etc. Methods for prevention of caking of crystals. Brief study of spherical crystallization process. Numerical problems on crystal yield.	13
5.	Extraction and leaching Principle, theory and types of extraction. Solvents used for extraction, leaching and extraction equipments, small scale and large scale extraction methods, special extraction techniques-supercritical fluid extraction, applications in pharmaceutical industry.	8


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6.	Automated process control system Process variables - temperature, pressure, vacuum, flow level and their measurements. Elements of automatic process control systems. Elements of computer aided manufacturing. Introduction to latest process control systems used in pharmaceutical industry.	7
7.	Industrial hazards and safety precautions Industrial hazards: mechanical, chemical, electrical, fire and dust hazards. Measures to prevent and combat the hazards. Accident records. Introduction to waste water system in industry.	4

UNIT OPERATION-I

Subject code: 22100P1

Practicals (3 hours/week, 4 credits, 45 hours)

Sr. No.	Course Contents
1	Study of various process parameters during size reduction by various mills.
2	Study of various techniques to determine particle size distribution.
3	Determination of degree of mixing of solid-liquid and solid-solid mixing by different mixing equipments.
4	Study the effect of various factors (rate of cooling, rate of agitation, seeding, solvent, etc.) on crystallization of different salts.
5	Study of liquid-liquid and solid-liquid extraction of various materials by different extraction techniques like maceration, percolation, infusion and decoction.
6	Demonstration of handling hazardous chemicals and safety precautions.

Books Recommended:

1. Elementary Chemical Engineering - Max S. Peters, Published by McGraw Hill Book Company, New York, 1954
2. Perry's Chemical Engineer's Handbook - Robert H Perry, Green D. W., Maloney J. O. 7th Edition, 1998, McGraw - Hill Inc., New York.
3. Tutorial Pharmacy by Cooper & Gunn, ed. S. J. Carter, CBS Publishers & Distributors, Delhi, 6th Edition, 2000.
4. Unit Operations of Chemical Engineering, 5th edition - McCabe, Smith & Harriott, McGraw - Hill Inc., New York.
5. Pharmaceutics: The Science of Dosage Form Design - M. E. Aulton.
6. The Theory & Practice of Industrial Pharmacy - Lachman L., Lieberman H.A. & Kanji J. L., 3rd edition, 1990 Varghese Publishing House, Bombay.
7. Alfonso G. Remington: The Science & Practice of Pharmacy. Vol. I & II. Lippincott, Williams & Wilkins Philadelphia.
8. Online resources can also be accessed.



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GUJARAT TECHNOLOGICAL UNIVERSITY

B.PHARM SEMESTER-I
PHARM CHEM-I (INORGANIC CHEMISTRY)
SUBJECT CODE: 2210002

Theory (4 Hours / Week; 4 Credits, 60 Hours)

Sr. No.	Course Contents	Hours
1.	Introduction to Pharmaceutical Chemistry and pharmacopeia.	1
2.	Impurities in Pharmaceuticals: Sources of impurities, tests for purity and identity, limit tests for iron, arsenic, lead, heavy metals, chloride, sulphate.	5
3.	An outline of method of preparation, uses, special tests if any, of the following class of inorganic pharmaceuticals included in the current pharmacopoeia:	
3.1	Acids and Bases: Buffers, Waters	4
3.2	Gastrointestinal agents: Acidifying agents, Antacids, Protective and adsorbents, Cathartics.	7
3.3	Major intra and extra-cellular electrolytes: physiological ions, electrolytes used for replacement therapy, acids-base balance and combination therapy.	7
3.4	Essential and trace elements: Transition elements and their compounds of pharmaceutical importance: Iron and haematinics, mineral supplements.	6
3.5	Topical agents: Protective, Astringents and Anti-infectives.	5
3.6	Gases and Vapors: Oxygen, Anesthetics and Respiratory Stimulants.	2
3.7	Dental products: Dentifrices, Anti-caries agents.	3
3.8	Complexing and Chelating agents used in therapy.	2
3.9	Miscellaneous agents: Sclerosing agents, Expectorants, Emetics, poisons and Anti-dotes, Sedatives etc	7
3.10	Pharmaceutical Aids used in pharmaceutical industry : Anti-oxidants, preservatives, Filter aids, Adsorbents, Diluents,	6
3.11	Inorganic Radio pharmaceuticals: Nuclear radiopharmaceuticals, reactions, Nomenclature, Methods of obtaining their standards and units of activity, measurements of activity, clinical applications and dosage, hazards and precautions.	5


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PHARM CHEM-I (INORGANIC CHEMISTRY)

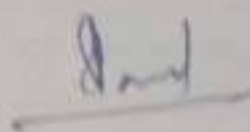
Subject code: 22100P2

Practicals (3 hours/week, 3 credits, 45 hours)

Sr. No.	Course Contents
1.	The backgrounds and systematic qualitative analysis of Inorganic mixture of up to 4 radicals. Six mixtures to be analyzed, Preferably by semi-micro methods.
2.	All identification tests for pharmacopoeial inorganic pharmaceuticals and qualitative tests for cations and anions should be covered.
3.	Limit tests for Cl, SO ₄ , As, Heavy metals and Lead along with a few modifications.
4.	Volumetric Analysis of few important compounds covered in theory

Books Recommended:

1. Inorganic Medicinal and Pharmaceutical Chemistry : J. H. Block, E. B. Roche, T. O. Soine, C. O. Wilson, Varghese Publishing House, First Indian Reprint, 1986.
2. Bentley and Driver's Textbook of Pharmaceutical Chemistry: Revised by L. M. Atherden, Oxford University Press, 8th Ed. 1969.
3. The Indian Pharmacopoeia, Latest Edition, Controller of Publications, Delhi.
4. Practical Pharmaceutical Chemistry edited by A. H. Beckett, J. B. Stenlake, CBS Publishers, and First Indian edition 1987.
5. Vogel's Qualitative Inorganic Analysis Revised by G. Svehla, Longman Gr. Ltd., 7th Ed. 1996.



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GUJARAT TECHNOLOGICAL UNIVERSITY

B.PHARM SEMESTER-I

PHARMACEUTICAL ANALYSIS-I

Subject code: 2210003

Theory (4 Hours / Week; 4 Credits, 60 Hours)

Sr. No.	Course Contents	Hours
1.	Basics of drugs and formulation analysis : Weights, balances, importance of analysis, quality control and quality assurance, analytical methods (classification, validation parameters), requirements - chemicals (types, purification, checking purity), glass wares (types, calibration, cleaning), sampling techniques, sampling error minimization. Units of concentrations. Errors science, errors minimization.	6
2.	Volumetric analysis (Titrimetric analysis)	
2.1	Acid-base titrations: Relative strength and its effect on titration, common ion effect, pH, Henderson-Hasselbach equation, buffers, neutralization curve, acid bas indicators, theory of indicators, back titrations, biphasic titrations, pharmacopoeial applications, hydrolysis of salts, ionic products of water and law of mass action.	15
2.2	Redox titrations : Theory of redox titrations, redox indicators, types of redox titrations, iodometry, cerimetry, mercury metry, diazotization nitrite titrations, 2,6-dichlorophenol indophenol titrations, titration curve and calculations of potentials during course of titrations.	12
2.3	Argentometric or precipitation titrations : Mohrs, Fajans and Volhard methods	6
2.4	Nonaqueous titrations : Nonaqueous solvents, titrants and indicators. Differentiating and leveling solvents.	5
2.5	Complexometric titrations : Theory of the titrations, titrant, indicators and pharmacopoeial applications.	6
2.6	Miscellaneous titrations : Karl-Fischer titrations, Kjeldahl method.	3
3.	Gravimetric analysis : Stability, solubility products, types of precipitations, precipitation techniques, pharmacopoeial applications	7



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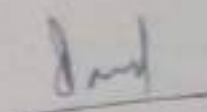
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PHARMACEUTICAL ANALYSIS-I
B.PHARM SEMESTER-I
 Subject code: 22100P3
Practicals (3 hours/week, 3 credits, 45 hours)

Sr. No.	Course Contents
1	Acid-base titrations Simple, back titrations, titrations of mixtures like NaOH+Na ₂ CO ₃ , borax + boric acid.
2	Redox titrations Simple, iodometry, cerimetry, 2,6-dichlorophenol-indophenol titrations, mixtures like Fe ⁺² + Fe ⁺³ , oxalic acid + sodium oxalate
3	Complexometric titrations Replacement, back titrations
4	Nonaqueous titrations
5	Argentometric titrations
6	Gravimetric assay of one pharmacopoeial drug
7	Calibrations/cleaning of glasswares and checking precision and lower limit of quantitation of titrimetric methods.

Books recommended:

1. Pharmacopoeia: USP, B.P., IP.
2. Practical Pharm. Chemistry, Vol. I - Backett, The athlone Press of University of London.
3. Fundamentals of Analytical Chemistry - Skoog, Harcourt College Publishers.
4. Quantitative chemical analysis - Vogel A. I, Pearson Education.
5. Text Book of Pharmaceutical Analysy - K. A. Connor, John Willey & Sons, New York.
6. Quantitative Chemical Analysis - Ayer by Harper & Row, New York.



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B. PHARM. SEMESTER-I

HUMAN ANATOMY PHYSIOLOGY

Subject code: 2210004

Theory (4 Hours / Week; 4 Credits, 60 Hours)

Sr. No.	Course Contents	Hours
1	Introduction and Scope of Anatomy and Physiology. Structural and functional organization of various organ systems. Homeostasis, Negative and positive feedback system. Transcellular, Extra-cellular and Intra-cellular fluids and their composition. Serosal cavities. Definitions of various terms used in Anatomy.	4
2	Structure and function of cell and its components with special emphasis on molecular structure of cell membrane, transporter mechanisms, mitochondria and nucleus. Cell cycle and its significance. Mechanism of protein synthesis by cell organelles	6
3	Elementary tissues of the body: Various elementary tissues and their subtypes with Characteristics, location and functions: epithelial tissue, muscular tissue, connective tissue and nervous tissue	4
4	Osseous system: Structure, Composition and function of skeleton. Histology of bone. Classification of joints and their function. Types of movements of joints. Brief introduction to disorders of bones and joints	5
5	Muscular system: Gross anatomy of skeletal muscles. Neuromuscular junction. Physiology of muscle contraction and its components. Properties of skeletal muscles. Brief introduction to muscle disorders.	7
6	Haemopoietic system: Introduction, composition, properties and functions of blood and its components. Haemopoiesis Lifecycle and physiology of RBC. Blood groups and their significance. Hemostasis and fibrinolytic pathway. Types of Anemia. Brief information regarding disorders of blood.	9
7	Lymph and lymphatic system: Composition, formation, circulation and functions of lymph, Basic physiology and functions of spleen. Disorders of lymph and lymphatic system.	3
8	Cardiovascular System: Anatomy and physiology of the heart, Circulatory system including coronary circulation and pulmonary circulation. Properties of Cardiac muscle, Electrocardiogram (ECG), Blood pressure and its regulation, Basic understanding of cardiac cycle and heart sounds, cardiac output and factors affecting cardiac output. Renin Angiotensin Aldosterone system and its significance. Brief introduction to cardiovascular disorders like hypertension, atherosclerosis, angina pectoris, myocardial ischaemia and infarction, congestive cardiac failure and cardiac arrhythmias.	11

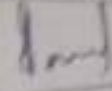
9	Body defense Mechanisms and Immunity: Basic principles of immunity, innate immunity, adaptive immunity, acquired immunity, immune interactions (cellular and humoral immunity).	5
10	Digestive system: Gross anatomy of the gastrointestinal tract. Structure and functions of various organs of alimentary canal and associated organs like liver, pancreas and gall bladder. Physiology of digestion and absorption at various parts of gastrointestinal tract including phases of gastric secretion. Brief overview of disorders of G. I. tract and associated organs.	6

HUMAN ANATOMY PHYSIOLOGY

Subject code: 22100P4

Practical (3 hours/week, 3 credits, 45 hours)

Sr. No.	Course Contents
1	Study of the human skeleton with the help of charts and models, Study of joints with the help of charts
2	Digestive and Muscular System (Names, position, attachments and functions of various muscles) with the help of charts and models
3	Histology of elementary tissues and various organs of Cardiovascular, Digestive and Muscular System
4	Hematology experiments Use and Care of Microscope Study of Haemocytometry Hemoglobin estimation Total WBC count Total RBC count Differential WBC count Determination of clotting time and bleeding time of blood Erythrocyte Sedimentation Rate (ESR) Blood Groups, Effect of Osmosis on RBC
5	Study of the human cardiovascular (Heart, Arterial and Venous System), Circulatory system including arterial and venous system with special reference to the names and positions of main arteries and veins, Coronary circulation, Pulmonary circulation. Determination of pulse rate, blood pressure, listening to heart sounds. Demonstration of ECG
6	Amphibian experiments for study of properties of skeletal muscle using either demonstrations or computer simulated experiments

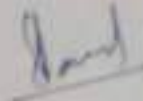

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Books Recommended (Latest Editions):

1. William J. Larsen: Anatomy – Development, function, Clinical Correlations- Saunders (Elsevier Science)
2. Guyton A.C. and Hall J.E.: Textbook of Medical Physiology – 10th Edition – W. B. Saunders
3. Seeley R. R., Stephens T. D. and Tate P.: Anatomy and Physiology 2000- McGraw Hill Co.
4. Waugh A. and Grant A.: Ross and Wilson's Anatomy and Physiology in Health and illness – Churchill Livingstone
5. Sobotta. Atlas of Human Anatomy (2 Volumes) –Edited by Putz and R. Pabst, Lippincott, Williams and Wilkins
6. Anne M. R. Agur & Ming J. Lee: Grant's Atlas of Anatomy –Lippincott, Williams and Wilkins
7. Goshing T. A., Harris P. F., Whitmore I., William, Human Anatomy: Color Atlas and Text – Mosby
8. Bullock B.L. & Henze R.L., Focus on Pathophysiology –Lippincott
9. Martini F. Fundamentals of Anatomy and Physiology (Prentice Hall)
10. Goyal R. K. & Mehta A. A. Human Anatomy Physiology And Health Education, (B. S. Shah Prakashan)
11. West J. B. Best and Taylor's physiological Basis of Medical Practice (Williams and Wilkins, Baltimore)
12. Tortora G. J. and Anagnostokos, N. P. Principles of Anatomy and Physiology (Harper and Colling Publishers, New York)
13. Joshi Vijaya D. Preparatory Manual for Undergraduates Physiology (B.I. Churchill Livingstone) –
14. Chatterjee C. C. Human Physiology (Medical Allied Agency, Calcutta)
15. Goyal R. K. et al.: Practical Anatomy Physiology and Biochemistry (B.S. Shah Prakashan, Ahmedabad)
16. Garg K. et al. A Text Book of Histology (CBS Publishers, New Delhi)
17. Lesson C. R. et al.: Text Book of Histology (W.B.Saunders Company)



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GUJARAT TECHNOLOGICAL UNIVERSITY

B.PHARM. SEMESTER - I
BASICS OF COMPUTER APPLICATIONS

Subject Code: 2210005
Theory (3 Hours / Week; 1 Credit)

Sr. No.	Course Content	Hours
1	Computer Fundamentals Definition, characteristics, history, computer terminology, computer organization, input & output devices, storage devices (including latest devices), classifications of computers (including current computer systems), application of computers in pharmacy, introduction to computer virus, problems associated with virus infection and its remedies.	07
2	Operating Systems Definition, functions of an operating system, types of operating systems and their characteristics, difference between operating system and application software. <i>Windows Operating Systems:</i> Desktop, start-menu, components of control panel, accessories, components of my computer and my documents, recycle bin, printer and mouse settings, maximizing, minimizing, restoring and closing of windows, windows explorer, taskbar and its functions. Different file formats, various types of files, file extension, opening files by various programs	05
3	Basics of MS Word and its applications Word Essentials, Parts of MS Word screen, Typing and Editing, Finding and Replacing, Autocorrect and Auto text, Reusing Text and Graphics, use of spell-check & grammar, thesaurus and scientific symbols, viewing of document by various ways, Editing Tools, Text Formatting, Text Character, Formatting Paragraphs, Formatting and Sorting Lists, Page Design and Layout, Page Margins, Page Numbers, Columns, Working with Tables, Creating and formatting of tables and sorting, merging of data in tables etc., inserting, deleting and sizing of rows and columns in tables, Opening, Saving and Protecting Documents, Locating and Managing Documents, Printing.	06
4	Basics of MS Excel and its applications Introduction to EXCEL worksheet, calculations in EXCEL, preparation of templates for application in pharmaceutical chemistry, pharmaceutical technology, pharmacology and pharmacognosy (statistical treatment of data for Beers Lamberts curve, solution of problems based on physical chemistry, stability study, area under the curve, etc.) Special attention must be given to arithmetic expressions. Library functions such as logarithm, square root, sum, average, standard deviation, t-test, F-test, Chi-square test, ANOVA etc. Drawing graphs in EXCEL- line graph, histogram and pie-chart. Editing chart features such as annotation, labeling of axis, changing legends etc.	06
5	MS PowerPoint Creating and viewing a presentation, adding animations and managing slides etc.	02


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6	Internet and its applications Internet – Basic terms, software and hardware requirement for internet, web browsers, internet tools, study of pharmaceutical web sites, online journals and search engines, searching through pharmaceutical databases, study of patent websites. Use of emails, mail merge and application of address book.	05
7	Introduction to the following software MS Paint, MS Access, Outlook, Adobe acrobat reader, Adobe Professional, Chemdraw, ISIS Draw, Nero Burning room	04

BASICS OF COMPUTER APPLICATIONS

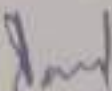
Subject Code: 22100P5

Practical (3 Hours / Week; 3 Credits)

Sr. No.	Course Contents
	Practical exercises should be based on theoretical topics. The practical should broadly cover the following:
1	Exercises on word processing to execute various commands in preparing and editing documents.
2	Preparation of documents and implementing various formatting parameters in MS Word.
3	Working with footnotes and endnotes, referencing documents
4	Working with auto-indexing, table and figure numbering
5	Preparing and editing worksheets in MS EXCEL, Inserting formulas for different functions in MS EXCEL like sum, average, standard deviation, logarithm, square root etc.
6	Drawing various charts using pharmaceutical experimental data
7	Preparation of power point presentation with animation
8	Working with internet browsing and using search engines
9	E-mailing using address book and applying mail merge
10	Surfing various pharmaceutical web sites, online journals and patent search

Recommended Books:

1. Taxali R.K., P.C. Software for Windows 98 made simple – 8th Edition – 2002 – Tata Mc, New Delhi.
2. WORD 2000, Guy Hart Davis, BPB Publications, New Delhi, 1999
3. MS Office: Step by Step, Joyce Cox, Prentice Hall of India, New Delhi, 2007
4. Accessing and Analysing Data with MS EXCEL, Cornell, Prentice Hall of India, New Delhi, 2007.
5. Manuals available with the software


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GUJARAT TECHNOLOGICAL UNIVERSITY


B.PHARM SEMESTER-II

PHYSICAL PHARMACY

Subject code: 2220001

THEORY (3 Hours / Week; 3 Credits, 45 Hours)

Sr. No.	Course Contents	Hours
1.	States of Matter: Introduction, binding forces between molecules, states of matter-solids, liquids, gases, liquid crystals, glassy state, phase equilibrium and phase rule, condensed systems	5
2.	Solubility and Distribution Phenomenon: General principles, solvent-solute interactions, solubility of gases in liquids, solubility of liquids in liquids, solubility of solids in liquids, distribution of solutes between immiscible solvents.	6
3.	Surface and Interfacial phenomenon: Liquid interface, adsorption at liquid interfaces, adsorption at solid interface, applications of surface active agents, electrical properties of interfaces.	6
4.	Complexation and protein binding : Metal complexes, organic molecular complexes, protein binding, thermodynamic treatment of stability constants, applications of complexes in dosage forms.	5
5.	Disperse systems: a. Colloidal dispersions: Definition, types, properties of colloids, protective colloids, applications of colloids in pharmacy. b. Suspensions and Emulsions : Interfacial properties of suspended particles/globules, settling in suspensions, theory of sedimentation, effect of Brownian movement, sedimentation of flocculated particles, sedimentation parameters, wetting of particles, controlled flocculation, flocculation in structured vehicle, rheological considerations, emulsions ; types, theories, physical stability.	9
6.	Micromeritics: Particle size and distribution, methods for determining particle size, particle shape and surface area, methods for determining surface area, derived properties of powders,	6
7.	Rheology : a. Newtonian system, Non-Newtonian systems, thixotropy in formulation, determination of rheological properties, applications in pharmacy. b. Flow of Powders: Introduction, methods to determine, factors affecting powder flow, pharmacopeial specification of angle of repose, hausner's ratio, carr's index.	8


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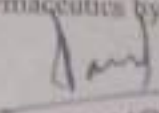
B.PHARM SEMESTER-II
PHYSICAL PHARMACY
 Subject code: 22200PI
PRACTICAL (3 Hours / Week; 3 Credits, 45 Hours)

Practical related to following topics should be covered:

Sr. No.	Course Contents	Hours
1.	Solubility of solids.	45
2.	Determination of phenol water coefficient.	
3.	Preparation of thymol salol eutectic system.	
4.	Preparation of ternary phase system with one pair of partially miscible liquid.	
5.	Determination of latent heat, vapor pressure, critical point.	
6.	To find out the distribution coefficient of given solid.	
7.	Determination of surface / interfacial tension, HLB value and CMC of surfactants	
8.	Determination of particle size and size distribution of powders by different methods.	
9.	Determination of derived properties of powder	
10.	Determination of particle shape and surface area	
11.	Determination of viscosity of Newtonian and Non-newtonian systems	
12.	Effect of temperature on viscosity of liquids.	
13.	Effect of particle size, porosity, moisture, lubricants, glidants on flow property of powder.	
14.	Studies on different types of complexes and determination of their stability constants	
15.	Determination of sedimentation parameters for suspensions and emulsions.	

Books Recommended (Latest Editions):

1. Martin's Physical pharmacy by Patrick J. Sinko, 5th edition, Lippincott Williams & Wilkins, New York, 2006.
2. Pharmaceutics: The Science of Dosage Form Design, 2nd edition, Aulton, Michael E., Churchill Livingstone, London, 2002.
3. Remington: The Science and Practice of Pharmacy, Vol-I & II, 20th edition, Gennaro, Alfonso R., Lippincott Williams & Wilkins, New York, 2002.
4. Physicochemical Principles of Pharmacy, 3rd edition, Florence, A. T. Atwood, D. Macmillan Press Ltd., London 1998.
5. Pharmaceutical Dosage Forms and Drug Delivery Systems, Ansel, Howard. C., Allen, Loyd V., Popovich, Nicholas G. Lippincott Williams & Wilkins, New York, 2002.
6. Cooper and Gunn's Tutorial Pharmacy, ed. Carter, S. J., 6th edition, CBS Publishers & Distributors, Delhi, 2000.
7. Bentley's textbook of Pharmaceutics by E. A. Rawlins


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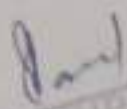
B.PHARM SEMESTER-II

PHARMACEUTICAL CHEMISTRY-II (PHYSICAL CHEMISTRY)

Subject Code: 2220002

THEORY (3 Hours /Week; 3 Credits, 45 Hours)

Sr. No.	Course Contents	Hours
1.	The liquid state: Physical properties surface tension, parachor, viscosity, refractive index, optical rotation, dipole moment of chemical constituents.	7
2.	Solutions: Ideal and real solutions, solutions of gases in liquids, colligative properties, partition co-efficient, conductance and its measurement, Debye-Huckel theory.	8
3.	Thermodynamics: Basic principles, First, Second and third laws, Zeroth Law, absolute temperature scale, thermo chemical equations, phase equilibria and phase rule, One and two component systems.	9
4.	Adsorption: Basic principles, Freundlich and Gibbs adsorption isotherms, Langmuir theory of adsorption.	4
5.	Photochemistry: Basic principles, Consequence of light adsorption, Jablonski diagram, Lambert-Beer Law, Quantum efficiency.	6
6.	Chemical kinetics: Zero, first and second orders reactions, complex reaction, theories of reaction kinetics, characteristics of homogeneous and heterogeneous catalysts, acid-base enzyme catalysis.	11

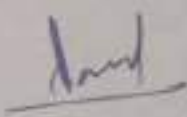

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B.PHARM SEMESTER-II
PHARMACEUTICAL CHEMISTRY-II (PHYSICAL CHEMISTRY)
Subject Code: 22200P2
PRACTICAL (3 Hours / Week; 3 Credits, 45 Hours)

Sr. No.	Course Contents	Hours
1.	Experiments on surface tension and viscosity, partition coefficient, adsorption, order of reaction (First and Second), refractive index and molar refraction should be covered.	45

Books Recommended (Latest Editions):

1. Text book of Physical Chemistry: Samuel Glasstone, Macmillan India Limited, 2nd Ed. 1995.
2. Elements of Physical Chemistry; Peter Atkins, Julio de paula, Oxford University Press, 4th Ed. 2007.
3. Essentials of Physical Chemistry: Arun Bahl, B.S. Bahl, G.D. Tuli, S Chand & Co Ltd, 26th Ed. 2009.
4. Schaum's Outline of Theory and Problems of Physical Chemistry: Clyde R. Metz, Tata McGraw-Hill Publishing Company Ltd., New Delhi. 2nd Ed. 2004.
5. Physical Chemistry: Keith J. Laidler, John H. Meiser, CBS Publishers & Distributors, New Delhi. 2nd Ed. 2006.


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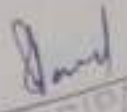
B.PHARM SEMESTER-II

PHARMACEUTICAL ANALYSIS-II

Subject Code: 2220003

THEORY (4 Hours / Week; 4 Credits, 60 Hours)

Sr. No.	Course Contents	Hours
1.	Basics of instrumental analytical methods: Advantages, limitations, validation, signal to noise ratio.	4
2.	Chromatography: Classification, theories, retention mechanism, separation efficiency, methodology and pharmacopoeial applications of column, paper and thin layer chromatography.	15
3.	Electroanalytical methods: Basics of electroanalytical methods	4
3.1	Conductometry: Conductances, factors affecting conductance, Kohlrausch law, conductivity cells, applications	6
3.2	Potential and pH metric methods: Standard reduction potentials, various electrodes, electrodes and cell potential, applications of potentiometry and pH metric.	8
3.3	Polarography, amperometry, biamperometry: Basics of current flow in polarography, dropping mercury electrode, diffusion current, half wave potential, modifications like pulsed and differential pulse polarography, stripping voltametry, biamperometric titrations, amperometric titrations.	11
4	Calorimetry: Types, thermogravimetric analysis, differential scanning calorimetry, differential thermal analysis, melting point, etc. and their applications	5
5	Polarimetry: Polarimeter, qualitative and quantitative applications	3
6.	Extraction techniques : Simple extraction, multiple extractions, separation of drugs in multicomponent system. Effect of pH on extractability of drugs, continuous extractions.	3
7.	Miscellaneous methods: Oxygen combustion flask method, gasometric method, etc.	1


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B.PHARM SEMESTER-II
PHARMACEUTICAL ANALYSIS-II
 Subject Code: 22200P3
PRACTICAL (3 hours/week, 3 credits, 45 hours)

Sr. No.	Course Contents	Hours
	Quantitative analysis of different compounds involving following techniques:	45
1	Conductometry	
2	Potentiometry	
3	pH metry	
4	Polarimetry	
5	Column chromatography	
6	Thin layer chromatography	
7	Paper chromatography	
8	Polarography, amperometry and biamperometry	

Books recommended (Latest Editions):

1. Pharmacopoeia: IP, BP, USP.
2. Practical Pharm. Chemistry, Vol. I - Backett, The athlone Press of University of London.
3. Fundamentals of Analytical Chemistry - Skoog, Harcourt College Publishers.
4. Quantitative chemical analysis - Vogel A. I, Pearson Education.
5. Text Book of Pharmaceutical Analysis - K. A. Connor, John Willey & Sons, New York.
6. Textbook of Pharmaceutical Analysis - J. W. Munson, Marcel Dekker Inc., New York.



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B. PHARM SEMESTER-II

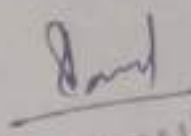
HUMAN ANATOMY AND PHYSIOLOGY

Subject Code: 2220004

THEORY (4 Hours/Week, 4 Credits, 60 Hours)

Sr. No.	Course Contents	Hours
1	<p>Respiratory System: Anatomy and physiology of various organs of respiratory system, pulmonary ventilation and factors affecting it, lung volumes and capacities, gas laws in relation to exchanges of oxygen and carbon dioxide, external and internal respiration including transport of gases in the blood, control and regulation of respiration, voice production, brief outline of hypoxia, asthma, COPD, emphysema, chronic bronchitis, pneumonia, tuberculosis, pulmonary oedema, sudden infant death syndrome, severe acute respiratory syndrome.</p>	8
2	<p>Nervous system: Organization and functions of nervous system, parts of Neuron, structural and functional classification of neurons, Neuroglia, Myelination, Gray and white matter, Graded potential, Resting membrane potential, Generation and propagation of Nerve action potential, Signal transmission at synapses, Post synaptic potentials (EPSP, IPSP) and their summation, Brief overview of various types of neurotransmitter, Overview of nervous disorders like multiple sclerosis, epilepsy.</p> <p>Anatomy of spinal cord (External, Internal), Protective structures of Spinal cord and nerves, names and functions of spinal nerves, physiology of spinal cord, sensory and motor tracts, reflexes and reflex arcs, brief outline of meningitis and poliomyelitis</p> <p>Major parts and protective coverings of brain, blood brain barrier, CSF, medulla oblongata, pons, midbrain, reticular formation, cerebellum, thalamus, Epithalamus, subthalamus, hypothalamus, cerebral cortex, lobes of cerebrum, cerebral white matter, basal nuclei, limbic system, sensory, motor and association areas of cerebral cortex, brain waves, cranial nerves names and functions, brief outline of cerebrovascular accident, transient ischemic attack, Alzheimer's disease, Dementia, Encephalitis, Attention Deficit Hyperactivity Disorder</p> <p>Comparison of somatic and autonomic nervous system, Anatomy of autonomic motor pathways (preganglionic neurons, autonomic ganglia, postganglionic neurons, enteric neurons), Synthesis, release and removal of neurotransmitters (e.g. Acetylcholine, Nor adrenaline), Physiology of the ANS, comparisons of sympathetic and parasympathetic divisions of ANS.</p>	5 5 8 4
3	<p>Special Senses: Basics Sensory modalities, Process of sensation, sensory receptors, somatic sensation, somatic sensory and motor pathways, Brief outline of Parkinson's disease, Amyotrophic lateral sclerosis.</p> <p>Olfactory receptors, physiology of olfaction, Anatomy of taste buds and papillae, physiology of gustation, Accessory structures of eyes, anatomy of eyeball, image</p>	6

	formation, refraction abnormalities, photo receptors and physiology of vision. Anatomy of ear, physiology of hearing and equilibrium. Brief outline of cataract, glaucoma, deafness, meniere's disease, otitis media.	
4	Urinary System: Anatomy of kidney, nephron, functions of renal system, glomerular filtration, tubular reabsorption and tubular secretion and their regulation, formation of urine, ureter, urinary bladder, urethra, brief outline of renal calculi, urinary tract infection, glomerular disease, renal failure, acid base balances and imbalances.	8
5	Endocrine System: Hormone, its type, endocrine glands (pituitary gland, thyroid, parathyroid, adrenals, Pancreas, testes and ovary), their secretion, regulation of secretion, functions and disorders (brief outline of pituitary gland, thyroid gland, adrenal gland, pancreatic islet disorders, definitions of gynecomastia, hirsutism).	8
6	Reproductive System: Gross Anatomy of male reproductive system and their functions, sperm and spermatogenesis, Accessory sex glands. Gross Anatomy of Female reproductive system and their functions, Ovum and Oogenesis, Physiology of Menstruation, Family planning, various contraceptive methods, Medical termination of pregnancy (Abortion), brief outline of erectile dysfunction (Impotence), Premenstrual syndrome, Male and female infertility, endometriosis, Benign prostatic hyperplasia.	8



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B. PHARM. SEMESTER-II
HUMAN ANATOMY AND PHYSIOLOGY
 Subject Code: 22200P4
PRACTICAL (3 Hours/Week, 3 Credits, 45 Hours)

Sr. No.	Course Contents	Hours
1	Biochemical analysis of urine: physical characteristics, normal constituents	3
2	Biochemical analysis of urine: abnormal constituents	3
3	Identify the constituents of urine in unknown sample.	3
4	Study anatomy of Respiratory system using charts and models	3
5	Study anatomy of Nervous system using charts and models	3
6	Study anatomy of Ear and Eye using charts and models	3
7	Study anatomy of Urinary system using charts and models	3
8	Study anatomy of Male & Female reproductive system using charts & models	3
9	Study histology and functions of various organs of Respiratory system and nervous system using slides	3
10	Study histology and functions of various organs of slides urinary system and male and female reproductive system using slides.	3
11	Study of various contraceptive techniques using charts	3
HUMAN EXPERIMENTS		
12	Determination of body temperature and study of learning and memory (Short term and long term)	3
13	Determination of lung function a. Determination of lung volumes and vital capacity using Spirometer / Flowmeter b. Determination of breath holding time	3
14	Determination of vision acuity a. Near Point and near response b. Determination of Stereoscopic vision c. Dominance of the eye	3
15	Determination of other special senses a. Temperature sensations b. Sensation of taste c. Sensation of smell	3

Books Recommended (Latest Editions):

1. Tortora Gerard. J. and Derrickson Bryan. Principles of Anatomy and Physiology (International Student Edition 13th edition- Wiley)
2. Guyton A.C. and Hall J.E. : Textbook of Medical Physiology – 10th Edition- W. B. Saunders
3. Waugh A. and Grant A.: Ross and Wilson's Anatomy and Physiology in Health illness – Churchill Livingstone
4. Chatterjee C. C. Human Physiology (Medical Allied Agency, Calcutta)
5. West, J. B. Best and Taylor's physiological Basis of Medical Practice (Williams and Wilkins, Baltimore)
6. Martini, F. Fundamentals of Anatomy and Physiology (Prentice Hall)
7. Goyal R. K. & Mehta A.A. Human Anatomy Physiology and Health Education, (B. S. Shah Prakashan)
8. Garg K. et al. A Text Book of Histology (CBS Publishers, New Delhi)
9. Sobotta : Atlas of Human Anatomy (2 Volumes) –Edited by Putz and R. Pabst

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- Lippincott, Williams and Wilkins
10. Anne M. R. Agur & Ming J. Lee: Grant's Atlas of Anatomy -Lippincott, Williams and Wilkins
 11. Gosling T.A., Harris P.F., Whitmore L, William, Human Anatomy: Color Atlas and Text -Mosby
 12. Joshi Vijaya D. Preparatory Manual for Undergraduates Physiology (B.I. Churchill Livingstone)
 13. Textbook of practical Physiology C.L.Ghai (Jaypee Brothers Medical publishers)
 14. Goyal R.K. et al.: Practical Anatomy Physiology and Biochemistry (B. S. Shah Prakashan, Ahmedabad)



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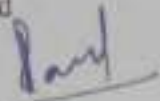
B.PHARM SEMESTER-II
BASICS OF COMPUTER APPLICATIONS-II
 Subject code: 22200P5
PRACTICAL (3 Hours / Week; 3 Credits, 45 Hours)

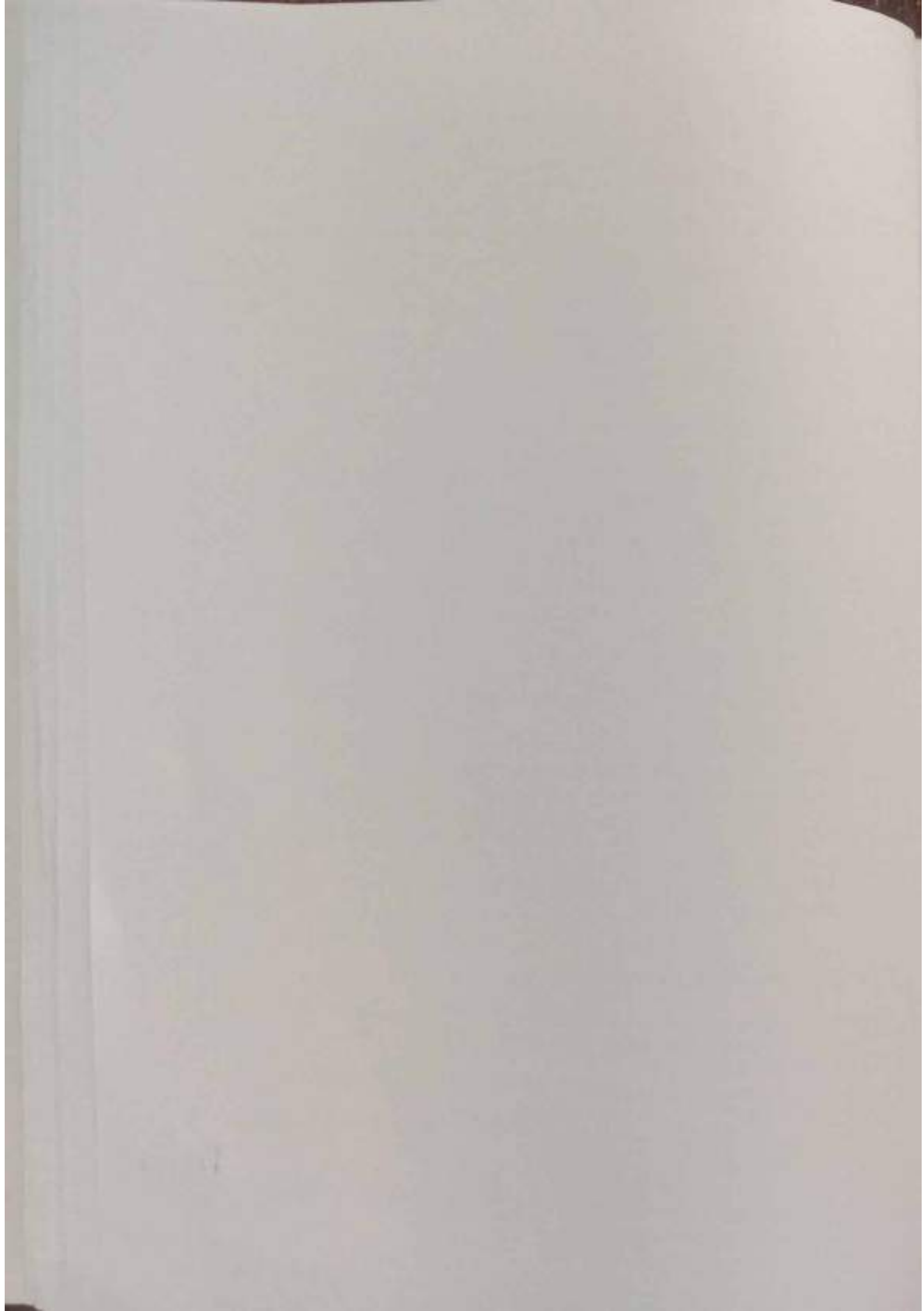
Exercises covering the following topics should be performed using any spreadsheet:

Sr. No.	Course Contents	Hours
1.	To calculate the mean, median and mode of any given data.	45
2.	To calculate mean deviation, standard deviation and standard error of any given data.	
3.	To create data frequency table and cumulative frequency table of any given data.	
4.	Basic of modification in various types of charts includes Column, line, and pie, chart using spreadsheet.	
5.	Basic of modification in various types of charts includes bar area and scattered chart using spreadsheet.	
6.	To present various response data (e.g. drug therapy) graphically.	
7.	To prepare a semi log plot for given data (e.g. the first order kinetic process for degradation and finding dose in pharmacology).	
8.	To calculate correlation value for given data (e.g. Beers plot, dissolution data and in vivo data).	
9.	To calculate regression line for given data (e.g. beers plot, bioavailability data, drug stability data).	
10.	To Calculate the geometric mean for given data.	
11.	To perform F-test for the comparison of variance (e.g. two granulation process).	
12.	To perform one-sided t-test for given data (e.g. stability study data, bioavailability study or pharmacology based animal study).	
13.	To perform two-sided t-test for given data (e.g. stability study data, bioavailability study or pharmacology based animal study).	
14.	To apply one-way ANOVA for given data (e.g. assay development, pharmacology based animal study).	
15.	To apply two-way ANOVA for given data (e.g. assay development, pharmacology based animal study).	

Books Recommended (Latest Editions):

1. MS Office: Step by Step, Joyce Cox, Prentice Hall of India, New Delhi, 2007
2. R.K., P.C. Software for Windows 98 made simple – 8th Edition – 2002 – Tata, New Delhi.
3. Accessing and Analyzing Data with MS EXCEL, Cornell, Prentice Hall of India, New Delhi, 2007
4. Pharmaceutical Statistics: Practical and Clinical Applications, Fourth Edition, Sanford Bolton, Charles Bon, Marcel Dekker.
5. Methods in Biostatistics, B. K. Mahajan, Jaypee Brothers
6. Advanced mathematics and biostatistics, G C Patel, G. K. Jani, R. M. Chaudhary, Atul Prakashan, Ahmedabad


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B.PHARM SEMESTER-II

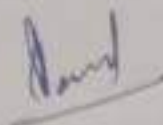
CONTRIBUTOR PERSONALITY DEVELOPMENT

Subject code: 1990001

THEORY (4 Hours / Week; 4 Credits, 60 Hours)

Please refer Syllabus section for Contributor Personality Development subject for year 2012 odd & Even Term (Revised 29-12-2012).

URL: http://www.gtu.ac.in/syllabus/CPD_26612.pdf



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MCA Sem-2/ B.E. Sem-2 & 7 / B.Pharm. Sem-2 & 7/

Diploma Engineering Sem-2 & 5 (01-07-2013)

Subject Name: Contributor Personality Development

Subject Code: 1990001

Table-I -For MCA/B.E. / D.E

Table-I						
Teaching Scheme				Evaluation Scheme		
Theory (Hrs.)	Tutorial (Hrs.)	Practical (Hrs.)	Credit	University Exam (E)	Mid Sem Exam (Theory) (M)	Practical (Internal)
4	0	0	4	70	30	50

*For the Evaluation Scheme of Diploma Engineering Sem – 2, please refer the link

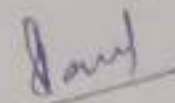
http://www.gtu.ac.in/Syllabus/New_Diploma/sem-2/Pdf/3990001.pdf

Table-I –For B.Pharm only

Table-II						
Teaching Scheme				Evaluation Scheme		
Theory (Hrs.)	Tutorial (Hrs.)	Practical (Hrs.)	Credit	University Exam (E)	Mid Sem Exam (Theory) (M)	Practical (Internal)
4	0	0	4	80	0	20

Note:

1. This subject is compulsory.
2. 4 Credits will be over and above the existing credit structure.
3. This subject will be taught by faculty of English. For B. Pharm., the institute will have to nominate one faculty member for the subject.
4. In Institutes, where as the load is not managed by the lecturers of English only, please nominate the other faculty for teaching the course of Contributor Personality Development.


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(A) Background

The Contributor Personality Program has been designed keeping in mind the following:

1.0 Technology students should not only be excellently trained in the technological field they should acquire soft skills if they are to be successful. Every student must also learn about the techniques of effective participation in a group discussion. He/she must learn to prepare his/her resume and he/she should also be groomed for presenting himself/herself at an interview.

2.0 There is a great need to equip students with not only the right skill-sets but also the right mindsets.

Right Mindset	Can learn the right skills	What employers want
Wrong Mindset	Unemployable	Can be highly paid, but a liability to the organization
	Inappropriate Skills and Capabilities	Appropriate Skills and Capabilities

3.0 The 'mindsets' needed in today's environment must support both (i) effective action and (ii) values and service oriented behavior.

Effective action without human values can lead to personal benefits for individuals but a long-term cost to both nation and society. Human values without effective action can lead to an inability on the part of the individual to perform and flourish in today's environment.

This combination of effectiveness with human values is crystallized in the concept of "contributor ship".

4.0 Students who adopt and develop the right mindsets early in their professional career are able to bring about a positive and sustainable change in their overall personality.

They are able to grow the right appreciation to their peers, services, industry, and their own future. They become more responsible and capable of shaping their own lives.


DR. V. S. S. S.

Therefore, the program may be rightly called a "Contributor Personality Development Program".

- 5.0 Any program of this sort must, in order to be effective, be inspired and guided by a high ideal and principles/ practices flowing from that ideal.

The Contributor Personality Program is guided by the ideals and ideas of Swami Vivekananda – who represented in his lifetime personality the highest ideals of human values combined with effective action.

The Contributor Personality



Contributor

- **Creates value - for self, for the organization, for society**
- **Takes charge and makes things happen, making a positive difference**
- **Creates opportunities and sees possibilities everywhere**
- **Is 'in demand' wherever he/she goes**
- **Seeks long-term career success and life-fulfillment**

(B) Course Outline

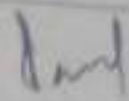
Topics 1-6 relate to the basic axioms or "mental models" that students carry about themselves, about success, careers, contribution, etc. The right mental models are a necessary prerequisite for developing into a Contributor.

Topics 7-12 are 6 core practices that will help a student manifest the ideal of contributor ship in one's life.

Topics 13-15 relate to the students capability to connect into the job-market.

Topic	Course Title
1	Who is a Contributor Student develops an appreciation of who the Contributors are and how they fundamentally differ from Non-contributors in their overall approach to work, to other human beings, to society as a whole.

2	<p>The Contributor's identity</p> <p>Student develops his/ her own answer to the question "who am I?" The student becomes aware of the fact that Non-contributors usually define themselves in terms of what they have acquired in life (e.g. qualifications, position, years of experience, etc.) while Contributors define themselves in terms of what they will become or accomplish (e.g. capacity to deliver, commitment and ownership of the organization's purpose, etc.).</p>
3	<p>The Contributor's vision of success</p> <p>The student explores the meaning of success in his life. Through this exploration, the student is expected to recognize that Contributors have a wider definition of success than Non-contributors. While Non-contributors define success in terms of material success, achievement, external impact, etc., Contributors are able to widen the definition of success to include personal fulfillment, development of self-esteem, ongoing development of personal capabilities etc.</p>
4	<p>The Contributor's vision of career</p> <p>The student learns to distinguish between an "acquisitive career" and a "contributive career". An acquisitive career is one in which the career-seeker is focused on acquiring higher position, higher salary, more benefits etc. This preoccupation with selfish interests often damages the individual's career, as well as, damages the organization and society. A contributive career is one where the career-seeker is focused on contributing, with rewards being a by-product of the contributions made.</p>
5	<p>The scope of contribution</p> <p>The student learns to perceive that in all type of work, every type of role, there is a possibility of contributing at multiple levels – contributing to self, contributing to organization, and contributing to society.</p> <p>The student also appreciates the difference between "acquisition for self" and "contribution to self" – the former being material acquisition and the latter being conscious development of oneself through the medium of one's career.</p>
6	<p>Embarking on the journey to contributor ship</p> <p>The student recognizes the fundamental "building blocks" for becoming a Contributor – the first building block being a shift from a "victim" to being a "creator of one's destiny"; the second building block being acceptance of the ideal of contributor ship; the third building block being the willingness to take full responsibility for one's own development; the fourth building block being the capacity to reflect on one's development and make appropriate modifications.</p>



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7	<p>Design Solutions</p> <p>When faced with a challenge, the Contributor's first response is: "Can we find a solution?" This is unlike a Non-contributor who may respond to the challenge by trying a little and giving up, blaming others, or finding excuses to cover up the issue.</p> <p>Whereas, the Contributor finds a solution. In other words, the Contributor develops the capacity to find solutions through continuous practice and learning from other Contributors.</p> <p>In this topic, students learn the importance of willingness and ability to find solutions.</p>
8	<p>Focus on value</p> <p>What does creating value mean? It means making a positive difference, a tangible impact, a specific contribution to any situation. This positive difference or impact can be in the form of achieving a specific goal, creating a product, creating 'human touch' in a particular interaction, or enhancing one's own capacity, or the capacity of one's colleagues and team-mates.</p> <p>Contributors are therefore extremely result-focused, but the result is measured in terms of value created.</p> <p>In this topic, students learn to clarify the meaning of the word "value" and how value is created in various situations.</p>
9	<p>Engage deeply</p> <p>Contributors are instantly distinguished by the way they approach work. They get involved. They are enthusiastic. They go deep into the subject. In short, Contributors love what they do.</p> <p>This is in direct contrast to Non-contributors who want to do only what they love - an approach that seems reasonable until you realize that life and workplaces have so much variety that you may very often be called upon to do tasks that seem unpleasant or boring until you get involved.</p> <p>In this topic, students learn the importance of engaging deeply with whatever work they do – at work, in study, in personal life.</p>
10	<p>Think in Enlightened Self-Interest</p> <p>Contributors think in Enlightened Self-Interest. In every situation they get into, they find a way to create something good for self and for all at the same time – including team mates, bosses, customers and their organization.</p> <p>Contrasting to this is the mindset of a Non-Contributor. Such a person is only concerned with his/ her own self-interest in a situation. He/she is not concerned about the impact (positive or negative) on the other person. This leads to unpleasant</p>

	<p>situations, broken relationships, unhappy team-mates, subordinates, and bosses, and lower trust in any situation.</p> <p>Students are expected to learn to appreciate the importance of thinking win-win for all stakeholders and also in various situations.</p>
11	<p>Practice Imaginative Sympathy</p> <p>One of the unique qualities of Contributors is their ability to appreciate and understand others' life situation, others' mental condition, and others' point of view. How do they do this?</p> <p>They have consciously developed a 'way of thinking' called 'Imaginative Sympathy'. In this way of thinking, they are able to give due importance to the human aspects of a situation, and not just the technical or commercial aspects.</p> <p>But this is not all. Imaginative Sympathy goes beyond looking at the human aspect of the situation. It also means that Contributors are able to anticipate possible interactions or reactions, they are able to take a multi-dimensional view of a situation and they are able to bring about changes or results while taking everybody along with them.</p> <p>Imaginative Sympathy translates itself into active concern for others. Students will learn the importance and consequences of Imaginative Sympathy in a workplace situation.</p>
12	<p>Demonstrate Trust Behavior</p> <p>Contributors recognize that they are able to achieve results and make contributions with the help of other human beings. They receive this help if and only if they are trusted and, in turn, trust. Contributors practice trust behavior from very early in their career, thereby building a huge trust balance (like a bank balance) over their careers and relationships.</p> <p>The term Trust Behavior may be described as character-in-action. This includes keeping one's word and commitments, staying with a task, acting with integrity in every situation, making sure that there is complete transparency in one's actions and interactions, etc.</p> <p>Students are expected to learn to develop a deep appreciation of trust behavior and how it is practiced.</p>
13	<p>Resume Building</p> <p>In this topic, students learn to develop a resume for the job-market. Students will learn to develop both a generic resume and resumes specific to some types of jobs. Students learn about best practices and common errors in developing their resume.</p>

	<i>Most important, students learn to analyze the jobs offered and present themselves in terms of their potential / willingness to contribute to the job.</i>
14	Group Discussions (GDs) <i>In this topic, students learn (i) how to participate in a group discussion from the contributor's view-point (i.e. how to speak) (ii) how to contribute to the development of the topic (i.e. what to speak) and (iii) to develop the Contributor's view-point on various GD topics (i.e. how to interpret a topic of discussion from the point of view of a contributor)</i>
15	Interview Skills <i>In this topic, students learn about (i) common interview questions and how to develop answers (ii) typical challenges faced in interviews beyond the questions (such as body language, grooming, presentation) (iii) most important, the student learns the importance of trust building and creating confidence in the interview.</i>

(C) Course Plan

The course duration is 48 hours. It can be conducted in sessions of 1 hour each or some of the sessions can be combined as 2 hours each. The course plan is as follows –


Topic 1: Who is a Contributor – – 2 hours Theory and practice exercises based on Contributor Personality Program Workbook (Vol I) – 1 hour Presentations and Projects	3 hours
Topic 2: The Contributor's identity – – 2 hours Theory and practice exercises based on Contributor Personality Program Workbook (Vol I) – 1 hour Presentations and Projects	3 hours
Topic 13: Resume Building – 2 hours for Concepts, Tools, and Techniques – 2 hours for Projects	4 hours
Topic 3: The Contributor's vision of success – – 2 hours Theory and practice exercises based on Contributor Personality Program Workbook (Vol I) – 1 hour Presentations and Projects	3 hours
Topic 4: The Contributor's vision of career – – 2 hours Theory and practice exercises based on Contributor Personality Program Workbook (Vol I) – 1 hour Presentations and Projects	3 hours
Topic 5: The scope of contribution – – 2 hours Theory and practice exercises based on Contributor Personality Program Workbook (Vol I) – 1 hour Presentations and Projects	3 hours

Topic 6: Embarking on the journey to contributorship – – 2 hours Theory and practice exercises based on Contributor Personality Program Workbook (Vol I) – 1 hour Presentations and Projects	3 hours
Topic 14: Group Discussions (GDs) – 2 hours for Concepts, Tools, and Techniques – 2 hours for Projects and Practice	4 hours
Topic 7: Design Solutions – – 2 hours Theory and practice exercises based on Contributor Personality Program Workbook (Vol II) – 1 hour Presentations and Projects	3 hours
Topic 8: Focus on value – – 2 hours Theory and practice exercises based on Contributor Personality Program Workbook (Vol II) – 1 hour Presentations and Projects	3 hours
Topic 9: Engage deeply – – 2 hours Theory and practice exercises based on Contributor Personality Program Workbook (Vol II) – 1 hour Presentations and Projects	3 hours
Topic 10: Think in Enlightened Self-interest – – 2 hours Theory and practice exercises based on Contributor Personality Program Workbook (Vol II) – 1 hour Presentations and Projects	3 hours
Topic 11: Practise Imaginative Sympathy – – 2 hours Theory and practice exercises based on Contributor Personality Program Workbook (Vol II) – 1 hour Presentations and Projects	3 hours
Topic 12: Demonstrate Trust Behavior – – 2 hours Theory and practice exercises based on Contributor Personality Program Workbook (Vol II) – 1 hour Presentations and Projects	3 hours
Topic 15: Interview Skills – 2 hours for Concepts, Tools, and Techniques – 2 hours for Projects and Practice	4 hours
TOTAL	48 hours

(D) Examination Approach

Total marks: 150. Break-up of marks -

- (i) Final exam : 70 marks (equal weightage for topics 1-15)
- (ii) Presentations and projects for topics 1-12: 30 marks
- (iii) Projects for topics 13-15: 50 marks


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(E) Instructional Strategy

1.0 The entire course will use a three-level instructional strategy

- Level I: Classroom Explorations
- Level II: Projects and Presentations
- Level III: Self-study by students

2.0 Level I: Classroom Explorations

1. The Classroom Explorations will be organized around the 'Contributor Personality Program – Study Book'.

The Study Book may be downloaded by the student from the resource site produced by GTU.

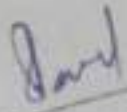
2. The Classroom Explorations involves two kinds of explorations:
 - (i) Exploration of key concepts / frameworks such as "contributors vision of success" etc.
 - (ii) Exploration of the examples provided in the CPP Study Book.
3. The Classroom Explorations will be supported by Session Guide Sheets available online in the CPP ActivGuide.

3.0 Level II: Projects & Presentations

1. The entire Classroom Exploration process will be supplemented by projects and presentations.
2. Session Guides will provide sample topics for projects and presentations. Individual instructors will be free to develop their own projects/ presentation topics also.
3. This will not only enhance conceptual clarity but also build presentation, public-speaking, report writing, and group discussion skills of the students.

4.0 Level III: Self Study by students

1. Students will be given extensive learning support (upto 400 learning units) in the ActivGuide website. This will include videos, presentations, tests, etc.
2. Students can refer to ActivGuide on their own time through internet.


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(F) Reference Material

Basic Study Material

SN	Author/s	Name of Reference	Publisher	Edition
1	Illumine Knowledge Resources Pvt. Ltd. (Downloadable from the internet)	Contributor Personality Program Workbook (Vols I & II)	Illumine Knowledge Resources Pvt. Ltd	Latest
2	Illumine Knowledge Resources Pvt. Ltd. (will be made available to all students on the Internet)	Contributor Personality Program ActivGuide	Illumine Knowledge Resources Pvt. Ltd	Latest

Reference Books

Topic	Course Title	Reference
1	Who is a Contributor	1. On Contributors, Srinivas V.; Illumine Ideas, 2011 2. Enlightened Citizenship and Democracy; Swami Ranganathananda, Bharatiya Vidya Bhavan, 1989 3. Personality Development, Swami Vivekananda; Advaita Ashrama
2	The Contributor's identity	1. To have or to be, Erich Fromm; Continuum International Publishing Group, 2005 2. The art of being, Erich Fromm; Continuum International Publishing Group, 1992 3. Raja Yoga, Swami Vivekananda; Advaita Ashrama
3	The Contributor's vision of success	1. Eternal Values for a Changing Society – Vol IV (Ch 25, 35), Swami Ranganathananda; Bharatiya Vidya Bhavan, 1993 2. Karma Yoga, Swami Vivekananda; Advaita Ashrama
4	The Contributor's vision of career	1. Six Pillars of Self Esteem, Nathaniel Branden; Bantam, 1995 2. Mindset: The New Psychology of Success, Carol S. Dweck; Random House Publishing Group, 2007
5	The scope of contribution	1. Awakening India, Swami Vivekananda; Ramakrishna Mission, New Delhi, 2011 2. Eternal Values for a Changing Society – Vol IV

		<p>(Ch 35), Swami Ranganathananda; Bharatiya Vidya Bhavan, 1993</p> <p>3. Lasting Contribution: How to Think, Plan, and Act to Accomplish Meaningful Work, Tad Waddington; Agate Publishing, 2007</p>
6	Embarking on the journey to contributor ship	<p>1. Vivekananda: His Call to the Nation, Swami Vivekananda; Advaita Ashrama</p> <p>2. Eternal Values for a Changing Society – Vol IV (Ch 33), Vol III (Ch 19, 21, 30) Swami Ranganathananda; Bharatiya Vidya Bhavan, 1993</p> <p>3. Lectures from Colombo to Almora, Swami Vivekananda; Advaita Ashrama</p>
7	Design Solutions	<p>1. Why not?: how to use everyday ingenuity to solve problems big and small, Barry Nalebuff, Ian Ayres; Harvard Business School Press, 2003</p> <p>2. How to Have a Beautiful Mind, Edward De Bono; Vermilion, 2004</p>
8	Focus on value	<p>1. The value mindset: returning to the first principles of capitalist enterprise (Ch 8 & 9); Erik Stern, Mike Hutchinson; John Wiley and Sons, 2004</p> <p>2. Managing for Results, Peter F. Drucker; HarperCollins, 2009</p>
9	Engage deeply	<p>1. The Power of Full Engagement: Managing Energy, Not Time, is the Key to High Performance and Personal Renewal, Jim Loehr, Tony Schwartz; Simon and Schuster, 2003</p>
10	Think in Enlightened Self-interest	<p>1. The 7 Habits of Highly Effective People, Stephen R. Covey; Simon and Schuster, 2004</p> <p>2. Creating Shared Value, Michael E. Porter and Mark R. Kramer; Harvard Business Review; Jan/Feb2011, Vol. 89 Issue 1/2</p>
11	Practice Imaginative Sympathy	<p>1. Eternal Values for a Changing Society – Vol IV (Ch 8, 10, 23, 35, 37), Swami Ranganathananda; Bharatiya Vidya Bhavan, 1993</p> <p>2. Eternal Values for a Changing Society – Vol III (Ch 18), Swami Ranganathananda; Bharatiya Vidya Bhavan, 1993</p>
12	Demonstrate Trust Behavior	<p>1. The Speed of Trust: The One Thing That Changes Everything, Stephen M. R. Covey, Rebecca R. Merrill, Stephen R. Covey; Free Press, 2008</p> <p>2. Integrity: The Courage to Meet the Demands of</p>

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		Reality, Henry Cloud; HarperCollins, 2009
		3. Responsibility at work: how leading professionals act (or don't act) responsibly, Howard Gardner, John Wiley & Sons, 2007
13	Resume Building	1. What Color Is Your Parachute? 2012: A Practical Manual for Job-Hunters and Career-Changers, Richard Nelson Bolles; Ten Speed Press, 2011 2. The what color is your parachute workbook: how to create a picture of your ideal job or next career, Richard Nelson Bolles; Ten Speed Press, 2011
14	Group Discussions (GDs)	1. Effective Group Discussion: Theory and Practice, Gloria J. Galanes, Katherine Adams; McGraw-Hill, 2004
15	Interview Skills	1. What Color Is Your Parachute? 2012: A Practical Manual for Job-Hunters and Career-Changers, Richard Nelson Bolles; Ten Speed Press, 2011 2. The what color is your parachute workbook: how to create a picture of your ideal job or next career, Richard Nelson Bolles; Ten Speed Press, 2011

General References:-

SN	Author/s	Name of Book	Publisher	Edition
1	Swami Ranganathananda	Universal Message of the Bhagavad Gita (Vol 1-3)	Advaita Ashrama, Kolkata	Latest
2	Swami Ranganathananda	Eternal Values for a Changing Society (Vol 1-4)	Bharatiya Vidya Bhavan	Latest
3	Asim Chaudhuri	Vivekananda: A Born Leader	Advaita Ashrama, Kolkata	Latest
4	Swami Vivekananda	Complete Works of Swami Vivekananda (Vol 1-9)	Advaita Ashrama, Kolkata	Latest
5	Swami Vivekananda	Letters of Swami Vivekananda	Advaita Ashrama, Kolkata	Latest

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GUJARAT TECHNOLOGICAL UNIVERSITY


Subject Name: Environmental Studies

Subject Code: 2220006

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	0	3	80	20	0	0

Contents:

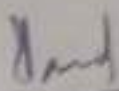
Sr. No.	Topics	Teaching Hrs.	Module Weightage
UNIT I: ENVIRONMENT AND NATURAL SYSTEMS			
1	Introduction to Environment and Environmental Studies: Definition and Components of Environment, Relationship between the different components of Environment, Man and Environment relationship, Impact of technology on Environment, Environmental Degradation, Multidisciplinary nature of the Environment studies, its scope and importance in the present day Education System	4	6%
2	Ecology and Ecosystems: Introduction: Ecology- Objectives and Classification , Concept of an ecosystem- structure and functions of ecosystem Components of ecosystem- Producers, Consumers, Decomposers Bio-Geo- Chemical Cycles- Hydrologic Cycle, Carbon cycle, Energy Flow in Ecosystem, Food Chains, Food webs ,Ecological Pyramids Major Ecosystems: Forest Ecosystem, Grassland Ecosystem, Desert Ecosystem, Aquatic Ecosystem, Estuarine Ecosystem.	10	11%
3	Natural Resources: a. Renewable and Nonrenewable resources, exploitation and conservation, Role of individual in conservation of natural resources. b. Water resources: Water sources- Surface and Ground water sources, Indian and Global scenario. c. Land as a resource, social issues d. Forest resources: Definition and Classification of Forests Ecological and Economic importance and benefits of forest, Indian scenario, Deforestation: causes and effects, remedial measures. e. Food resources: Sources of food, Global and Indian food demand scenario, Limits of food production, Environmental effects of Agriculture.	8	14%
UNIT II: HUMAN POPULATION AND ENVIRONMENTAL POLLUTION			
4	Human Population and Environment:	4	8%


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	Population Growth, World and Indian scenario, Population and Environmental Degradation, Malthusian theory, Optimum theory, Population explosion – Causes, Effects and Control. Urbanization: Urban population growth and Environmental problems		
5	Environmental pollution: Types of Environmental Pollution: a) Water Pollution: Introduction – Water Quality Standards, Sources of Water Pollution: Industrial, Agricultural, Municipal; Classification of water pollutants, Effects of water pollutants, Eutrophication b) Marine pollution- c) Air Pollution: Composition of air, Structure of atmosphere, Ambient Air Quality Standards, Classification of air pollutants, Sources of common air pollutants like PM, SO ₂ , NO _x Natural & Anthropogenic Sources, Effects of common air pollutants d) Land Pollution: Land uses, Land degradation: causes, effects and control, soil erosion e) Noise Pollution: Introduction, Sound and Noise, Noise measurements, Causes and Effects f) Thermal Pollution: Causes and effects g) Role of individual in the prevention of pollution	14	22 %
UNIT III: ENERGY AND GLOBAL ENVIRONMENTAL ISSUES			
6	Global Environmental Issues: Climate Change, Global Warming and Green House Effect, Acid Rain, Depletion of Ozone layer	3	17 %

Reference Books:

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha Second edition, 2013 Publisher: Universities Press (India) Private Ltd, Hyderabad.
2. Basics of Environmental Studies by Prof Dr N S Varandani, 2013 Publisher: LAP -Lambert Academic Publishing, Germany
3. Environmental Studies by Anindita Basak, 2009 Publisher: Dring Kindersley(India)Pvt. Ltd Pearson
4. Textbook of Environmental Studies by Deeksha Dave & S S Kateva, Cengage Publishers.
5. Environmental Sciences by Daniel B Botkin & Edward A Keller Publisher: John Wiley & Sons.
6. Environmental Studies by R. Rajagopalan, Oxford University Press
7. Environmental Studies by Benny Joseph, TMH publishers
8. Environmental Studies by Dr. Suresh K Dhameja, 2007 Published by : S K Kataria & Sons New Delhi
9. Basics of Environmental Studies by U K Khare, 2011 Published by Tata McGraw Hill


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GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: III

Subject Name: Dispensing Pharmacy I and Drug Store Management
Subject Code: 2230001

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	3	6	80	20	80	20

Theory

Sr. No	Course Contents	Total Hrs
1	Definition and scope.	1
2	The prescription: Handling of prescription, source of errors in prescription, care required in dispensing procedures including labelling at dispensed products.	2
3	Dispensing techniques: Compounding and dispensing procedures, packaging, storage and stability of medicines, labelling of dispensed product.	2
4	Pharmaceutical calculations: Posology: Introduction to imperial and metric system, avoirdupois and apothecaries system of weights and measures. Calculation of doses for infants, adults and elderly patients, enlarging and reducing recipes, percentage solutions, allegation, alcohol dilution, proof spirit, isotonic solutions, displacement value etc.	10
5	Principles involved and procedures adopted in dispensing of <ul style="list-style-type: none"> • Liquid Products – Oral and external solutions, Mixtures and Emulsions. Liniments, lotions etc. • Solid Products – Powders, Lozenges, Pastilles, Tablet triturates etc • Ophthalmic- Eye drops, Eye lotions, Eye ointments, Contact lens solutions etc. • Oral unit dosage forms, inhalations etc. 	15
Drug Store Management		
6	Drugs store Management and inventory control: <ul style="list-style-type: none"> • Organization of drugs store, Types of materials stocked, storage conditions • purchase and inventory control principles, purchase procedures, purchase order, procurement and stocking. • Quality control of drugs in hospitals. 	8
7	Retail and whole sale drugs store: Organization and structure of retail and whole sale drug store, types of drug stores and design, maintenance of drug store, dispensing of proprietary products, maintenance of records of retail and wholesale.	7


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1.	Introduction to Latin to English translation, imperial, metric system, avoirdupois and apothecaries system of weights and measures.
2.	To prepare and dispense aromatic waters (e.g. chloroform and camphor), elixirs (e.g. Phenobarbitone elixirs BPC)
3.	To prepare and dispense gargles (e.g. Potassium chloride and phenol gargles) Mouth washes (e.g. Compound sodium chloride, mouth wash B.P.) Throat paints (e.g. Mandel's paints) Douches (e.g. boric acid, potassium permanganate) Ear Drops (e.g. Sodium bicarbonate, Chloramphenicol)
4.	To prepare and dispense Mixtures Containing: diffusible, indiffusible solid with volatile oil, precipitate forming liquid, slightly soluble liquid and pediatric Kaolin Mixture as per BP'88)
5.	To prepare and dispense emulsion (liquid paraffin emulsion, emulsion with fixed oil, volatile oil, resinous liquids, soap emulsion, emulsion based enema, w/o type emulsion etc.)
6.	To prepare and dispense lotions (e.g. salicylic acid Calamine and precipitate Sulphur), liniments (e.g. turpentine liniment, white liniment)
7.	To prepare and dispense Eutectic powder, aspirin powder, dispensing of potent drug in powders, Compound Rhubarb Powder, Compound Sodium Bicarbonate powder, Compound zinc Oxide-salicylic acid dusting powder, Zinc starch And talc Dusting Powder.
8.	To prepare and dispense Insufflations (Camphor -Menthol Insufflations etc) and Kaolin Poultices B.P.C
9.	To prepare and dispense effervescent granules (Sodium phosphate effervescent granules, antacid effervescent granules etc.)
10.	To prepare and dispense tablet triturates and lozenges.

References Books:

1. Pharmaceutical Practice - by Diana M. Collett and Michale E. Aulton, ELBS Publishers.
2. Dispensing for pharmaceutical by Cooper and Gunn by S.J. Carter, CBS Publishers
3. Pharmaceutical Calculations by Mitchell J. Stocklosa and Howard C. Ansel, B. L. Waverly Pvt. Ltd., New Delhi.
4. Pharmaceutical Dosage forms and Drug delivery systems by Howard C. Ansel, Lippincott Williams and Wilkins.
5. Pharmaceutical Practice, Edited by A.J. Winfield and R.M.E. Richards.
6. Bentley's Textbook of pharmaceuticals, E A Rawlins.
7. Remington: The Science and Practice of Pharmacy, Latest Edition, by Mack Publishing Company.
8. Management by James A.F. Stoner.
9. Statistics for Management by Richard I. Levin
10. Personnel Management by Arun Monappa.
11. Business Organisation and Office Management by Santhosh Bushan.


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GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: III

Subject Name: Pharmaceutical Engineering
Subject Code: 2230002

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	3	6	80	20	80	20

Theory

Sr No	Course Contents	Total Hrs
1	Introduction: Pharma engineering and its significance, unit operations and unit processes. Unit systems, SI unit, CgS unit, gas constant and conversion of units. Physical quantities, dimensions and units, dimensional equations, dimensional analysis and dimensionless groups. Different types of graphical representation.	2
2	Stoichiometry: General principles, material balance-tie substances, chemical reactions and molal units, rate process, steady, unsteady and equilibrium state, laws of combining weights, applications of gas laws, energy balance, fuels and combustion, etc., Mathematical problems.	9
3	Fluid flow: Types of steady flow, Reynold number & its significance, types of pressure, viscosity, concept of boundary layers, total energy balance and total mechanical energy balance, losses in mechanical energy of fluids, basic equations of fluid flow, valves, flow meters, manometers. Mathematical problems.	10
4	Material handling systems: Solid handling- storage, conveyers, vacuum & pneumatic conveying. Liquid handling- storage, pumps Gases- Fans, blowers and compressors. Colour coding of Pipelines, use of forklifts and pallets, store design in pharmaceutical industries.	8
5	Heat transfer: Modes of heat transfer. Conduction- Fourier's law, resistances in series and parallel, use of mean area and mean temperature difference. Convection-Concept of film, overall coefficient, heat transfer by forced convection in laminar and turbulent flow, condensing vapours, evaluation of individual film coefficients. Radiation-Black body, absorptivity & emmissivity. Heating of fluids, steam as heating medium, properties and uses of steam, steam traps, study of steam table. Heat exchange equipments-Heat exchangers, condensers, boilers, extended surface scraped and surface equipments etc. applications of heat transfer in industrial processes. Mathematical problems.	10

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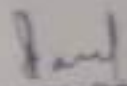
6	Mass Transfer: Principle, streams in mass-transfer operations, solid/fluid and fluid/fluid mass transfer, influence of mass transfer on unit operations.	3
7	Materials of Pharmaceutical Plant Construction: General study of composition, corrosion resistance, properties, factors affecting the selection of material of pharmaceutical plant construction with special reference to stainless steel and glass. Corrosion-types, causes, theories of corrosion and its prevention.	3

Practical – 22300P1

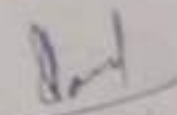
1.	To demonstrate unit systems and conversion of units.
2.	To demonstrate stoichiometry and tie substances in chemical reactions
3.	To measure pressure of gas and other fluids using different manometers (U-tube manometer, inclined manometer etc)
4.	Study of various flow meters (orifice meter, venturi meter, rotameter) and ejector pump.
5.	Experiment on Reynolds number
6.	Determination of overall heat transfer coefficient.
7.	Demonstration of corrosion resistance of various materials.
8.	Practical related to topics in pharmaceutical engineering theory should be carried out.
9	Introduction to engineering drawing – Demonstration of orthographic and isometric projections, preparation of sheets based on orthographic projections.

References Books:

1. Elementary Chemical Engineering - Max S. Peters, Published by McGraw Hill Book Company, New York, 1954.
2. Perry's Chemical Engineer's Handbook - Robert H Perry, Green D.W., Maloney J.O. 7th Edition, 1998, McGraw - Hill Inc., New York.
3. Tutorial Pharmacy by Cooper & Gunn, ed. S.J.Carter, CBS Publishers & Distributors, Delhi, 6th Edition, 2000.
4. Unit Operations of Chemical Engineering, 5th edition - McCabe, Smith & Harriot, McGraw - Hill Inc., New York.
5. Pharmaceutical Engineering - K.Sambamurthy, 2002 NAI (P) Ltd., Delhi.
6. Pharmaceutics : The Science of Dosage Form Design - M.E. Aulton.
7. The Theory & Practice of Industrial Pharmacy - Lachman L., Lieberman H.A. & Kanjig J.L., 3rd edition, 1990 Varghese Publishing House, Bombay.
8. Alfonso G. Remington: The Science & Practice of Pharmacy. Vol. I & II. Lippincott, Williams & Wilkins Philadelphia.
9. Pharmaceutics I (Pharmaceutical Engineering), Jani G. K., B. S. Shah Prakashan, Ahmedabad.
10. Pharmaceutical Engineering : Principles and Practice, Subramanyam C.V.S., Thimma J, Suresh S.S. et. al., 2002, Vallabh Prakashan, Delhi.
11. A Textbook of Engineering Drawing Vol. I and II, P.J.Shah, 6th Edition, 2003, Ahmedabad
12. Engineering Drawing, 34th edition, N.D.Bhat Charutar Publishing House, 1994


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13. Engineering Drawing & Graphic Technology, 13th edition by Thomas E. French, Charles J. Vierch, Robert J. Foster, McGraw Hill International Edition, New Delhi, 1972
14. Introduction to Chemical Engineering by Walter L. Badger & Julius T. Banchero, McGraw Hill International edition, New Delhi, 1955


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1971

GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: III

Subject Name: Pharmaceutical Chemistry-III (Biochemistry - I)
Subject Code: 2230003

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	3	6	80	20	80	20

Sr. No.	Course contents	Proposed Hours
1	Biochemical Organization of the cell and Transport Processes Across cell Membrane.	04
2	Introduction to Carbohydrates, Lipids	08
3	a. 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. b. The Citric Acid Cycle: Significance, Reaction and Energetic of the Cycle, Amphibolic Role of the Cycle and Glyoxalic Acid Cycle, Uric Acid Cycle c. Role of Hormones in Maintenance of Blood Sugar Level.	15
4	Lipid metabolism: oxidation of fatty acids, beta-oxidation and energetic, alpha-oxidation, omega-oxidations, biosynthesis of ketone bodies and their utilization, biosynthesis of saturated and unsaturated fatty acids, control of lipid metabolism and metabolism of cholesterol.	07
5	Enzymes: Nomenclature, Enzyme Kinetics and its Mechanism of action, Mechanism of Inhibition, Enzymes and Iso-Enzymes in Clinical Diagnosis.	05
6	Co-Enzymes: Vitamins as Co-Enzymes and their Significance. Metals as Co-Enzymes and their Significance.	03
7	Water and mineral metabolism: brief introduction	03

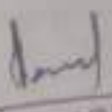
PRACTICAL - 22360P3

1.	To perform the identification for carbohydrates (Glucose, Maltose, Lactose, Sucrose, Fructose etc....)
2.	Detection and identification of lipids (Glycerol, Cholesterol, Oleic Acid, Stearic Acid etc....)
3.	To determine the Acid value and Saponification value of the given fixed oil.
4.	To determine the Iodine value of the given fixed oil.
5.	To estimate glucose in urine by Benedict's method.
6.	To determine glucose content in blood by folin Wu method.
7.	To estimate the total cholesterol in plasma.
8.	To perform biochemical analysis of flour and potato.

9.	To perform biochemical analysis of cheese or milk or bread.
10.	To perform biochemical analysis of (i) gastric juice and (ii) estimation of total acidity in gastric juice.
11.	To perform the estimation of pepsin in gastric juice.
12.	To perform the Gastric juice analysis.
13.	To perform estimation of diastase in urine.
14.	To determine the achromic point and chromic period of salivary amylase.
15.	To estimate acidity and ammonia in Uria.

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.
3. R. K. Murray, D. K. Granner, P. A. Mayes, V.W. Rodwell, Harpers Biochemistry, Prentice hall International Inc. latest edn.
4. S. C. Rastogi, Biochemistry, Tata McGraw Hill New delhi, Latest edn.
5. M.Cohn, K.S. Roth, Biochemistry and Disease. William and Wilkins co. Baltimore, Latest edn.
6. U.Satyanarayan, Biochemistry, Books and allied (P) Ltd. Calcutta, latest edn.
7. G. F. Zubay, W. W. Parson, D. E. Vance, Principles of Biochemistry, WCB Publishers, England, latest edn.
8. S. Ramkrishnan, K. G. Prasannan, R. Rajan. Textbook of medical Biochemistry, Orient Longman Madras, Latest edn.
9. S.K. Sawhney, Randir Singh Eds, Introductory practical Biochemistry, Narosa Publishing house 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


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 Sri G.M. Datta College of Pharmacy
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GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm SEMESTER: III

Subject Name: Pharmaceutical Chemistry-IV (Organic Chemistry – I)

Subject Code: 2230004

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	3	6	80	20	80	20

Theory

Sr. No	Course content	Proposed Hours
1	Structure and Properties : Introduction to organic chemistry, quantitative analysis of elements, determination of molecular weight and molecular formula, Atomic structure, atomic orbitals, molecular orbital theory, molecular orbitals, bonding and antibonding orbitals.	08
2	Chemical bonding and Properties : Introduction, covalent bond, hybridization and hybrid orbitals, intermolecular and intramolecular forces, bond dissociation energy, electronegativity, polarity of bonds, polarity of molecules, resonance, hyperconjugation	08
3	Reactive intermediates of carbon: Carbocation, carbanion, free radical, carbenes, nitrenes, reaction involving these intermediates	04
4	Structure, properties, nomenclature, preparation and reactions of the following class of functional groups <ul style="list-style-type: none"> • Alkanes, alkenes, alkynes, dienes, alkyl halides, alcohols, ethers, • Benzene, • Polynuclear aromatic compounds, [naphthalene, anthracene. 	25

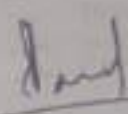
PRACTICAL – 22300P4

1.	Introduction to safe working in organic chemistry laboratory.
2.	Systemic qualitative analysis of organic compounds and preparation of their derivatives {Various examples of organic compounds include, Acidic: Oxalic acid, succinic acid, tartaric acid, citric acid, benzoic acid, salicylic acid, cinnamic acid, p-nitrobenzoic acid, acetyl salicylic acid, Phthalic acid etc; Strong acidic Amphoteric: p-aminobenzoic acid, o-aminobenzoic acid, sulphanic acid etc.; Weak acidic amphoteric: Sulphanilamide etc.; Phenolic: α -naphthol, β -naphthol, Phenol, Resorcinol, Catechol, o/m/p-nitrophenol, o/m/p-cresol etc.; Basic: Aniline, N-methyl aniline, N,N-dimethyl aniline, o/m/p-anisidine, o/m/p toluidine, o/m/p chloroaniline, diphenyl amine, o/m/p-nitroaniline etc.; Neutral: Isopropyl alcohol, tert. Butyl alcohol, Acetophenone, benzophenone, acetaldehyde, benzaldehyde, m-dinitrobenzene, nitrobenzene, o/m/p-nitrotoluene, acetanilide, benzanilide, benzamide, acetamide, urea, thiourea, naphthalene, anthracene, chlorobenzene, bromobenzene, ethylacetate, benzyl alcohol, methanol, ethanol, diethyl

	ether, toluene etc. ; * Salt Sodium benzoate, Sodium acetate
2.1	Preliminary test for given organic compounds. (3)
2.2	Nature identification of given organic compounds (Category: Salts, Acidics, Strongly acidic amphoteric, Phenolics, Weak acidic amphoteric, Basics, Neutrals* (6)
2.3	Element detection for given organic compounds(3)
2.4	Oxidizability and bromination test for selected category(3)
2.5	Functional group test for following functional groups: <ul style="list-style-type: none"> • Carboxylic acids and phenols. (3) • Basic compounds and amino carboxylic acids. (3) • Aldehyde, ketone, ester, ether, alcohol, amide, acetamides, halogenated and non-halogenated hydrocarbon and nitro compounds (including nitrocarboxylic acid and nitro phenol) (6) • Melting point and Boiling point determination of given organic compound (3) • Derivatization of functional groups for above selected functional groups(6)
2.6	Identification of given unknown organic compounds for above compounds (9)

Reference Books:

1. Organic Chemistry, Robert T. Morrison and Robert N. Boyd, 6th Ed., Pearson Education, 2002.
2. Organic Chemistry, G. Marc Loudon, 4th Ed., Oxford University Press, 2004.
3. Organic Chemistry, Vol I and II by I. L. Finar, 6th Ed., Pearson Education, 2000.
4. Advanced Organic Chemistry, Jerry March, 4th Ed., Wiley India, 2007.
5. Vogel's textbook of practical organic chemistry, 5th Edition, Pearson Education Ltd., 2005
6. "Experimental Organic Chemistry" L. M. Harwood, L. J. Moody, J. M. Percy, 2nd Edition, Blackwell Science, 2005.
7. Techniques and Experiment of Organic Chemistry, Addison Ault, 6th Edition, University Science Books, 1998.
8. Introduction to Organic Laboratory Techniques, A Microscale Approach, Donald L. Pavia, Gary M. Lampman, George S. Kriz, 3rd Edition, Harcourt College Pub., 4th Edition, 2007.


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 Sri G. M. Bhatia College of Pharmacy
 5321

GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm SEMESTER: III

Subject Name: Health Education & Community Health
Subject Code: 2230005

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	0	3	80	20	0	0

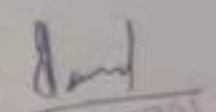
Sr No	Course Contents	Total Hrs
	Health Education	
1	Concept of health: Definitions of health, Dimensions of health, determinants of health, indicators of health.	4
2	Health care of the community: concept of health care, health system (levels of health care – primary, secondary and tertiary), elements and principles of primary health care, health for all, national strategy for HFA / 2000.	3
3	Nutrition and health- Classification of foods , proteins- functions, sources, requirements & diseases, Fats – classification, sources, functions, fats and diseases, requirements, Carbohydrates, dietary fibres Vitamins- functions, sources, deficiency, requirement, Minerals and trace elements – source, functions, deficiency, requirements , Nutritional requirements - Recommended Daily Allowance , food guide pyramid	10
4	Occupational Health- health of the worker, occupational hazards and diseases, measures for health protection of workers; medical measures for prevention of occupational diseases	4
5	Concept of disease concept of causation, natural history of disease (Prepathogenesis and pathogenesis phase, agent factors, host factors, environmental factors, risk factors, risk groups, spectrum of disease, iceberg of disease), concepts of disease control, concepts of prevention Mode of intervention. List of communicable and non-communicable diseases.	4
6	Communicable diseases : Brief outline, their causative agents, modes of transmission, symptoms and prevention- Respiratory infections (Chicken pox, measles, influenza, diphtheria, whooping cough, SARS, tuberculosis) , Intestinal infections (poliomyelitis, helminthiasis, Hepatitis, Cholera, Typhoid, Amoebiasis, Food poisoning), Arthropod borne infections (Dengue, Malaria, Filariasis), Zoonoses (Rabies, Plague), Surface infections (Trachoma, Tetanus, Leprosy, Syphyllis, Gonorrhoea and AIDS). Hospital acquired infections	12
7	Principles of Epidemiology and it's methods- Definition, Aims, approach, epidemiologic methods (Observational, experimental), uses of epidemiology.	5
8	Demography – concepts and importance, Demography cycle	

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9	First Aid: Emergency treatment of shock, snake bites, burns, poisoning, Fractures and resuscitation methods.	2
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References Books:

1. Textbook of Preventive and Social Medicine by K. Park. 20th Edition
2. Health Education and Community Pharmacy by P. C. Dandiya, Z. Y. K. Zafer, A. Zafer 2005 onwards
3. Basics of Education and Community Pharmacy by Dr. R. K. Goyal 4th edition


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GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: III

Subject Name: Pharmacognosy-I
Subject Code: 2230006

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	3	6	80	20	80	20

Theory

Sr No	Course Contents	Total Hrs
1	Definition, history, scope and development of Pharmacognosy.	2
2	Sources of drugs: Plant, Animal, Marine, Mineral and Biotechnology	3
3	Introduction to plant parts and tissue. a) Definition and function of leaf, stem, root, flower, fruit and seed. Classification of modification leaf, stem, root b) Definition, classification and functions of plant tissues. c) Classification and identification non-living cell contents d) Microscopic difference between mono cot and dicot leaf, stem and root	5
4	Classification of drugs: Alphabetical, Morphological, Taxonomical, Chemical and Pharmacological. Role of chemotaxonomy in classification.	3
5	Cultivation, collection, processing and storage of crude drugs a. Factors influencing cultivation of medicinal plants. b. Types of soils and fertilizers of common use. c. Plant hormones and their applications. d. Polyploidy, Mutation and Hybridization with reference to medicinal plants. e. Poly Houses/Green Houses for cultivation.	7
6	An introduction to active constituents of drugs and their classification, properties and chemical tests.	4
7	Evaluation of crude drugs by organoleptic, microscopic (including quantitative microscopy), physical, chemical, biological and other methods. Adulteration of crude drugs. WHO guidelines for evaluation of Herbal drugs.	6
8	Carbohydrates and derived products: Definition, classification, physico-chemical properties, general methods of preparation, sources and systematic Pharmacognostic study of following drugs. • Monosaccharide: Honey • Polysaccharides: Starch, Dextrin • Gums and Mucilage: Agar, Isabgol, Guar gum, Acacia, Tragacanth, Sodium Alginate, Stercuila • Carbohydrate derivatives: Chitin and Pectin	6
9	Lipids: Definition, classification, physico-chemical properties.	9

<p>general methods of preparation, sources and systematic Pharmacognostic study of following drugs.</p> <ul style="list-style-type: none"> • Fixed oil: Castor oil, Olive oil, Hydrocarpus oil, Sesame oil, Linseed oil, Mustard oil, Rape seed oil, Rice bran oil, Cod liver oil, Shark liver oil, Karanj oil • Fat: Lard, Cocos butter, Kokum butter • Wax: Beeswax, Wool fat. 	
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Practical

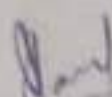
Sr No	Course Contents
1	Use, Care and types of Microscopes, Techniques in microscopy.
2	Microscopy of plant tissues and their components.
3	Microscopy of monocot and dicot leaf, stem, root.
4	Study of chromosomes in Onion Cells (Polyploidy).
5	Microscopy of cell contents: Starch grains, Calcium oxalate crystals and Phloem fibres.
6	Quantitative microscopy (Determination of leaf constants).
7	Phytochemical Screening: General chemical test for primary and secondary metabolites.
8	Carbohydrates: Study of crude drugs for morphology and chemical test for saccharides, gum and mucilage. Isolation of Potato starch. Microscopy of Maize, wheat, potato and rice starch.
9	Lipid: Study of crude drugs for morphology, chemical test, study of acid value, iodine value and saponification value.

References Books:

1. Botany: A. C. Dutta, Calcutta Oxford University Press, New Delhi, 6th Revised Edition, 2010.
2. College botany Vol-I-III, Ganguly H.C., Das K.S., and Dutta C., New Central Book Agency [P] Lt., 2006.
3. Cultivation and Utilization of Medicinal Plants, Anil C. K. and Kapur B. M., RRL Jammu, 1st Edition, 1989.
4. Supplement to Cultivation and Utilization of Medicinal Plants, Handa, S.S. and Kaul, M.K., 1996. RRL, CSIR Publication, Jammu Tawi.
5. A Text book of Pharmacognosy: C. S. Shah, J. S. Quadry, B. S. Shah Prakashan, Ahmadabad. 15th Edition, 2009.
6. Textbook of Pharmacognosy: T. E. Wallis, CBS Publishers and Distributors, New Delhi, 5th Edition, reprinted, 2009.
7. Pharmacognosy: C. K. Kokate, A. P. Purbit, S. B. Gokhale, NiraliPrakashan Pune, 42nd edition, 2006.
8. Pharmacognosy: V. E. Tyler, L. R. Brady, J. E. Hadders, Lea and Febiger Philadelphia, 9th Edition, 1988.
9. Trease and Evans Pharmacognosy. 16th Edition, William Charles Evans, W. Saunders, Edinburg London New York Philadelphia St. Louis Sydney Toronto 2009.
10. Essentials of Pharmacognosy by Ansari S. H., Birla Publications Pvt. Ltd., 4th Edition, 2011.
11. Pharmacognosy of Powdered crude drugs - M. A. Lyenger (Manipal Power Press)
12. Practical Pharmacognosy, Technique and Experiment by C. K. Kokate and S. B. Gokhale, NiraliPrakashan, Pune, 8th edition, 2005.

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13. Quality Control, Herbal Drugs, An approach to evaluation of Botanicals. Dr. Pulok K. Mukherjee. Business Horizons Pharmaceutical Publishers; 2002
14. The Practical Evaluation of Phytopharmaccutics by Brain K. R. and Turner R. D., Wriyth-Sciencetechnics Bristol.
15. Malati G Chauhan & A. P. G Pillai, Microscopic profile of powdered drugs used in Indian system of medicine, Volume I, Bark drugs 2005, Institute of Ayurvedic medicinal plant science, Gujarat Ayurved unit Jamnagar, CPTA
16. Malati G Chauhan & A. P. G Pillai, "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.
17. Malati G Chauhan & A. P. G Pillai, " 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,


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GUJARAT TECHNOLOGICAL UNIVERSITY


B.Pharm SEMESTER: IV

Subject Name: Unit Operations-II
Subject Code: 2240001

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	3	6	80	20	80	20

Theory

Sr. No	Course Contents	Total Hrs
1	Filtration: Theory and mechanism of filtration process, Types of filtration, factors influencing filtration, filter aids, filter media, industrial filter including filter press, filter leaf, rotary filter, edge filter, cartridge filters, membrane filters, mathematical problems on filtration, optimum cleaning cycle in batch filters, applications in pharmacy.	8
2	Centrifugation: Principle and theory of centrifugation, industrial centrifuges including perforated basket centrifuge, sedimentation type centrifuge, continuous centrifuges, etc., applications in pharmacy.	4
3	Drying: Theory and mechanism of drying, moisture content, loss on drying, rate of drying & time of drying calculations, classification of dryers, factors affecting selection of dryers, dryers used in pharmaceutical including drum dryer, spray dryer, fluidised bed dryer, tray dryer, tunnel dryer, rotary dryer vacuum dryer, Microwave, Radiant heat dryer (Infra Red), Mathematical problems on drying, applications in pharmacy.	9
4	Distillation: Raoult's law and its limitation, Henry's Law, Phase diagram, volatility & relative volatility, General parts of distillator, simple steam and flash distillation, batch and continuous distillation, rectification distillation columns and their efficiency, McCabe Thiele method for calculation of number of theoretical plates, azeotropic, molecular & steam distillation, mathematical problems, applications in pharmacy.	8
5	Evaporation: Basic concept of phase equilibria, factors affecting evaporation, heat transfer in evaporators, Duhring's Rule and Raoult's law, evaporators including natural circulation, forced circulation & film	8


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	evaporators, single effect and multiple effect evaporators, mathematical problems, applications in pharmacy.	
6	Humidity, Ventilation and Air Conditioning Systems (HVAC): Basic concepts & definitions, measurement of humidity, psychometric charts, theory and calculations of humidification processes, humidity control, applications of humidity, equipment for humidification and dehumidification operations. Types of refrigeration cycles, air conditioning, applications in pharmacy. Design of HVAC systems.	8

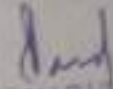
Practical – 22400P1

1	Study of filtration process and various factors affecting it.
2	Demonstration of centrifuge.
3	Study of rate of drying curve and various parameters related to it.
4	Demonstration of various dryers.
5	Study of various distillation processes.
6	Comparison of efficiency of different columns used in distillation process.
7	Study of evaporation process and various factors affecting it.
8	Determination of humidity and related parameters using DBT/WBT and dew point method.
9	Demonstration of sling psychrometer, dial type and digital humidity measuring instruments.

Note: Any other practical related to theory topic can be carried out.

References Books:

1. Elementary Chemical Engineering - Max S. Peters, Published by McGraw Hill Book Company, New York, 1954
2. Perry's Chemical Engineer's Handbook - Robert H Perry, Green D.W., Maloney J.O. 7th Edition, 1998, McGraw - Hill Inc., New York.
3. Tutorial Pharmacy by Cooper & Gunn, ed. S.J. Carter, CBS Publishers & Distributors, Delhi, 6th Edition, 2000.
4. Unit Operations of Chemical Engineering, 5th edition - McCabe, Smith & Harriott, McGraw - Hill Inc., New York.
5. Pharmaceutical Engineering - K. Sambamurthy, 2002 NAI (P) Ltd., Delhi.
6. Pharmaceutics: The Science of Dosage Form Design - M.E. Aulton.
7. The Theory & Practice of Industrial Pharmacy - Lachman L., Lieberman H.A. & Kanjig J.L., 3rd edition, 1990 Varghese Publishing House, Bombay.
8. Alfonso G. Remington: The Science & Practice of Pharmacy. Vol. I & II. Lippincott, Williams & Wilkins Philadelphia.
9. Introduction to Chemical Engineering by Walter L. Badger & Julius T. Banchero, McGraw Hill International edition, New Delhi, 1955.
10. Pharmaceutical Engineering (Principles and Practices) by C.V.S. Subrahmanyam, Vallabh prakashan, Delhi 110034.


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GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: IV

Subject Name: Dispensing Pharmacy II and Pharma Industrial Management
Subject Code: 2240002

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	3	6	80	20	80	20

Theory

Sr No	Course Contents	Total Hrs
1	Principles involved and procedures adopted in dispensing of <ul style="list-style-type: none"> • Semisolid Products – Ointment, Creams, Gels, Pastes • Suppositories – Bases, Dispensing, Displacement value etc. 	8
2	Incompatibilities <ul style="list-style-type: none"> • Physical, chemical and therapeutic incompatibilities observed in prescriptions of dispensed products • Identification and correction of incompatibilities. • Inorganic incompatibilities including incompatibility of metals and their salts, non metals, acids, alkalis. Organic incompatibilities: purine bases, alkaloids, ammonium compounds, carbohydrates, glycosides, anesthetics, surface active agents.	14
Pharma Industrial Management		
3	Concept of Management Administrative management: Planning, Organizing, Staffing, Directing and Controlling. Entrepreneurship Development and 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.	12
4	Pharmaceutical marketing Functions, buying, selling, transportation, storage, finance, insurance, feedback, information, channels of distribution, wholesale, retail departmental store, multiple shops and mail order business.	7
5	Salesmanship Principles of sales promotion, advertising, ethics of sales merchandising.	4

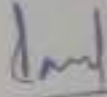
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1.	Practicals may be designed to solve a Physical incompatibilities(e.g. immiscibility, insolubility and liquidification)
2.	Practicals may be designed to solve Chemical incompatibilities of alkaloidal salt with alkali substance, soluble iodides, Tannins and salicylates, Iron, CO ₂ .
3.	Chemical incompatibilities of soluble salicylates with alkali, acid and ferric salt.
4.	Incompatibility of potassium chlorate with oxidizable substances and incompatibility causing evolution of gas (e.g. boric acid with sodium bicarbonate and glycerine, bismuth subnitrate with sodium bicarbonate)
5.	To prepare and dispense Pastes (e.g. Zinc Gelatin Paste, Compound zinc oxide Paste, Zinc and Salicylic acid Paste, Compound aluminium Paste etc.)
6.	To prepare and dispense jellies (e.g. Sodium Alginate, Zinc gelatin jelly and Lubricating jelly).
7.	To prepare and dispense suppositories (Tannic acid suppositories, Phenol suppositories, Ichthamol suppositories with Cocoa Butter, Cocoa Butter suppositories containing insoluble solid (boric acid), Cocoa Butter suppositories containing soluble solid (chloral hydrate)
8.	To prepare and dispense Glycerol - gelatin suppositories with macrogols base (Suppository of Eucalyptus Oil, Zinc Oxide - Glycerogelatin suppository, Soap-Glycerin Suppository etc).

References Books:

1. Pharmaceutical Practice - by Diana M. Collett and Michale E. Aulton, ELBS Publishers.
2. Dispensing for pharmaceutical by Cooper and Gunn by S.J. Carter, CBS 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. Pharmaceutical Practice, Edited by A.J. Winfield and R.M.E. Richards.
6. Bentley's Textbook of pharmaceuticals, E A Rawlins.
7. Remington: The Science and Practice of Pharmacy, Latest Edition, by Mack Publishing Company.
8. Management by James A.F. Stoner.
9. Statistics for Management by Richard I. Levin.
10. Personnel Management by Arun Monappa.
11. Business Organisation and Office Management by Santhosh Bushan.


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GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: IV

Subject Name: Pharmaceutical Chemistry – V (Biochemistry – II)
Subject Code: 2240003

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	3	6	80	20	80	20

Theory

Sr. No.	Course contents	Proposed Hours
1	Detailed chemistry of Proteins and nucleic acid	08
2	Metabolism of ammonia and nitrogen containing monomers: nitrogen balance, biosynthesis of amino acids, catabolism of amino acids, conversion of amino acids to specialized products. Assimilation of ammonia, urea cycle. Metabolic disorders of urea cycle, metabolism of sulphur containing amino acids, porphyrin biosynthesis, formation of bile pigments, hyperbilirubinemia, purine biosynthesis, purine nucleotide interconversion, pyridine biosynthesis.	12
3	Biosynthesis of nucleic acids. Brief introduction of genetic organization of the mammalian genome, alteration and rearrangement of genetic material, biosynthesis of DNA and its replication, DNA repair mechanism, biosynthesis of RNA	05
4	Genetic code and protein synthesis: genetic code, components of protein synthesis and inhibition of protein synthesis. Brief account of genetic engineering and polymerase chain reactions	05
5	Regulation of gene expression	02
6	The Concept of free energy, Determination of Change in free energy from Equilibrium Constant and Reduction Potential, Bioenergetics, Production of ATP and its Biological Significance	02
7	Biological oxidation, enzymes and co-enzymes involved in oxidation reduction and its control. The respiratory chain, its role in energy capture and its control, energetic of oxidative phosphorylation, inhibitors of respiratory chain and oxidative phosphorylation, mechanism of oxidative phosphorylation	08
8	Techniques used in biochemistry: spectrophotometry, centrifugation, electrophoresis, chromatography, extraction and purification of proteins and nucleic acids	03

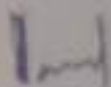

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PRACTICAL - 22400P3

1	Identification of various proteins (Gelatin, Casein, Albumin etc...)
2	Identification of various proteins (Peptone, Creatinine etc...)
3	To identify substances of physiological importance (Protein, Lactic Acid, HCl etc...)
4	To identify substances of physiological importance (Bile, Blood, Creatinine, Urea, Acetone, NaCl etc...)
5	To perform the tests for normal inorganic and organic constituent of urine.
6	To perform the qualitative analysis for pathological (abnormal) constituents in urine.
7	To estimate Creatinine in blood by colorimetric analysis.
8	To estimate total proteins in plasma by biuret method.
9	To perform the estimation of urea in blood by diacetyl method.
10	To perform estimation of chloride and phosphate in urine.
11	To determine titratable acidity and ammonia in urine.
12	To perform the estimation of Calcium and Magnesium in urine.
13	To perform biochemical analysis of bile.
14	Separation of Amino Acids (Proline, Glutamate, Aspartate, Glycine, Alanine etc...) by Paper Chromatography.
15	Separation of Amino Acids (Proline, Glutamate, Aspartate, Glycine, Alanine etc...) by Thin Layer Chromatography (TLC).
16	To estimate calcium in serum.
17	Colourimetric analysis of Bilirubin and cholesterol in plasma.
18	Estimation of uric acid in urine.

Books recommended:

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.
3. R. K. Murray, D. K. Granner, P. A. Mayes, V.W. Rodwell, *Harpers biochemistry*, Prentice hall international Inc. latest edn.
4. M.Cohn, K.S. Roth, *Biochemistry and disease*. William and Wilkins co. Baltimore, Latest edn.
5. U. Satyanarayan, *Biochemistry*, Books and allied (P) Ltd. Calcutta, latest edn.
6. G. F. Zubey, W. W. Parson, D. E. Vance, *Principles of Biochemistry*, WCB publishers, England, latest edn.
7. S.K. Sawhney, Randir Singh Eds, *Introductory practical biochemistry*, Narosa publishing house New Delhi.
8. D. T. Plummer, *An introduction to practical biochemistry*, Tata McGraw Hill New Delhi.
9. J. Jayaraman, *Laboratory manual in biochemistry*, Wiley eastern Ltd. New Delhi.
10. G. T. Mills, G. Leaf *Practical Biochemistry*, John Smith and Son Ltd.
11. Alan H. Gowenlock, Janet R. McMurray, Donald M. McLaughlan, *Varley's Practical clinical biochemistry*, Heinemann professional publishing.
12. P. G. Tikkar, *Practical Biochemistry*.


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B.Pharm
SEMESTER-IV

Subject Name: Pharmaceutical Chemistry – VI (Organic Chemistry – II)
Subject Code: 2240004


Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	3	6	80	20	80	20

Sr. No.	Course contents	Proposed Hours
1	Stereochemistry: <ul style="list-style-type: none"> • Chirality • Optical activity (dextro and leavo rotation concept) • Stereoisomerism • Enantiomers, Diastereomers, Mesomers with physical, chemical and biological properties of the same. • Geometrical isomers and its nomenclature. Physical and chemical properties of the same • Racemic mixture and its resolution methods. • Specification of configuration: Relative configuration (L and D), Absolute configuration (R and S) (CIP Rules) • Axial Chirality: Stereochemistry of Allene, spiran and Biphenyl. • Conformational isomers: Alkanes and Cyclohexane 	08
2	Structure, properties, nomenclature, preparation and reactions of following class of functional groups <ul style="list-style-type: none"> • amines, • phenols, • aldehydes and ketones, • carboxylic acids and their derivatives. 	22
3	Unsaturated carbonyl compounds, Nucleophilic aromatic substitution	02
4	Heterocyclic compounds: Chemistry, preparation and properties of <ul style="list-style-type: none"> • Furan, thiophene, pyrrol and pyridine • Pyrazole, imidazole, oxazole, isoxazole and thiazole • Pyrazine, pyridazine and pyrimidine • Quinoline, isoquinoline and indole 	10
5	Introduction, principles and applications of: <ul style="list-style-type: none"> • nanochemistry, • microwave synthesis and • green chemistry. 	03


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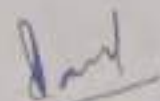
PRACTICAL - 22400P4

1.	<p>Qualitative analysis of unknown organic compound according to the following list of organic compounds :</p> <p>1.1 - Identification and characterization of given unknown organic compound (Salts/Acids/Strong acidic Amphoterics)</p> <p>1.2 - Identification and characterization of given unknown organic compound (Phenolics/Basics)</p> <p>1.3 - Identification and characterization of given unknown organic compound (Neutrals)</p> <p>1.4 - Identification and characterization of given unknown organic compound (Salts/Acids/Strong acidic Amphoterics/Phenolic/Basics Neutrals)</p> <p>1.5 - Identification and characterization of given unknown organic compound (Salts/Acids/Strong acidic Amphoterics/Phenolic/Basics/Neutrals)</p> <p>List of organic compounds:</p> <p>a. Salts: Sodium benzoate, Sodium salicylate etc.</p> <p>b. Acidics: Benzoic acid, Salicylic acid, Cinnamic acid, Acetyl salicylic acid, Phthalic acid etc.</p> <p>c. Strong acidic Amphoterics: p-Aminobenzoic acid, o-Aminobenzoic acid, Sulphanilic acid etc.</p> <p>d. Weak acidic Amphoterics: Sulphanilamide etc.</p> <p>e. Phenolics: o/m/p-nitrophenol, alpha/beta-naphthol, o/m/p-cresol etc.</p> <p>f. Basics: Aniline, N-Methyl aniline, N,N-Dimethyl aniline, o/m/p-Anisidine, o/m/p-Nitroaniline, p-Chloroaniline, o/m/p toluidine etc.</p> <p>g. Neutrals: Acetophenone, Benzaldehyde, m-Dinitrobenzene, Nitrobenzene, Chlorobenzene, Bromobenzene, Acetanilide, Benzamide, Anthracene, Napthalene, Benzophenone isopropyl alcohol, tert butyl alcohol etc.</p>	15
2	<p>Introduction and detailed demonstration to various synthetic techniques and apparatus used therein:</p> <p>2.1 Heating and cooling methods, distillation, reaction work-up, filtration and extraction.</p> <p>2.2 Purification and identification</p>	06
3	<p>3.1 Synthesis and purification of selected organic compounds:</p> <ol style="list-style-type: none"> 1. Synthesis of p-nitroacetanilide from acetanilide (Nitration) 2. Synthesis of p-bromoacetanilide from acetanilide (Halogenation) 3. Synthesis of p-nitroaniline from p-nitroacetanilide (Hydrolysis) 4. Synthesis of p-bromoaniline from p-bromoacetanilide (Hydrolysis) 5. Synthesis of benzal from benzoin (Oxidation) 6. Synthesis of benzylidene acetophenone (Chalcone) from acetophenone and benzaldehyde (Condensation reaction) 7. Synthesis of Magneson-II from p-nitroaniline (Diazotization). <p>Monitoring progress of reaction by Thin Layer Chromatography (TLC) with the help of any one of above selected reaction.</p>	21
4	Introduction to the use of stereomodels	03


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Reference Books:

1. Organic Chemistry, Robert T. Morrison and Robert N. Boyd, 6th Ed., Pearson Education, 2002.
2. Organic Chemistry, G. Marc Loudon, 4th Ed., Oxford University Press, 2004.
3. Organic Chemistry, Vol I and II by I. L. Finar, 6th Ed., Pearson Education, 2000.
4. Advanced Organic Chemistry, Jerry March, 4th Ed., Wiley India, 2007.
5. Vogel's textbook of practical organic chemistry, 5th Edition, Pearson Education Ltd., 2005
6. "Experimental Organic Chemistry" L. M. Harwood, L. J. Moody, J. M. Percy, 2nd Edition, Blackwell Science, 2005.
7. Techniques and Experiment of Organic Chemistry, Addison Ault, 6th Edition, University Science Books, 1998.
8. Introduction to Organic Laboratory Techniques, A Microscale Approach, Donald L. Pavia, Gary M. Lampman, George S. Kriz, 3rd Edition, Harcourt College Pub., 4th Edition, 2007.



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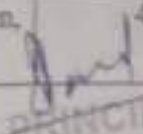
B.Pharm
SEMESTER: IV

Subject Name: Basic Concepts of Pharmacology and Clinical Pharmacy Practice
Subject Code: 2240005

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	0	3	80	20	0	0

Theory

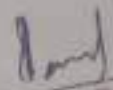
Sr No	Course Contents	Total Hrs
1	Define following terms: Pharmacy, Pharmacology, Clinical pharmacy, Clinical Pharmacology, Pharmacokinetics, Pharmacodynamics, Pharmacoepidemiology, Pharmacoeconomics, Pharmacogenomics, Therapeutics, Toxicology, Chemotherapy, Pharmacopoeia, Drug, Medicine, Poison, Drug tolerance, Tachyphylaxis. Introduction and scope of pharmacology and clinical pharmacy, Nature and sources of drugs, Drug nomenclature, Routes of drug administration.	4
2	Pharmacokinetics: (A) Biological membrane, mechanism of drug transportation, Absorption, factors affecting absorption, Distribution, volume of distribution, redistribution, penetration into brain, passage across placenta, plasma protein binding, tissue storage, Metabolism/biotransformation, Phase-I and Phase-II reactions, microsomal enzymes and their induction, Excretion, mechanism of renal excretion, enterohepatic circulation. (B) Area under curve (for single dose and repeated dose), Bioavailability and bioequivalence, Plasma half life and Clearance, Loading dose and maintenance dose, Therapeutic drug monitoring (TDM) and its significance.	12
3	Pharmacodynamics: Principle of drug action, Target of drug action-receptors, ion channels, enzymes, transport proteins, Introduction to various types of receptor- ligand gated ion channel, G-protein coupled receptor, kinase linked receptor, nuclear receptor, Introduction to various types of ion channels- open channels and gated channels, Dose response relationship, Agonist and antagonist, Combined effects of drugs (potentiation, addition, synergism and antagonism), Drug antagonism	9
4	Modification in effects of drugs with special reference to Children, elders and pregnancy.	4


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5	Drug interaction: Classify drug interaction based on mechanisms (pharmacokinetic types and pharmacodynamic types), drug food interaction.	3
6	Adverse drug reactions: Brief outline on followings terminology related to adverse effects- side effects, overdose effects, secondary effects, toxic effects, intolerance, drug allergy, iatrogenic effects, mutagenicity, teratogenicity, carcinogenicity, photosensitivity, drug withdrawal reactions, drug dependence Classify ADR as per Rawlins-thompson system, Pharmacovigilance and epidemiological methods in ADR detection, Medication errors and adverse drug events.	7
7	Patient counselling, communication skills for effective counselling, steps for patient counselling, Medication adherence and non-adherence, determinants of medication non-adherence, Drug information and poison information.	4
8	Concept of essential medicines and rational drugs use, essential medicines list, Standard Treatment Guidelines, Drug and Therapeutics Committee	2

References Books:

1. Clinical pharmacy and therapeutics. Roger Walker and Cate Whittlesea
2. Satoskar, R.S. and Bhadarkar, S.D. Pharmacology and pharmacotherapeutics..
3. Rang, H.P. & Dale, M.M. Pharmacology
4. Goodman Gilman, A., Rall, T.W., Nies, A.I.S. and Taylor, P. The pharmacological Basis of therapeutics.
5. Katzung, B.G. Basic and clinical pharmacology. Latest edition.
6. K.D. Tripathi. Essentials of Medical Pharmacology.
7. G. Parathsarthee, K. Nyfort-Hansen and M. C. Nahata. A textbook of clinical pharmacy practice.


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B.Pharm SEMESTER: IV

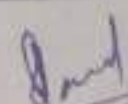
Subject Name: Pharmacognosy-II

Subject Code: 2240006

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	3	6	80	20	80	20

Theory

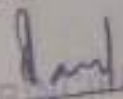
Sr No	Course Contents	Total Hrs
1	<p>Volatile Oils: Definition, classification, physico-chemical properties, general methods for isolation, source, cultivation, collection, commercial varieties and systematic pharmacognostic study of volatile oils containing drugs</p> <ul style="list-style-type: none"> • Alcohol: Coriander, Geranium, Sandal wood • Esters and Alcohol: Rose, Mentha • Aldehyde: Cinnamon, Cassia, Lemon peel, Orange peel, Lemon grass, Eucalyptus, Cumin • Ketone: Caraway, Dill • Phenol: Clove, Tulsi, Ajowan • Ether: Star Anise, Fennel, Nutmeg, Cardamom <p>Others: Gaultheria, Valerian, Vaj, Vetiver, Nagarmotha, Garlic, Saffron, Vanilla</p>	25
2	<p>Resins: Definition, classification, Physico-chemical properties, general methods for isolation, source, cultivation, collection, commercial varieties and their systematic pharmacognostic study of following drugs</p> <ul style="list-style-type: none"> • Acid resin: Colophony • Resin Alcohol & Phenols: Balsam, Cannabis • Ester Resin: Benzoin • Oleo gum resin: Asafoetida, Myrrh, Guggul, Salaiguggul • Oleo-resin: Ginger, Turmeric • Glyco-resin: Kaladana, Podophyllum, Nishoth <p>Other: Vidang, Capsicum</p>	13
3	<p>Tannins: Definition, classification, Physico-chemical properties, general methods for isolation, source, cultivation, collection, commercial varieties and their systematic pharmacognostic study</p> <ul style="list-style-type: none"> • Hydrolysable: Amla, Harde, Behda, Galls • Condensed: Pale catechu, Black catechu, Ashoka, Bael, Pterocarpus 	7


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1	Demonstration of methods for isolation of volatile oil from crude drugs.
2	Study the Morphology of Volatile oil containing following drugs. Perform Microscopy (TS and Powder) and TLC of underlined drugs <ul style="list-style-type: none"> • Leaf drugs: <u>Mentha</u>, <u>Eucalyptus</u>, Lemon grass, Gaultheria, Tulsi, Basil, Geranium, Rosemary, Thyme • Bark and Peel: <u>Cinnamon</u> (Ceylon and Chinese), Orange peel, Lemon peel, Star anise • <u>Umbelliferous</u> fruits: <u>Fennel</u>, <u>Coriander</u>, Dill, Ajowan, Caraway, Cumin • Flower drugs: <u>Clove</u> and Rose • Seed and wood: <u>Cardamom</u>, Nutmeg, Sandal wood • Rhizome: <u>Vaj</u>, Valerian, Nagarmoth, Garlic
3	Study of Morphology and Microscopy (TS and powder drugs) of <u>Amla</u> , <u>Ashoka</u> , <u>Pale catechu</u> , <u>Black catechu</u> , Galls, <u>Harde</u> , <u>Behda</u> , <u>Bael</u> , <u>Pterocarpus</u>
4	Isolation of oleoresin, identification (Chemical test) and study of Morphology and Microscopy (TS and powder drugs) from <u>Colophony</u> , <u>Balsam</u> , <u>Benzoin</u> , <u>Myrrh</u> , <u>Asafoetida</u> , <u>Guggul</u> , <u>Ginger</u> , <u>Turmeric</u> , <u>Vidang</u> , <u>Kaladana</u>
5	Isolation of tannins from crude drugs and extract. Removal of tannin from drugs and extract. Tests for tannins
6	Isolation of Thymol / Eugenol / Menthol

References Books:

1. Cultivation and Utilization of Aromatic Plants, Atal C. K. and Kapur B. M., RRL Jammu, 1st Edition, 1989
2. Cultivation and Utilization of Medicinal Plants, Atal C. K. and Kapur B. M., RRL Jammu, 1st Edition, 1989
3. Supplement to Cultivation and Utilization of Medicinal Plants, Handa, S.S. and Kaul, M.K., 1996. RRL, CSIR Publication, Jammu Tawi,
4. Supplement to Cultivation and Utilization of Aromatic Plants, Handa, S.S. and Kaul, M.K., 1996. RRL, CSIR Publication, Jammu Tawi
5. A Text book of Pharmacognosy. C. S. Shah, J. S. Quadry, B. S. Shah Prakashan, Ahmadabad. 15th Edition, 2009.
6. Textbook of Pharmacognosy: T. E. Wallis, CBS Publishers and Distributors, New Delhi, 5th Edition, reprinted, 2009.
7. Pharmacognosy: C. K. Kokate, A. P. Purohit, S. B. Gokhale, Nirali Prakashan Pune, 42nd edition, 2008.
8. Trease and Evans Pharmacognosy. 16th Edition, William Charles Evans, W. Saunders, Edinburg London New York Philadelphia St. Louis Sydney Toronto 2009.
9. Essentials of Pharmacognosy by Ansari S. H., Birla Publications Pvt. Ltd., 4th Edition, 2011.
10. Pharmacognosy of Powdered crude drugs - M.A. Lyenger. (Manipal Power Press)
11. Practical Pharmacognosy, Technique and Experiment by C. K. Kokate and S. B. Gokhale, Nirali Prakashan, Pune, 8th edition, 2005
12. Quality Control, Herbal Drugs, An approach to evaluation of Botanicals. Dr. Pulok K. Mukherjee. Business Horizons Pharmaceutical Publishers; 2002
13. The Practical Evaluation of Phytopharmaceutics by Brain K. R. and Turner R. D. Wriqth-Sciencetchnics Bristol


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14. Malati G Chauhan & A. P.G Pillai, Microscopic profile of powdered drugs used in Indian system of medicine, Volume 1, Bark drugs 2005, Institute of Ayurvedic medicinal plant science, Gujarat Ayurved unit Jamnagar; CPTA.
15. Malati G Chauhan & A.P.G Pillai, "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
16. Malati G Chauhan & A.P.G Pillai, " 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


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B.Pharm
SEMESTER: V

Subject Name: Hospital and Community Pharmacy
Subject Code: 2250001

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	0	3	80	20	0	0

Theory

Sr No	Course Contents	Total Hrs
1	Organization and structure: Organization of a hospital, organization & personnel of hospital pharmacy, responsibilities of a hospital pharmacist, pharmacy procedural manual, Budget preparation and Implementation, Pharmacy and Therapeutic Committee, Hospital Formulary and its contents, preparation and revision of hospital formulary.	8
2	Drug distribution systems in hospitals: a) Dispensing of drugs to out-patients. b) Dispensing of drugs to in-patients. c) Dispensing of controlled drugs. d) Pre-packaging and labeling. e) Drug charges and charging policy. f) Central Sterile Supply Unit and their Management. g) Surgical supplies and health accessories	8
3	Duties and responsibilities of hospital pharmacist	2
4	Hospital formulary: Format and appearance of the formulary, distribution of the formulary, keeping the formulary current use of nonformulary drugs, the legal basis of the formulary system, anti-substitution laws and formulary, Preparation of the formulary, formulary Vs. drug catalogue or list, selection of guiding for admission or deletion of drug, contents, prescription writing, format, size, loose leaf Vs bound publication, formulary drug listing service preparation, categorizing and indexing, sample pharmacologic index, text, specialty formulary	6
5	Nuclear pharmacy: Introduction to Radio-pharmaceuticals, radio-active half life, Units of radio-activity Production of radio-pharmaceuticals, methods of isotopic tagging, preparation of radio-isotopes in laboratory using radiation dosimetry, radio-isotope generators, permissible radiation dose level, radiation hazards and their prevention, specifications for radio-active laboratory.	5
6	Records and Reports: Prescription filling, drug profile, patient medication profile, annual report.	3
7	Patient counseling and Patient Compliance: Role of pharmacist in community health care and education.	3
8	Drugs Information Services: Sources of Information on drugs,	6

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	disease, treatment schedules, procurement of information, computerized services (e.g. MEDLINE, MEDLAR etc.), retrieval of information, medication error, safe use of medicine, drug information center, pharmacist as a information specialist.	
9	Use of computer in hospital: Terminology, program criteria, managing computer system, development of ASHP technical assistant bulletin on hospital drug distribution and control, impact of the computer in dispensing time, model computer regulations.	4

References Books:

1. Merchant and Quadry, Text book of hospital pharmacy
2. Hassan, Hospital pharmacy (Lee and Febiger)
3. R K Parikh, Hospital Pharmacy
4. Parmar N S Health education and community pharmacy

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GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: V

Subject Name: Pharmaceutical Microbiology & Biotechnology – I
Subject Code: 2250002

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	3	6	80	20	80	20

Theory

Sr No	Course Contents	Total Hrs
1	Introduction and Scope of Microbiology	2
2	General microbiology: <ul style="list-style-type: none"> a) Microscopy <ul style="list-style-type: none"> • Light Microscopy (Bright Field, Dark field & Phase contrast, Fluorescent, Differential interference) • Electron Microscopy (SEM & TEM) b) General Structure <ul style="list-style-type: none"> • Prokaryotic and Eukaryotic Cell c) Brief over view of 3 kingdom Classification system d) Structure and Taxonomy of Actinomycetes, Bacteria, Spirochetes, Rickettsia and Viruses, fungus with emphasis on pathogenic and pharmacological importance. e) Identification of microbes <ul style="list-style-type: none"> • Staining Techniques f) Nutritional requirements <ul style="list-style-type: none"> • Nutrition requirements, Growth curve • Introduction to various nutritional media, • Cultivation and Isolation of bacteria, virus and fungus. g) Bacterial count techniques 	19
3	Control of microbes in pharmaceutical industry <ul style="list-style-type: none"> a. <u>Disinfection:</u> <ul style="list-style-type: none"> • Classification, mode of actions and Factor affecting Disinfection • Dynamics of Disinfection • Evaluation of Disinfection b. <u>Sterilization:</u> <ul style="list-style-type: none"> • Introduction, significance, sensitivity of microorganisms, • Detailed methods for sterilization processes. • Sterilization control and sterility assurance. 	14
4	Introduction of DNA & RNA, details of Genetic code and protein synthesis Introduction and scope of Biotechnology	06
5	Immobilization of Enzymes: <ul style="list-style-type: none"> • Techniques of immobilization 	04

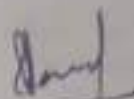
- Factors affecting enzyme kinetics
- Applications

PRACTICAL - 22500P2

1.	Introduction to Pharmaceutical Microbiology practical
2.	Preparation of Various Media
3.	Sub culturing of Common Bacteria (Aerobic and Anaerobic)
4.	Staining of Microorganism (Monochrome staining, Gram staining, acid fast staining etc)
5.	Methods of Isolation
6.	Study of Sterilization and Their Validation
7.	Viable Counts and total counts by various methods
8.	Evaluation of the disinfectants
9.	Maintenance and preservation of pure culture

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.
7. Principles of Fermentation Tehchnology. Second edn. P. F. Stanbury, A. Whiteshaker and S. J. Hall Aditya Books Pvt Ltd. New Delhi.
8. Microbiology, Pelczar/Chan Kreig Tata McGraw Hill edn.
9. Industrial Microbiology L.E. Casida, Jr. New age International Publishers.
10. Fundamental Principles of Bacteriology. A. J. Sale, Tata McGraw Hill Publishing Company Ltd.
11. Fundamentals of Microbiology by Forbischer.
12. Bentleys Text book of Pharmceutics.
13. Dispensing Pharmacy by Cooper and Gunn, Twelfth edn.
14. Remington Pharmaceutical Science, Latest edn.
15. Microbiology by Ronald Atlas.



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GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: V

Subject Name: Pharmaceutical Analysis III
Subject Code: 2250003

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	3	6	80	20	80	20

Theory

Sr No	Course Contents	Total Hrs
1	Fundamentals of Spectroscopy: Classification of spectra i.e. line, band, continuous spectra / absorption, emission spectra; Wave properties of electromagnetic radiation; Particle/photon properties of electromagnetic radiation; Electromagnetic spectrum.	03
2	UV-VIS Spectroscopy: Theory; Beer and Lambert's law - limitations and deviations from the law; Terminologies associated with absorption measurements; Types of transitions; Factors affecting spectral characteristics (structural and nonstructural); Effect of conjugation; Wood ward Fieser rule; Photometric titrations; Instrumentation, applications (in analysis of organic compounds and inorganic complexes), advantages and limitations of UV Visible spectroscopy; Quantitative analysis of binary mixtures of absorbing substances by simultaneous equation method; Calibration of UV Visible Spectrophotometer as per Pharmacopoeia.	10
3	Fluorescence Spectroscopy: Introduction: luminescence, photoluminescence; Theory of Fluorescence and Phosphorescence; Jablonski diagram; Factors affecting fluorescence intensity (structural and nonstructural); Instrumentation, applications, advantages and limitations of fluorescence spectroscopy	04
4	IR Spectroscopy: Theory of absorption of Infrared radiation by molecules; Molecular vibrations; Factors influencing vibrational frequencies; Calculation of vibrational frequencies (Hooke's law); Sample handling techniques; Instrumentation (Dispersion and FTIR spectrometer) and applications of IR Spectroscopy; Calibration of IR Spectrophotometer as per Pharmacopoeia.	07
5	Atomic Spectroscopy: Basics of atomic spectroscopy; Principle of atomic absorption and atomic emission spectroscopy; Interferences in atomic spectroscopy; Factors affecting atomic spectroscopy like solvents, buffers, other ions, etc; Flame Photometry; Atomic emission spectroscopy with plasma and electrical discharge sources; Instrumentation (including radiation sources like hollow cathode	05

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	lamp), applications, advantages and limitations of atomic absorption and atomic emission spectroscopy.	
6	Mass Spectrometry: Theory; Ionization techniques, Ion separating techniques; Different types of ions and their significance in mass spectra, Fragmentation rules and rearrangements; Instrumentation and applications of mass spectrometry	06
7	Nuclear Magnetic Resonance spectroscopy: Fundamental Principles - nuclear spin, magnetic moment; Proton NMR spectroscopy - theory, chemical shift and factors affecting chemical shift, spin-spin coupling, coupling constant, relaxation process, Instrumentation and applications of PMR, Brief overview of ¹³ C NMR.	07
8	Structure elucidation by joint application of UV, IR, NMR and Mass spectrometry	03

Note:

Examples based on assays & structure elucidation shall be covered at concerned subtopics in each of the above chapters

Practical - 22500P3

Sr. No.	Content
1	Calibration of UV spectrophotometer
2	Calibration of IR spectrophotometer
3	To determine % purity of paracetamol by UV Spectrophotometry
4	Determination of λ_{max} , $A(1cm1\%)$, Detection-Quantitation Limit and preparation of calibration curve (Verification of Beer's law) for any drug by UV-visible spectrophotometer.
5	To determine % purity of Metformin by UV Spectrophotometry
6	Effect of pH and solvent on the UV spectrum of given compound
7	To determine excitation and emission wavelength of drug by spectrofluorimetry
8	Assay of quinine sulphate by spectrofluorimetry
9	To determine effect of Quenching on fluorescence of quinine sulphate by fluorimetry
10	Assay of sulpha drugs by colorimetry
11	To determine %purity of paracetamol by colorimetry
12	To determine isobestic point of indicator by UV Spectrophotometry
13	To determine dissociation constant of indicators by UV spectrophotometry
14	Content Uniformity of any drug as per Pharmacopoeia.
15	Identification of API by IR spectrum.
16	To interpret multiplication of signals of various compound by NMR
17	Workshop on structure elucidation of simple organic compounds using UV, IR, NMR, and Mass
18	To determine % purity of Paracetamol and Diclofenac Sodium Combination as per IP'96
19	Simultaneous estimation of Paracetamol & Ibuprofen/any other combination by simultaneous equation method

Principal

References Books:

1. Principles of Instrumental Analysis Skoog, Holler, Nieman, 5th edition.
2. Instrumental Methods of Analysis, H.H. Willard, L.L. Meritt, J.A. Dean and F.A. Settle Wadsworth, New York
3. Pharmaceutical Analysis: Modern methods Part A, Part B, James W. Munson.
4. Vogel's Text Book of Quantitative Chemical Analysis, G. H. Jeffery, J. Basset, J. Mendham, R. C. Denny (Rev. by), Longman, London
5. A Textbook of Pharmaceutical Analysis. Connors K.A.
6. Practical Pharmaceutical chemistry, part 1&2, A.H. Beckett and J.B. Stenlake, the athlone press, London.
7. Pharmacopoeia of India, Govt. of India, Ministry of Health.
8. British Pharmacopoeia, ministry of health and social welfare, UK.
9. The United States Pharmacopoeia-National Formulary (USP-NF)

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	diphenhydramine, triprolidine, chlorcyclizine, chlorpheniramine, promethazine, cyproheptadine, cetirizine) H ₂ antagonists b) Eicosanoids: history and discovery, eicosanoids biosynthesis, drug action mediated by eicosanoids, eicosanoids approved for human clinical use	
	4) Diagnostic agents: Radiopharmaceuticals, Radiological contrast media (Synthesis: diphenoxylate, diatrizoic acid)	02
	5) Drugs acting on ANS a) Parasympathomimetic agents: SAR- Parasympathomimetics (Synthesis: Neostigmine, Dicyclomine HCl) b) Parasympatholytic agents: SAR- Muscarinic antagonists c) Sympathomimetic agents: SAR- β -Phenylethanolamine class (Synthesis: Adrenaline, Salbutamol and Ephedrine) d) Sympatholytic agents: (Synthesis: Propranolol and atenolol) e) Neuromuscular blocking agents and ganglionic blockers	12

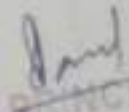
Practical - 22500P4

Sr. No.	Content	No. of practical hours
A	Separation and qualitative analysis of Organic binary mixtures containing having salt, acidic, phenolic, amphoteric, basic and neutral nature (Solid + Solid (Solid), Solid + Solid (Eutectic)) with derivative preparations. 1. Salts (sodium benzoate, Sodium salicylate etc.) 2. Acids (Benzoic acid, salicylic acid, cinnamic acid, acetyl salicylic acid etc.) 3. Phenols (α -Naphthol, β -Naphthol, $o/m/p$ -nitrophenol etc.) 4. Strong acidic amphoteric (p -amino benzoic acid, o -amino benzoic acid, sulphanic acid etc.) and weak acidic amphoteric (Sulphanilamide etc.) 5. Bases (α -Naphthylamine, p -anisidine, diphenyl amine, $o/m/p$ -nitroaniline etc.) 6. Neutrals (Benzophenone, m -dinitrobenzene, acetanilide, benzamide, naphthalene etc.)	30
1	Separation and qualitative analysis of organic binary mixture	
2	Separation and qualitative analysis of organic binary mixture	
3	Separation and qualitative analysis of organic binary mixture	
4	Separation and qualitative analysis of organic binary mixture	
5	Separation and qualitative analysis of organic binary mixture	
6	Separation and qualitative analysis of organic binary mixture	
7	Separation and qualitative analysis of organic binary mixture	

8	Separation and qualitative analysis of organic binary mixture	
9	Separation and qualitative analysis of organic binary mixture	
10	Separation and qualitative analysis of organic binary mixture	
B	Synthesis of some organic compounds including some heterocyclic compounds:	12
11	Benzimidazole from o-phenylenediamine	
12	2-phenylindole from phenyl hydrazine	
13	Methyl orange from sulphanic acid	
14	9,10dihydroanthracene-9,10-endo- α,β -succinic anhydride from anthracene (Diels-Alder Reaction)	
15	Workshops on stereo models using some selected drugs	3

References Books:

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


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GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: V

Subject Name: Pharmacology and Pharmacotherapeutics-I
Subject Code: 2250005

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	3	6	80	20	80	20

Theory

Sr No	Course Contents	Total Hrs
1	Pharmacology of Peripheral and Autonomic Nervous system	
	Neurohumoral transmission (autonomic and somatic)- organization and function, co-transmission	03
	Cholinergic system and drugs- cholinergic transmission, receptors, Parasympathomimetics, anticholinesterases, anticholinesterase poisoning, Parasympatholytics, drugs acting on autonomic ganglia (stimulants and blockers)	06
	Adrenergic system and drugs- adrenergic transmission, direct, indirect and mixed Sympathomimetics, Sympatholytics, Neuron blocking agents	06
	Skeletal muscle relaxants (peripherally, directly and centrally acting) - classification, mechanism of actions, actions and uses, difference between competitive and non-competitive blockers, difference between centrally and peripherally acting muscle relaxants.	03
	Local anaesthetics- classification, mechanism of actions, local and systemic actions, adverse effects, uses and techniques of local anaesthesia	02
2	Autacoids	
	Histamine- pharmacological actions, pathophysiological actions, Histamine releasers, antihistaminics	03
	5-HT- pharmacological and pathophysiological actions, 5-HT antagonists, drug therapy of migraine	03
	Prostaglandins and leukotrienes- actions, pathophysiological role, uses, Platelet activating factor, bradykinin, angiotensin	02
3	Pharmacology of following class of drugs	
	Laxatives- classification, mechanism of action, details of each class, and antidiarrhoeal drugs- oral rehydration, drug therapy- specific and non-specific, details of each class of drugs	03
	Emetics and antiemetics- classification, uses, contraindications	02
	Antitussive agents and Expectorants- classification, individual drugs	02
4	Definition, epidemiology, etiology, pathophysiology, signs and symptoms, diagnosis, complications, treatment and management of following diseases/conditions:	
	Bronchial asthma, COPD	3
	Peptic Ulcer Disease, Gastro Esophageal Reflux Disorder (GERD)	2
	Inflammatory Bowel Disease	2


Hepatitis	2
Glaucoma	1

Practical - 22500P5

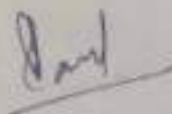
Sr. No.	Content
1	Introduction to experimental pharmacology, commonly used instruments in experimental pharmacology
2	Legal regulations for the use of experimental animals, common laboratory animals, Euthanasia of laboratory animals, anesthetics used in animal studies
3	Some common and standard techniques for drug administration (intravenous injection, intra gastric administration) and collection of blood samples
4	Preparation of different solutions for experiments. Drug dilutions, use of molar and W/V solutions in experimental pharmacology
	To study the effects of various agonists (pD_2) and antagonist (pA_2) using isolated preparations.
5	To record the concentration response curve (CRC) of acetylcholine using rat ileum/chicken preparation.
6	To study the effect of atropine on concentration response curve (CRC) of acetylcholine using rat/chicken ileum preparation.
7	To record the concentration response curve (CRC) of Histamine on guinea pig/chicken ileum
8	To study the effect of mepyramine on concentration response curve (CRC) of Histamine using guinea pig /chicken ileum preparation
	Demonstration Experiments :-To study the effects of autonomic drugs on rabbits eye
9	Demonstration Experiments :-To study the effect of hepatic microsomal enzyme inhibitors and inducers on pentobarbitone sleeping time
10	Case studies (questions based on history, etiology, symptoms, investigations, medication, adverse effects, drug interactions, pharmacists' advice)
11	To evaluate case study of Bronchial asthma / COPD (minimum 3 cases)
12	To evaluate case study of Peptic ulcer disease (minimum 3 cases)
13	a. To evaluate case study of Hepatitis (minimum 2 cases) b. To evaluate case study of Cough (minimum 2 cases)
14	a. To evaluate case study of Glaucoma (1 case) b. To evaluate case study of Organophosphorus poisoning (1 case) c. To evaluate case study of Myasthenia gravis (1 case)
15	a. To evaluate case study of diarrhoea and constipation (minimum 2 cases) b. To evaluate case study of emesis (minimum 2 cases)

References Books:

1. Satoskar, R.S. and Bhadarkar, S.D. Pharmacology and pharmacotherapeutics. 16th edition (single volume), 1999. Publisher: Popular, Dubai.
2. Rang, H.P. & Dale, M.M. Pharmacology. 4th edition, 1999. Publisher: Churchill Living stone.
3. 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 Mc Graw Hill, Pergamon press


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4. Katzung, B.G. Basic and clinical pharmacology. Latest edition. Publisher: Prentice Hall, Int.
5. Ghosh, M.N. Fundamentals of experimental pharmacology. Latest edition. Publisher: Scientific book agency, Kolkata.
6. R.K. Goyal. Practicals in Pharmacology: B.S. Shah Prakashan, Ahmedabad.
7. Clinical pharmacy and therapeutics. Roger Walker and Cate Whittlesea
8. Textbook of therapeutics. Drug and disease management. Eric T Herfindal Dick R Gourley



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Sri M. Gandhi College of Pharmacy
VAPI

GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: V

Subject Name: Pharmacognosy-III
Subject Code: 2250006

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	3	6	80	20	80	20

Theory

Sr No	Course Contents	Total Hrs
1	<p>Glycosides: Definition, classification, Physico-chemical properties, general methods for isolation, biological sources, agronomy (cultivation, collection), commercial varieties, chemical constituents, substitutes, adulterants, uses, diagnostic macroscopic and microscopic features and specific chemical tests of following drugs:</p> <p>a) Saponins: Liquorice, Ginseng, Dioscorea, Arjun, Aritha, Achyranthus, Brahmi, Gokhru, Methi, Satavari, Dhamaso, Gymnema, Sarsaparilla, senega</p> <p>b) Cardioactive Sterols: Digitalis, Squill, Strophanthus, Thevetia, Nerium</p> <p>c) Anthraquinone cathartics: Aloe, Senna, Rhubarb, Cascara, <i>Cassia fistula</i>, <i>Cassia tora</i>, Majith</p> <p>d) Bitter glycosides: Gentian, Picrorrhiza, Chirata, Kalmegh, Quassia</p> <p>e) Coumarins: Psoralea, Ajmoda, Bhangro, Calophyllum</p> <p>f) Cyanogenetic glycosides: Almond, Linseed, Prunus</p> <p>g) Isothiocyanate glycosides: Mustard, Black mustard</p> <p>h) Flavanoids: <i>Ruta graveolens</i>, Butea, Bhilama</p> <p>i) l. Others: Salix</p>	35
2	<p>Plant tissue culture: Introduction, basic requirements, types of culture, nutritional requirements, laboratory requirements and applications</p>	10

Practical - 22500P6

1. General methods for isolation and chemical tests of different glycoside containing drugs.
2. Study of Morphology, Microscopy and TLC of crude drugs: (T.S., Powder and TLC of underlined drugs):
 - a. Anthraquinone: Majith, Senna, Aloe, Rhubarb, Cassia fistula, Cassia tora
 - b. Cardioactive Sterols: Digitalis (Powder), Squill, Thevetia, Nerium (leaf)

- c. Saponins glycosides: Liquorice, Achyranthus, Satavari, Ginseng, Dhamaso, Brahmi, Methi, Dioscorea, Sarsaparilla, senega
 - d. Bitter glycosides: Gentian, Chirata, Kalmegh, Quassia
 - e. Coumarins: Psoralea, Ajmoda, Bhangro
 - f. Cyanogenetic and Isothiocyanate glycosides: Almond, Linseed, Mustard
3. Study of Morphology and Chemical test for following drugs: Bhilama, Palash.
 4. Introduction to basic laboratory requirements, maintenance of plant tissue culture and production of callus culture.
 5. Estimation of sennosides from senna.
 6. Estimation of aloin from alo.
 7. Isolation of Andrographolide from Kalmegh.

References Books:

1. Cultivation and Utilization of Medicinal Plants, Atal C. K. and Kapur B. M., RRI, Jammu, 1st Edition, 1989.
2. Supplement to Cultivation and Utilization of Medicinal Plants, Handa, S.S. and Kaul, M.K., 1996. RRI, CSIR Publication, Jammu Tawi.
3. A Text book of Pharmacognosy: Shah C. S., Quadry J. S., B. S. Shah Prakashan, Ahmadabad. 15th Edition, 2009.
4. Pharmacognosy: Kokate C. K., Purohit A. P., Gokhale S. B., Nirali Prakashan Pune, 42nd edition, 2008.
5. Textbook of Pharmacognosy: Wallis T. E., CBS Publishers and Distributors, New Delhi, 5th Edition, reprinted, 2009.
6. Trease and Evans Pharmacognosy. 16th Edition, William Charles Evans, W. Saunders, Edinburg, London, New York, Philadelphia, St. Louis Sydney Toronto 2009.
7. Natural Products, Vol I & II, by Agrawal O. P., Goel Publishing House, Meerut, 28th Edition, 2004.
8. Comprehensive Biotechnology, The Principles, application and regulation of biotechnology in Industry, agriculture and Medicine Vol. 1-4 Alan T, Howard Dalton and Murray Mao-Young.
9. An introduction to Plant Tissue Culture Kalyan Kumar De, New Central Book Agency (P) Ltd., Calcutta
10. Plant Tissue Culture, Sharma Rajni, Campos Books International, 1st Edition, 2007.
11. Chemistry of Natural products. Bhat SV, Nagasampagi BA, Meenakshi S. Narosa Publishing house, New Delhi, 2005.
12. Medicinal plants glycosides- Sims Toronto.
13. Natural Products as Medicinal Agents, Ed. Beal J. L. and Reinhard E., Hippocrates, Verlag, Stuttgart; 1982
14. Natural products, Ikan R., Academic Press, California, 1st Edition, 2005.
15. Pharmacognosy and Pharmacobiotechnology, Ashutosh Kar, 2nd Edition, New Age International Pvt. Ltd., New Delhi, 2007.
16. Pharmacognosy and Pharmacobiotechnology. Robbers J. E, Marilyn K. Speedie, Varro E. Tyler, Baltimore. Williams & Wilkins, 1996; a Wavery Company, USA.
17. Pharmacognosy: Phytochemistry Medicinal Plants, Jean Bruneton, 2nd Edition, Intercept Publications, Ltd, TEC & DOC Paris, 1999.

18. The Organic Constituents of Higher Plants. Their Chemistry and Interrelationships. Trevor Robinson, Burges Publishing Company, Minneapolis, USA, 1963.
19. Practical Pharmacognosy, Technique and Experiment C. K. Kokate and S. B. Gokhale, Nirali Prakashan, Pune, 8th edition, 2005.
20. The Wealth of India (Raw Material & Industrial Product), Published by Council of Scientific Industrial Research, New Delhi, 1st and 2nd Edition, 2005, 2nd (1950-2014)
21. Indian Medicinal Plants by Kirtikar and Basu, 1st Edition, International Book Distributors, Dehradun, 1999.
22. Compendium of Indian Medicinal Plant Vol. 1 to 6, by Rastogi Ram P., Mehrotra B. N., CDRI & NISCOM, 1st Edition, New Delhi, 1998.
23. Review on Indian Medicinal Plants, Vol I to XI (2004 to 2014) Editor: Gupta AK & Tundon Neeraj. By: Indian Council of Medicinal Research (ICMR), New Delhi.
24. Powdered Vegetable Drugs Jackson B. P. & Snowden D. W.
25. Chanhani M. G & Pillai A. P.G, Microscopic profile of powdered drugs used in Indian system of medicine, Volume I, Bark drugs 2005, Institute of Ayurvedic Medicinal Plant Science, Gujarat Ayurved University, Jamnagar.
26. Chanhani 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.
27. Chanhani 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, LP. G T. & R.A, Gujarat Ayurved University, Jamnagar.


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GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: VI

Subject Name: Forensic Pharmacy
Subject Code: 2260001

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	0	3	80	20	0	0

Theory

Sr. No	Course Contents	Total Hrs
1	Pharmacy an Introduction: Origin, development, scope, objectives and nature of pharmaceutical legislation in India. Code of Pharmaceutical Ethics.	2
2	Pharmaceutical education: A brief review	1
3	Pharmacy Act, 1948 and AICTE Act 1987, A Brief Study	10
4	The Drugs and Cosmetics Act, 1940 & Rules 1945 & Amendments	15
5	An elaborate study of the following: (as amended to date) <ul style="list-style-type: none"> • Poisons Act 1919 • The Drugs and Magic Remedies (Objectionable Advertisement) Act, 1954 • Medicinal and Toilet Preparations (Excise Duties) Act, 1955 • Prevention of Cruelty to Animals Act, 1960 • Patents Act 1970 • Medical Termination of Pregnancy Act, 1970 & Rules 1975 • Narcotic Drugs and Psychotropic Substances Act, 1985 • AICTE Act, 1987: A brief study. • Drugs (Price Control) order 1995 	15
6	• Law regulating the introduction of new drugs.	2

References Books:

1. B.M. Mittal - Textbook of Forensic Pharmacy Vallabh Prakashan
2. Jain, N.K.A Textbook of Forensic Pharmacy. Vallabh Prakashan, New Delhi.
3. G.K. Jani, Textbook of pharmaceutical Jurisprudence, Anil Prakashan.
4. The patents act 1970 with patents rules 1972.
5. All Theory, Acts and Rules Published by Government of India.

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Head of Department

GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: VI

Subject Name: Pharmaceutical Microbiology & Biotechnology - II
Subject Code: 2260002

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	3	6	80	20	80	20

Theory

Sr No	Course Contents	Total Hrs
1	Introduction to microbial genetics Mutation and its importance (Frame shift mutation and point mutation) Different mutagenic agents (Chemical, Physical, biological) Test to identify Mutants	05
2	Genetic recombination: <ul style="list-style-type: none"> • Transformation conjugation, transduction • Protoplast fusion, gene cloning and their applications, monoclonal antibodies and its application 	06
3	Study of various drug produces by biotechnology e.g. Humulin, Human growth hormone, streptokinase, activase, monoclonal antibodies etc	02
4	Analytical Microbiology: <ul style="list-style-type: none"> • Sterility testing of Pharmaceuticals • Microbiological Assay of Antibiotics, Vitamins and Amino acids 	07
5	Immunology and Immunological Preparation: <ul style="list-style-type: none"> • Immunity, primary and secondary defense mechanism, interferon • Principles of immunology, antigen antibody reactions and application, • Preparations, Standardization and storage of vaccines & toxoids diphtheria, tetanus toxoid, cholera, pertussis, plaque, BCG, rabies, polio, measles, typhoid, brief introduction to new generation vaccines-hepatitis, AIDS, Malaria, brief study of sera. • Various diagnostic tests based on immunological principle (widal, ELISA, various blotting techniques, tuberculin test, schick test) 	12
6	Blood Products and Plasma Substitutes: Collection, processing and storage of whole human blood, concentrated human RBCs, dried human plasma, human fibrinogen, human thrombin, human normal immunoglobulin, human fibrin, foam plasma substitutes, -ideal requirements, PVP, dextran etc. for control of blood pressure as per I.P.;	04
7	Fermentation :	09

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Dr. G. M. Bhatt College of Pharmacy
VAPI.

	<p>a. Historical development of antibiotics,</p> <p>b. methods used for their standardization, Screening of soil for organisms producing antibiotics,</p> <p>c. Fermenter, its design, control of different parameters, fermentation process.</p> <p>d. Media, Sterilization (fermenter, media, air, etc.) I</p> <p>e. Detailed production of</p> <p style="padding-left: 20px;">I) selected antibiotics: penicillins, streptomycins, tetracyclines</p> <p style="padding-left: 20px;">II) vitamin B 12, Riboflavin</p> <p style="padding-left: 20px;">III) others: citric acid, alcohol.</p> <p>f. Isolation and recovery of fermentation products</p>	
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PRACTICAL - 22600P2

1.	Microbiological assay of antibiotics vitamins and Amino acids
2.	Sterility testing of various pharmaceutical preparations
3.	Preparation and Standardization of vaccines
4.	Preparation of mutant <ul style="list-style-type: none"> • Gradient plate method • Velvet replicate method
5.	Design of fermentor
6.	Study of shake flask technique
7.	Production of alcohol using Bakers yeast
8.	Extraction of citric acid from fermented mass
9.	Preparation of anticoagulant solutions, coagulant foam/sheet

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. Crommelin, Daan J.A., Pharmaceutical Biotechnology : An Introduction for Pharmacists, and Pharmaceutical Scientists, 2nded. London : Routledge, 2002
4. Bergeys manual of systematic bacteriology, Williams and Wilkins- A Waverly company
5. El-Mansi, Mansi, Fermentation Microbiology and Biotechnology, New York : Taylor & Francis, 2003
6. Prescott and Dunn., Industrial Microbiology, 4th edition, CBS Publishers & Distributors, Delhi
7. Principles of fermentation technology, Second edn. P. F. Stanbury, A. Whitshaker and S. J. Hall Aditya Books Pvt Ltd. New Delhi.
8. Microbiology, Pelczar/Chan Kreig Tata McGraw Hill edn
9. Industrial microbiology L.E. Casida, Jr. New age international publishers
10. Fundamental principles of bacteriology. A. J. Sale, Tata McGraw Hill publishing company Ltd.
11. Remington Pharmaceutical Science, latest edn
12. I.P., B. P., USP
13. Stanbury F., P., Whitakar A., and Hall J., S., Principles of fermentation technology. 2nd edition, Aditya books Ltd, New Delhi

GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: VI

Subject Name: Pharmaceutical Analysis IV
Subject Code: 2260003

Theory	Teaching Scheme			Evaluation Scheme			
	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	3	6	80	20	80	20

Theory

Sr No	Course Contents	Total Hrs
1	X-ray spectroscopy Introduction, Generation of X-rays, X-ray diffraction, Bragg's law; Applications of X-ray diffraction.	04
2	Overview of Scattering Spectroscopy like Raman spectroscopy, Nephelometry and Turbidimetry.	03
3	Gas Chromatography Introduction; Theory and Principle of Gas-Chromatography; Mobile phase, Stationary phases for GSC and GLC; Instrumentation (including temperature programming and derivatization) and applications of GC; Overview of GC-MS.	06
4	High Performance Liquid Chromatography Introduction; Theory, Classification and Principle of HPLC; Mobile phase, Stationary phases for normal and reversed phase HPLC; Instrumentation (including significance of guard column) and applications of HPLC; Comparison of HPLC with GC; Overview of LC-MS, LC-MS/MS. Basic principle, theory and applications of partition, adsorption, ion-exchange, size exclusion, Super critical fluid and Affinity chromatography.	13
5	HPTLC Principle; Comparison with HPLC; Instrumentation, applications, advantages and limitations of HPTLC.	02
6	Radio chemical Methods Introduction; Nuclear reactions and radiation; Interaction of nuclear radiation with matter; Radioactive decay; Units of radioactive decay; Measurement of radioactivity; Activity analysis; Isotopes dilution analyses; Liquid scintillation systems; Applications of radio nuclides	05
7	Overview of radio-immuno assay (RIA) and ELISA (Immunochemical techniques).	02
8	GLP: Introduction; History, basic issues and quadrants of GLP; Responsibilities matrix; Calibration and Testing.	03
	IPR: Introduction; Steps of filing patents and Introduction of GATT and TRIPS	02
	ISO: Elements; Requirements and Interpretation of ISO 9001:2000, Quality Management System	03
	AMV: Analytical method validation, Validation parameters as per ICH guidelines.	02

Note:

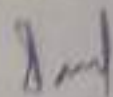
Examples based on assays & structure elucidation shall be covered at concerned subtopics in each of the following chapters.


PRINCIPAL

Sr. No.	Content
1	Quantitative analysis of market formulations by HPLC (Demo)
2	Quantitative analysis of market formulations by HPTLC (Demo)
3	Quantitative analysis of market formulations by GC (Demo)
4	Evaluation of Monographs as per I.P. - Complete testing including assay.
5	Colorimetric assay of non coloured drugs by derivatization method
6	Colorimetric assay of colored compound
7	Evaluation of linearity, range and accuracy of UV method
8	Evaluation of linearity, precision and robustness of UV method
9	Simultaneous estimation of drug by derivative or difference spectroscopy
10	To determine isoabsorptive point of two/three different drugs for selection of wavelength in HPLC for binary/ternary mixture
11	Determination of total sugar in fruits/jams
12	Determination of vitamin C in fruit juice
13	To determine total glucose in different brands of honey
14	Determination of total ash content in food product
15	Determination of food additives like preservatives, colors and flavours
16	Assay of antibiotic by nephelometry
17	To perform QC testing tablets
18	To perform QC testing tablets
19	To determine the % purity of Isoniazid and Rifampicin in combination tablets.
20	Separation and identification of slupha drugs by TC techniques

References Books:

1. Principles of Instrumental Analysis by Skoog, Holler and Nieman, 5th edition.
2. Instrumental Methods of Analysis, H.H. Willard, L.L. Merritt, J.A. Dean and F.A. Settle Wadsworth, New York.
3. Pharmaceutical Analysis: Modern methods Part A, Part B, James W. Munson.
4. Quality Assurance Guide by Organization of Pharmaceutical Products of India.
5. "Good Laboratory Practice Regulation" Drugs and Pharm. Sci. Series, Vol. 124, 2nd Ed., S. Weinberg, Marcel Dekker Inc., N.Y.
6. Quality Assurance of Pharmaceuticals - A compendium of guidelines and related materials - Vol. 1 - WHO Publications.
7. IPR Handbook for Pharma Students and researchers - Parikshit Bansal, Pharma Book Syndicate, Hyderabad
8. Pharmacopoeia of India, Govt. of India, Ministry of Health.
9. British Pharmacopoeia, ministry of health and social welfare, UK.
10. The United States Pharmacopoeia-National Formulary (USP-NF)



 PRINCIPAL

 ROFEL
 Shri G.M. Bhatnagar College of Pharmacy
 VEF

GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: VI

Subject Name: Pharmaceutical Chemistry – VIII (Medicinal Chemistry – II)
Subject Code: 2260004

Theory	Teaching Scheme			Evaluation Scheme			
	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	3	6	80	20	80	20

Theory

Sr. No	Course Contents	Total Hrs
1	Receptors and Drug action: <ul style="list-style-type: none"> • Types of receptors. • Theories of Drug-Receptor Interactions. • Various forces involved in drug-receptor interaction. • Factor affecting the drug-receptor interaction. 	04
2	Drug metabolism a) Introduction, Xenobiotics, Site of drug metabolism, Phase-I and Phase-II Metabolism in detail, overview about CYP450 and its importance, Factor affecting drug metabolism, importance of drug metabolism in drug design	11
3	Introduction, history, classification, nomenclature, mechanism of action, adverse effects, therapeutic uses, structure activity relationship (SAR), synthetic procedures of selected drugs and recent developments of following categories to be covered	
	Drugs Acting on CNS:	
	CNS stimulants: Analeptics, Antidepressants, Hallucinogens <ul style="list-style-type: none"> • SAR:- Tricyclic antidepressants • Synthesis:- Amphetamine, Fluoxetine, Imipramine 	05
	CNS Depressants: General and local anesthetics, Sedative and Hypnotics, Anxiolytics, Antiepileptics, Antipsychotics <ul style="list-style-type: none"> • SAR:- Benzoic acid and Aniline derivatives with Local anesthetic activity, Barbiturates, Benzodiazepines, Phenothiazines, Butyrophenones • Synthesis:- Halothane, Lignocaine, Thiopental sodium, Phenobarbitone, Chlordiazepoxide, Phenytoin, Carbamazepine, Chlorpromazine 	13
	Antiparkinson's agents <ul style="list-style-type: none"> • Synthesis: L-Dopa 	02
	Non Steroidal Anti-Inflammatory Agents, Anti Gout and DMARDS: <ul style="list-style-type: none"> • Synthesis:- Paracetamol, Aspirin, Diclofenac, Ibuprofen, Indomethacin, Allopurinol, Mefenamic acid, Nimesulide, 	07

Principal

	Naproxen	
	Alzheimer's disease	02
	Cognition enhancers	01

Practical - 22600P4

Sr. No.	Content	No. of practical hours
A	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. 1. Salts (sodium benzoate, Sodium salicylate etc.) 2. Acids (Benzoic acid, salicylic acid, cinnamic acid, acetyl salicylic acid etc.) 3. Phenols (α -Naphthol, β -Naphthol, o/m/p-nitrophenol, Phenol, o/m/p-cresol etc.) 4. Strong acidic amphoteries (P-amino benzoic acid, o-amino benzoic acid, sulphanilic acid etc.) and weak acidic amphoteric (Sulphanilamide etc.) 5. Bases (α -Naphthylamine, o/m/ p-anisidine, diphenyl amine, o/m/p-nitroaniline, Aniline, N-methyl aniline, N,N-dimethyl aniline etc.) 6. Neutrals (Benzophenone, Benzaldehyde, Acetophenone, Nitrobenzene, m-dinitrobenzene, acetanilide, benzamide, naphthalene etc.)	33
1	Separation and qualitative analysis of Organic binary mixtures with derivative preparation	
2	Separation and qualitative analysis of Organic binary mixtures with derivative preparation	
3	Separation and qualitative analysis of Organic binary mixtures with derivative preparation	
4	Separation and qualitative analysis of Organic binary mixtures with derivative preparation	
5	Separation and qualitative analysis of Organic binary mixtures with derivative preparation	
6	Separation and qualitative analysis of Organic binary mixtures with derivative preparation	
7	Separation and qualitative analysis of Organic binary mixtures with derivative preparation	
8	Separation and qualitative analysis of Organic binary mixtures with derivative preparation	
9	Separation and qualitative analysis of Organic binary mixtures with derivative preparation	
10	Separation and qualitative analysis of Organic binary mixtures with derivative preparation	
11	Separation and qualitative analysis of Organic binary mixtures with derivative preparation	
B	Synthesis of some organic compounds:	12

12	Aspirin	
13	Paracetamol	
14	Methyl salicylate	
15	Phenytoin	

References 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. Vogel's Text books practical organic chemistry, ELBS/Longman, London
7. Mann and Saunders, Practical organic chemistry, Orient Longman, UK
8. Shriner, Hermann, Morill, Curtin and Fusion. The Systematic Identification of Organic Compounds, John Wiley and Sons
9. Hans Thacher Clarke, A Handbook of Organic Analysis Qualitative and Quantitative, Fourth edition, Orient Longmans Ltd.
10. Arthur Vogel, Elementary Practical Organic Chemistry, Part-I and II, Second edition, CBS Publisher.

David
PRINCIPAL

ROFEL
Sri G.M. Bhatia College of Pharmacy
VAPL

GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: VI

Subject Name: Pharmacology and Pharmacotherapeutics-II
Subject Code: 2260005

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	3	6	80	20	80	20

Theory

Sr No	Course Contents	Total Hrs
1	Neuronal transmitters in CNS	04
	Pharmacology of following class of drugs:	
	General Anaesthetics- classification, mechanism of action, stages of anaesthesia, inhalational and intravenous anaesthetics, pharmacokinetics of inhalational anaesthetics, complications, preanaesthetic medications	02
	Ethyl Alcohol- pharmacological actions, mechanism of actions, pharmacokinetics, drug interactions, contraindications, toxicity, treatment, clinical uses, Disulfiram, Methyl alcohol poisoning and treatment.	02
	CNS Stimulants and Psychotomimetic Agents, hallucinogens- classification, individual drugs	02
	Analgesic, Antipyretic, Anti-Inflammatory agents- classification, NSAIDS and Prostaglandin synthesis, pharmacological actions, pharmacokinetics, adverse effects, uses, drug interactions, COX-II inhibitors	02
	Opioid analgesics- classification, pharmacological actions, adverse effects, poisoning and its treatment, uses, opioid receptors and receptor mechanisms, opioid anatagonists, endogenous opioid peptides	03
2	Definition, epidemiology, etiology, pathophysiology, signs and symptoms, diagnosis, complications, treatment and management of following diseases/conditions:	
	Insomnia	02
	Anxiety	02
	Psychosis	03
	Depression	03
	Mania	02
	Epilepsy	03
	Parkinsonism	02
	Alzheimers disease	03
	Gout	02
	Rheumatoid Arthritis	02
3	Drug dependence and drug abuse- drug use, drug abuse, drug induced reward, psychological and physical dependence, tolerance, mechanisms, treatment of various drug addiction- alcohol, tobacco	02
4	Immunomodulators- immunosuppressant drugs- classification, details of each class, immunostimulants (vaccines, antisera, immunoglobulins)	04

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Sr. No.	Content
1	Demonstration Experiments on Central Nervous System: Recording of Spontaneous Motor Activity
2	Demonstration Experiments on Central Nervous System: Recording of Stereotypy
3	Demonstration Experiments on Central Nervous System: Recording of Analgesia
4	Demonstration Experiments on Central Nervous System: Recording of Anti-inflammatory
5	Demonstration Experiments on Central Nervous System: Recording of Anticonvulsant activity
6	Demonstration Experiments on Central Nervous System: Recording of Muscle relaxant activity
7	To find out Nature of Unknown Drugs (Acetylcholine, Histamine, BaCl ₂ , Physostigmine, Atropine, Mepyramine and Papaverine) using Rat/Guinea Pig/Chicken Ileum Preparation.
8	To find out Nature of Unknown Drugs (Acetylcholine, Histamine, BaCl ₂ , Physostigmine, Atropine, Mepyramine and Papaverine) using Rat/Guinea Pig/Chicken Ileum Preparation.
9	To find out Nature of Unknown Drugs (Acetylcholine, Histamine, BaCl ₂ , Physostigmine, Atropine, Mepyramine and Papaverine) using Rat/Guinea Pig/Chicken Ileum Preparation.
10	To find out Nature of Unknown Drugs (Acetylcholine, Histamine, BaCl ₂ , Physostigmine, Atropine, Mepyramine and Papaverine) using Rat/Guinea Pig/Chicken Ileum Preparation.
11	Study on the Effects of CNS Stimulant (Coffee/Tea) on Human Volunteers.
12	Case studies (questions based on history, etiology, symptoms, investigations, medication, adverse effects, drug interactions, pharmacists' advice)
13	a. To evaluate case study of Rheumatoid arthritis (minimum 2 cases) b. To evaluate case study of gout (minimum 2 cases)
14	a. To evaluate case study of Parkinson's disease (minimum 2 cases) b. To evaluate case study of Alzheimer's disease (minimum 2 cases)
15	a. To evaluate case study of Psychosis or Depression (minimum 2 cases) b. To evaluate case study of Anxiety or Insomnia (minimum 2 cases)
	a. To evaluate case study of Epilepsy (minimum 2 cases) b. To evaluate case study of Drug abuse and dependence (minimum 2 cases)

References Books:

1. Rang H.Pt, Dale M.M., et al-Pharmacology (1995) 3rd Edn. Churchill livingstoneUSA.
2. Satoskar R.S.,et al-Pharmacology and Pharmacotherapeutics (1999) 6th 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 (1996) 9Edn. Pergamon Press, Singapore.
5. Seth,S.D. Text Book of pharmacology.B.I.Churchill, 1997.
6. Goyal, R.K, Mehta A.A.et al- ELEMENTS OF PHARMACOLOGY: B.S. Shah Prakashan, Ahmedabad
7. Goyal R.K.-Practicals in Pharmacology (1994-95) 1st Edn. M/s B. S. Shah Prakashan, Ahmedabad.
8. Sheth U.K. et al-Selected topics in Experimental Pharmacology(1972)15t Edn.The

- Kothari Book Depot, Mumbai.
9. Kulakarni S.K.- handbook of Experimental Pharmacology (1993)2nd Edn. allabh Prakashan, New Delhi.
 10. Ghosh M.N - Essentials of Exporimental Pharmacology,(1984) Scientific book agency, Calcutta.
 11. Clinical pharmacy and therapeutics . Roger Walker and Cate Whittlesea
 12. Textbook of therapeutics. Drug and disease management. Eric T Herfindal Dick R Gourley

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PRINCIPAL

ACFEL

Dr. M. B. Patil College of Pharmacy
VAPI

GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: VI

Subject Name: Pharmacognosy-IV
Subject Code: 2260006

Theory	Teaching Scheme			Evaluation Scheme			
	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	3	6	80	20	80	20

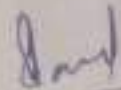
Theory

Sr No	Course Contents	Total Hrs
1	Alkaloids: Definition, classification, physico-chemical properties, general methods for isolation, biological sources, agronomy (cultivation, collection), processing, commercial varieties, chemical constituents, substitutes, adulterants, uses, diagnostic macroscopic, microscopic features and specific chemical tests of following alkaloid containing drugs a) Pyridine – Piperidine: Tobacco, Lobelia, Pomegranate, Piper, Areca nut b) Tropane: Datura, Belladonna, Hyocyamus, Scopolia, Withania, Dubosia, Cocca c) Quinoline & Isoquinoline: Cinchona, Ipecac, Opium, Camptotheca d) Indole: Ergot, Rauwolfia, Catharanthus, Nuxvomica, Physostigma e) Imidazole: Pilocarpus f) Steroidal: Veratrum, Kurchi, Kantakari g) Alkaloidal Amine: Ephedra, Colchicum h) Purines: Coffee, Tea, Cola i) Quinazoline: Vasaka j) Diterpene Alkaloids: Aconite, Taxus k) Others: Tylophora	31
2	Enzymes: Biological sources, preparation, identification test and uses of Diastase, Papain, Pepsin, Trypsin, Pancreatin, Bromalein, Ficin, Penicillinase, Hyalluronidase, Streptokinase, Urokinase.	6
3	Pharmaceutical Aids: Talc, Diatomite, Fibres and Natural colours.	4
4	Marine Pharmacognosy: Novel medicinal agents from marine sources	4

Practical – 22600P6

1. Study of Morphology, Microscopy and TLC of crude drugs: (T.S., Powder and TLC of underlined drugs):

- a. Datura, Tobacco, Pomegranate, *Piper longum*, *Piper nigrum*
- b. Withania (Root), Belladonna, Hyocyamus, Dubosia, Lobelia, Areca


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- c. Cinchona, Ipecac, Campotheca
 - d. Rauwolfia, Ergot
 - e. Nuxvomica, Catharanthus, Physostigma
 - f. Kurchi, Kantakari (Leaf & Stem)
 - g. Ephedra, Colchicum, (Seed & Corm)
 - h. Yasaka, Coffee, Tea, Cola
 - i. Tylophora, Aconite, Taxus
2. Study of Morphology and chemical tests of Talc, Diatomite, Fibres and Natural colour containing drugs. Microscopy of raw and absorbent Cotton, Wool, Jute, Silk and Rayon.
 3. Isolation of Quinine from Cinchona.
 4. Isolation of Caffeine from Tea
 5. Isolation of Piperine from Black Piper.
 6. Estimation of Total Alkaloids from Datura by Titrimetric method.
 7. Estimation of Quinine by UV Spectroscopy.

References Books:

1. Cultivation and Utilization of Medicinal Plants, Atal C. K. and Kapur B. M., RRL Jammu, 1st Edition, 1989.
2. Supplement to Cultivation and Utilization of Medicinal Plants, Handa, S.S. and Kaul, M.K., 1996. RRL, CSIR Publication, Jammu Tawi.
3. A Text book of Pharmacognosy: Shah C. S., Quadry J. S., B. S. Shah Prakashan, Ahmadabad. 15th Edition, 2009.
4. Pharmacognosy: Kokate C. K., Purohit A. P., Gokhale S. B., Nirali Prakashan Pune, 42nd edition, 2008.
5. Textbook of Pharmacognosy: Wallis T. E., CBS Publishers and Distributors, New Delhi, 5th Edition, reprinted, 2009.
6. Trease and Evans Pharmacognosy. 16h Edition, William Charles Evans, W. Saunders, Edinburg London New York Philadelphia St. Louis Sydney Toronto 2009.
7. Natural Products, Vol I & II, by Agrawal O. P., Goel Publishing House, Meerut, 28th Edition, 2004.
8. Chemistry of Natural products. Bhat SV, Nagasampagi BA, Meenakshi S. Narosa Publishing house, New Delhi, 2005.
9. Medicinal Natural Products a Biosynthetic Approach, Dewick Paul M. John Wiley and Sons, West Sussex, 2009.
10. Natural Products as Medicinal Agents, Ed. Beal J. L. and Reinhard.E , Hippocrates Verlag Stuttgart, 1982
11. Natural products by Ikan R., Academic Press, California, 1st Edition, 2005.
12. Pharmacognosy and Pharmacobiotechnology by Ashutosh Kar, 2nd Edition, New Age International Pvt. Ltd.; New Delhi, 2007.
13. Pharmacognosy and Pharmacobiotechnology. James E. Robbers, Marilyn K. Speedie, Varro E. Tyler, Baltimore: Williams & Wilkins, 1996; a Wavery Company, USA.

Jay
PRINCIPAL

14. Pharmacognosy: Phytochemistry Medicinal Plants by Bruneton Jean, 2nd Edition, Intercept Publications, Ltd., TEC & DOC Paris, 1999.
15. The Organic Constituents of Higher Plants. Their chemistry and interrelationships. Robinson Trevor, Burges Publishing Company, Minneapolis, USA, 1963.
16. Practical Pharmacognosy, Technique and Experiment by Kokate C. K. and Gokhale S. B., Nirali Prakashan, Pune, 8th edition, 2005.
17. The Wealth of India (Raw Material & Industrial Product), Published by Council of Scientific Industrial Research, New Delhi, 1st Edition, (1950-2014).
18. Indian Medicinal Plants by Kirtikar and Basu, 1st Edition, International Book Distributors, Dehradun, 1999.
19. Compendium of Indian Medicinal Plant Vol. 1 to 6, by Rastogi Ram P., Mehrotra B. N., CDRI & NISCOM, 1st Edition, New Delhi, 1998.
20. Review on Indian Medicinal Plants, Vol 1 to XI (2004 to 2014) Editor: Gupta A K & Tundon Neeraj. By: Indian Council of Medicinal Research (ICMR), New Delhi.
21. Powdered Vegetable Drugs by Jackson B. P. & Snowden D. W.
22. Chanhani M. G & Pillai A. P.G, Microscopic profile of powdered drugs used in Indian system of medicine, Volume I, Bark drugs 2005, Institute of Ayurvedic medicinal plant science, Gujarat Ayurved University, Jamnagar.
23. 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.
24. 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.


PRINCIPAL

ROFEL

Dr. D. M. Bhatia College of Pharmacy
UPT.

GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: VII

Subject Name: Dosage form Design I
Subject Code: 2270001

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	3	6	80	20	80	20

Theory

Sr No	Course Contents	Total Hrs
1	<p>Preformulation studies: a) Study of physical properties of drug like physical form, particle size, shape, density, wetting, dielectric constant, dissolution and organoleptic property and their effect on formulation, stability and bioavailability. b) Study of chemical properties of drugs like hydrolysis, oxidation, reduction, polymorphisms, racemization, polymerization etc., and their influence on formulation and stability of products. c) Study of prodrugs in solving problems related to stability, bioavailability and elegance of formulations.</p> <p>Theoretical aspects for determining solubility and permeability of the drug, its assessment and application</p>	8
2	<p>Pharmaceutical necessities: Study of following adjuvant in pharmaceutical products: Natural Gums, bio-degradable polymers, semi-synthetic cellulosic derivatives, and polymers for achieving modified drug release.</p>	6
3	<p>Stability of pharmaceuticals: a) Kinetic principles and stability testing: Reaction rate and order, acid base catalysis, decomposition reactions and stabilization of pharmaceuticals. b) Stability of formulation, factors affecting formulation stability, MKT, climatic zones, matrixing and bracketing instability study, accelerated stability testing, real time stability. Current WHO, USFDA and stability testing as per ICH guidelines for pharmaceutical drug substances and drug products. c) Product stability: Requirements, shelf-life, overages, containers, closures. d) Overage calculations</p>	8
4	<p>Biopharmaceutics: a) Introduction to biopharmaceutics and its role in formulation development. b) Passage of drugs across biological barriers (passive diffusion, active transport, facilitated diffusion and pinocytosis. c) Factors influencing absorption, - physiochemical, physiological and pharmaceutical. d) Drug distribution in the body, plasma protein binding and drug excretion</p>	12
5	<p>Bioavailability and Bioequivalence: a) Measures of bioavailability, C_{max}, t_{max} and area under the curve (AUC). b) Design of single dose bio-equivalence study and relevant statistics. c) Review of regulatory requirements for conduction of bio-equivalent studies.</p>	6

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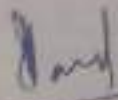
6	Introduction to BCS and dissolution study: Definition: BCS, BDDCS(Biopharmaceutical Drug Disposition Classification System), Dissolution mechanisms, Factors affecting dissolution, Intrinsic dissolution rate measurement, Dissolution apparatus for various dosage forms, Dissolution profile comparison using model independent method (similarity factor, dissimilarity factor).	5
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Practical - 22700P1

1	Determination of the angle of repose, Carr's index, Hausner's ratio of given powder/ granules.
2	Determination of solubility of given drug at different pH
3	To study the compression characteristic of different diluents.
4	To optimize the concentration of suspending agents.
5	To optimize the concentration of emulsifying agents.
6	To study the effect of various binders on performance of tablet.
7	To study the effect of various disintegrants on performance of tablet.
8	To evaluate the physical stability of emulsion and compare with marketed product.
9	To evaluate the physical stability of suspension and compare with marketed product.
10	To study the Influence of temperature on the stability of aspirin/ ascorbic acid solution.
11	Compendial dissolution testing and data evaluation for given tablets and capsules.
12	In-vitro dissolution profile comparison of given tablet with reference product using similarity and dissimilarity factor.
13	Enhancement of solubility of poorly water soluble drug by solid dispersion.
14	Enhancement of solubility of poorly water soluble drug by β -Cyclodextrin complexation.
15	Preformulation studies including drug-excipient compatibility studies.
16	Calculation of bioavailability parameters from the given pattern of drug absorption from oral & IV formulations.

References Books:

1. Applied Biopharmaceutics and Pharmacokinetics by Leon Shargel, Susanna Wu-Pong and Andrew B. C. Yu.
2. The Theory and Practice of Industrial Pharmacy by L. Lachman, H. Lieberman and J. Kanig.
3. Pharmaceutical Preformulation by Carstensen JT, Technomic Publishing Company, Inc., New Holland Avenue, Lancaster, Pennsylvania, USA.
4. Remington's Pharmaceutical Sciences, Mack Publishing Company, Easton, Pennsylvania.
5. Pharmacokinetics by Milo Gibaldi and Donald Perrier.
6. Handbook of Pharmaceutical excipients, Royal society of Great Britain, U.K.
7. Stability Studies, Marcel Dekker.
8. Pharmaceutical dissolution testing by Umesh V. Banker, Marcel Dekker Inc


PRINCIPAL

GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: VII

Subject Name: Pharmaceutical Technology I
Subject Code: 2270002

Theory	Teaching Scheme			Evaluation Scheme			
	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	3	6	80	20	80	20

Theory

Sr No	Course Contents	Total Hrs
1.	Sterile dosage forms: Definitions, Advantages, Disadvantages, Ideal requirements and Formulation of sterile dosage forms, Water for injection-Preparation and quality control, Design and requirements for production area-Aseptic techniques, sources of contamination and methods of prevention, design of aseptic area, laminar flow benches, services and maintenance, containers and closures, methods of filling including form fill and seal technology. Evaluation of sterile dosage forms, Parenteral suspensions, Prefilled syringes, Parenteral nutrients, Freeze dried products, Nanosuspensions etc, I.P. Products. Ophthalmic preparations: Requirements, formulations, methods of preparations, containers and evaluation. I.P. Products.	12
2.	Liquid dosage forms: Introduction, advantages and disadvantages, types of additives used-vehicles, stabilizers, preservatives, suspending agents, emulsifying agents, solubilizers, colors, flavors etc; manufacturing, packaging and evaluation of clear liquids, suspensions and emulsions (including microemulsion and multiple emulsion) and brief outline of other liquid products such as extracts, tincture, infusion etc., I.P. Products.	7
3.	Semisolid dosage forms: Definition, Advantages and disadvantages, types, mechanisms of drug penetration through skin, factors influencing penetration, semisolid bases, their selection and ideal requirements of bases. General formulation of semisolids, clear gels, suppositories; Manufacturing procedure, evaluation and packaging. I.P. products.	7
4.	Pharmaceutical aerosols: Definition, propellants, general formulation of aerosols, containers, manufacturing (cold filling and pressure filling technique) and packaging methods, pharmaceutical applications, evaluation of aerosol.	6
5.	Cosmeticology and cosmetic preparations Fundamentals of cosmetic science, structure and functions of skin and hair, formulation, preparation and packaging of cosmetics for skin -Sunscreen, moisturizers, cold cream, and vanishing cream, hair - Shampoo and conditioners, dentifrice-powders, gels, paste and manicure preparations like-nail polish, lipsticks, eye lashes, brief introduction to cosmeceuticals, baby care products, shaving cream, hygienic products	6
6.	Good Manufacturing Practice for Pharmaceuticals and validation Brief Introduction to GMP (schedule M) and quality assurance, practice of GMP-Procedure (SOPs), Building, Equipment, Personnel, Components, Documentation, Containers, Labeling, Laboratory Control, Distribution Records, Recovery & Reprocessing. Introduction to validation, validation of selective unit operations (e.g. granulation, compression, mixing) used in tablet manufacturing and steam sterilizer.	7

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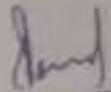
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VAPL

Practical - 22700P2

1.	Formulation and evaluation of syrup
2.	Formulation and evaluation of oral Liquids (emulsions, liniment, calamine lotion IP/BPC etc)
3.	Formulation and evaluation of milk of magnesia/aluminium hydroxide gel antacid suspension, dry suspension
4.	Formulation and evaluation of diclofenac sodium gel
5.	Preparation and evaluation of face powder
6.	Preparation and evaluation of lipstick
7.	Preparation and evaluation of cold cream
8.	Preparation and evaluation of vanishing cream
9.	Preparation and evaluation of tooth paste/ tooth powder
10.	Formulation and evaluation of dextrose injection
11.	Formulation and evaluation of NaCl injection
12.	Formulation and evaluation of Ascorbic Acid injection
13.	Formulation and evaluation of Diclofenac sodium injection
14.	Formulation and evaluation of any oil based injection.
15.	Formulation and evaluation of eye drops
16.	Formulation and evaluation of multidose injection.
17.	Formulation and evaluation of IV/peritoneal infusion
18.	Formulation and evaluation of microemulsion
19.	Formulation and evaluation of calcium gluconate injection

References Books:

1. The Theory and Practice of Industrial Pharmacy by L. Lachman, H. Lieberman and J. Kanig.
2. Gennaro, Alfonso R., Remington: The Science and Practice of Pharmacy, Vol-I & II, Lippincott Williams & Wilkins, New York
3. Pharmaceutical Dosage Forms and Drug Delivery Systems by Ansel & others.
4. Pharmaceutics: The Science of Dosage Form Design by Michael E. Aulton
5. Pharmaceutical Dosage Forms: Disperse systems: Vol.1, Vol. 2 and Vol.3, Ed. by Lieberman, Leon Lachman and Joseph B. Schwartz, Marcel Dekker Inc., New York.
6. Pharmaceutical Dosage Forms: Parenteral Medication: Vol.1, Vol. 2 and Vol.3, Ed. by Lieberman, Leon Lachman and Joseph B. Schwartz, Marcel Dekker Inc., New York
7. GMP for Pharmaceuticals by S. H. Willig and J. R. Storker.
8. Cosmetics by Poucher
9. Latest editions of IP, BP, USP.


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 Jodhpur

GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: VII

Subject Name: Pharmaceutical Chemistry – IX (Medicinal Chemistry - III)
Subject Code: 2270003

Theory	Teaching Scheme			Evaluation Scheme			
	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	3	6	80	20	80	20

Theory

Sr No	Course Contents	Total Hrs
	Introduction, history, 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.	
1	Chemotherapeutic Agents:	
	Antibacterial agents: • SAR: Sulphonamides, fluoroquinolones • Synthesis of sulphacetamide, sulphamethoxazole, Trimethoprim, Ciprofloxacin, Ofloxacin, Norfloxacin	4
	β-Lactam Antibiotics: • SAR: Penicillins, Cephalosporins,	4
	Tetracyclines, Aminoglycosides, Macrolides and Miscellaneous Antibiotics: • SAR: Aminoglycosides, Tetracyclines, Macrolides. • Synthesis of Chloramphenicol	6
	Antimycobacterial Agents: Synthesis: Ethambutol, Isoniazid, Pyrazinamide	3
	Antifungal Agents: Synthesis: Clotrimazole, Ketoconazole	2
	Antiprotozoal Agents: Antimalarial and Antiamoebic Agents • SAR: Quinolines • Synthesis: Chloroquine, Primaquine, Pyrimethamine, Metronidazole	4
	Anthelmintics: Synthesis: Albendazole, Mebendazole.	2
	Antiviral and Anti-HIV Agents: Synthesis: Amantadine	3
2	Antineoplastic agents: Synthesis: Chlorambucil, Cyclophosphamide, Thiopeta, Methotrexate, Fluorouracil, Tamoxifen.	5
	Drug Design and Development:	
	QSAR Lipophilic, electronic and steric parameters Hansch Linear Free Energy Relationship (LFER) model of QSAR Free Wilson Mathematical Model of QSAR.	5
	De novo Drug Design Molecular modeling (MM) Computer Aided Drug Design (CADD)	3

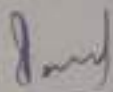
Methods of Lead Discovery Identification and Optimization of Lead	2
Brief introduction to Combinatorial Chemistry and Parallel Synthesis	2

Practical – 22700P3

Sr. No.	Contents	No. of practical hours
1	Synthesis, Reaction monitoring and purification of following organic compounds: Anthranilic acid from phthalic anhydride Sulphanilamide from acetanilide 3-phenyl propionic acid from diethylmalonate Hippuric acid from glycine Dihydroxytryptycene from anthracene and p-benzoquinone Fluorescein from resorcinol and phthalic anhydride. Purification of synthesized fluorescein by column chromatography Microwave assisted synthesis of any two compound	33
2	Characterization of synthesized compound with the help of UV and IR Spectroscopy	6
3	Demonstration of QSAR Models (Any two exercise) Literature survey of any QSAR Model and calculation of various physicochemical parameters Perform multiple regression analysis in MS Excel Generation of Best equation.	6

References Books:

1. J. N. Delagado and W. A. R. Remers, 11th 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, Oxford
4. Daniel Lednicer, Strategies for organic drug synthesis and design, John Wiley and Sons USA
5. G. L. Patrick. An Introduction to Medicinal Chemistry, 4th Edition, Oxford University Press.
6. Vogel's Text books practical organic chemistry, ELBS/Longman, London.
7. Arthur Vogel, Elementary Practical Organic Chemistry, Part-I and II, Second edition, CBS Publisher.


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GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: VII

Subject Name: Pharmacology and Pharmacotherapeutics - III
Subject Code: 2270004

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	3	6	80	20	80	20

Theory

Sr No	Course Contents	Total Hrs
1.	Chemotherapy General principles of chemotherapy- definition, classification, problems arising with the use of antimicrobial agents, choice of antimicrobial agents, combined use of antimicrobials, disadvantages of antimicrobial combinations, prophylactic use of antimicrobials, failure of antimicrobial therapy Classification, antibacterial spectrum, mechanism of action, mechanism of resistance, pharmacokinetics, adverse effects, uses, drug interactions of the following: <ul style="list-style-type: none"> • Sulfonamides, cotrimoxazole, Quinolones, 2 • Beta lactam antibiotics (penicillin, cephalosporins, monobactam, carbapenem, beta lactamase inhibitors), 3 • Macrolides, Lincosamide, Glycopeptide, 2 • Tetracycline and Chloramphenicol 2 • Aminoglycoside antibiotics 1 • Antifungal drugs 2 • Antiviral drugs 2 • Anthelmintics including antifilarial drugs 1 • Anticancer drugs 3 	(21)
2	Definition, epidemiology, etiology, pathophysiology, signs and symptoms, diagnosis, complications, treatment and management of following diseases/conditions: <ul style="list-style-type: none"> • Tuberculosis 2 • Leprosy 1 • Malaria, Dengue, Chikunguniya 4 • Amoebiasis 1 • Urinary Tract Infections 2 • Enteric Infections 1 • Meningitis 1 • Respiratory Tract Infections : Influenza A,B, H1N1, H5N1, SARS 2 • Leptospirosis 1 • Syphilis and Gonorrhea 1 • Leishmaniasis and Congofever 2 • Herpes and HIV Infections 1 	(24)

<ul style="list-style-type: none"> • Leukemia • Lymphomas • Breast Cancer, Cervical Cancer and Prostate Cancer 	2
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Practical - 22700P4

Sr. No.	Course Contents
	Case studies (questions based on history, etiology, symptoms, investigations, medication, adverse effects, drug interactions, pharmacists' advice)
1.	To evaluate case study of bacterial infection (minimum 3 cases)
2.	To evaluate case study of cancer (minimum 2 cases) and protozoal infections (2 cases)
3.	To evaluate case study of viral infection (minimum 3 cases)
4.	To audit given prescription for format of prescription, essentiality and rationality and suggest carry home message (three prescriptions-ANS/ GI/ Respiratory)
5.	To audit given prescription for format of prescription, essentiality and rationality and suggest carry home message (three prescriptions- Anemia/ CNS/ Infectious diseases)
6.	To suggest appropriate parenteral nutrition for hospitalized patients after proper nutritional assessments in different conditions, and enlist importance of medications necessary in a plan for Intensive Care Unit management.
7.	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 drugs)
8.	To evaluate cases for Interpretation of laboratory data: Renal/ Liver/ CVS/ Diabetes. (Min. three full cases with clinical and other relevant findings)
9.	To evaluate cases for Interpretation of laboratory data: Hematological/ Respiratory/ Cancer/ Infectious diseases (Min. three full cases with clinical and other relevant findings)
10.	To evaluate two cases involving skills of pharmacist for patient counselling.
11.	To evaluate for dose adjustment in geriatrics (three cases)
12.	To evaluate for dose adjustment in paediatrics (three cases)
13.	To evaluate for dose adjustment in pregnant women (three cases)
14.	To evaluate cases for Therapeutic Drug Monitoring (TDM) (two cases)
15.	Collecting information for a given drug (Preferably recently approved drugs) regarding adverse drug reactions, drug interactions and contraindications using authenticated sources (Recent text books, Latest Journals and online drug data bases such as medscape).

References Books:

1. J Rang, H.P. and Dale, M.M. Pharmacology, 5th edition, 2010. Publisher : Churchill Livingstone.
2. Tripathi K.D., Essentials of medical pharmacology 6th ed, 2010, Jaypee brothers medical publishers pvt, ltd.
3. Goodman Gilman A., Rall T.W., Nies A.I.S. and Taylor, P. Goodman and Gilman's The Pharmacological Basis of therapeutics, 12th edition, 2011. Mc Graw Hill, Pergamon Press.
4. Katzung, B.G. Basic and Clinical Pharmacology, 8th Edition, McGraw Hill, New York, 11th edn, 2009
5. Satoskar, R.S. and Bhandarkar, S.D. Pharmacology and Pharmacotherapeutics, 20th edition (single volume), 2010, Popular, Dubai
7. Kulkarni S.K. Handbook of experimental pharmacology, 3rd edition, 2009, Vallabh

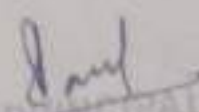
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Prakashan, New Delhi.

- 8. Clinical pharmacy and therapeutics . Roger Walker and Cate Whittlesea
- 9. Textbook of therapeutics. Drug and disease management. Eric T Herzfindal Dick R Gourley


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Dr. S. M. Bhatia College of Pharmacy
VAD

GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: VII

Subject Name: Pharmacognosy-V
Subject Code: 2270005

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	3	6	80	20	80	20

Theory

Sr No	Course Contents	Total Hrs
1.	<p>Biosynthetic studies and basic metabolic pathways: Brief introduction to biosynthetic pathways of secondary metabolite. Biogenesis of pharmaceutically important compounds</p> <p>Acetate mevalonate: Menthol, Vitamin-A, Diosgenin, β-amyrin, Glycyrrhetic acid, Carotenoids</p> <p>Shikimic acid: Atropine, Quinine, Reserpine, Morphine, Podophyllotoxin, Ephedrine, Colchicine, Ergot Alkaloids</p> <p>Acetate malonate: Linoleic acid, Omega-3 fatty acid</p>	12
2.	Natural allergens, Photosensitizing agents, Fungal toxins, Toxic plants and toxicological risk of plant drugs.	4
3.	Pesticides and herbicides	2
4.	Herbal cosmetics	2
5.	Nutraceuticals	2
6.	Plant sweeteners	1
7.	<p>Concept of Ayurveda, Ayurvedic formulations and their quality control: Introduction and principles of Ayurvedic, Unani, Siddha and Homeopathic systems of medicines. The holistic concept of Ayurvedic system of medicine. A study on different types of Ayurvedic formulations like Churna, Kwath, Gutika, Taila, Ghrita, Avaleha, Asavas, Arista, Bhasma and Pisti. Evaluation of Ayurvedic formulations.</p>	10
8.	<p>Detail study of Ayurvedic Drugs: Studies of traditional drugs, Common vernacular names, Botanical sources, Morphology, Chemical nature of chief constituents, Pharmacological categories, common uses and marketed formulations of following indigenous drugs</p> <p>Stem: Galo</p> <p>Leaf: Nagod</p> <p>Bark: Shirish</p> <p>Root: Chitrak, Rasna</p> <p>Fruit: Malkangni, Kalijiri</p> <p>Seed: Mucuna</p> <p>Flower: Dhatakpushpa</p> <p>Entire herb: Shankpushpi, Punarnava</p> <p>Unorganised: Shilajit</p>	12

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1. Study of Morphology, Microscopy & TLC study of following crude drugs (T.S., Powder, Microscopy & TLC of underlined drugs):
 - Gale
 - Nagol
 - Shirish
 - Chitrak (red and White)
 - Rasna (Pluchea & Alpinia)
 - Punarnava
 - Malkangani, Kalijiri, Dhatakipushpa, Shilajit, Mucuna, Shankpushpi
2. Study of plant used as insecticide, pesticide and herbicides
3. Preparation and evaluation of Herbal Cosmetics (Hair oil, Shampoo, Cream)
4. Preparation and evaluation of Churna (Triphala & Trikatu)
5. Preparation, Physical and chemical evaluation of Ayurvedic Preparations
Asavas, Arishta, Taila, Pills/Tablets.
6. Preparation of Avalcha and Kwath.
7. Study of Toxic Plants
8. Study of Plant Sweeteners

References Books:

1. Cultivation and Utilization of Medicinal Plants, Atal C. K. and Kapur B. M., RRL Jammu, 1st Edition, 1989.
2. Supplement to Cultivation and Utilization of Medicinal Plants, Handa, S.S. and Kaul, M.K. 1996. RRL, CSIR Publication, Jammu Tawi.
3. Pharmacognosy: C. K. Kokate, A. F. Parohit, S. B. Gokhale, Nirali Prakashan Pune, 42nd edition, 2008.
4. Trease and Evans Pharmacognosy, 16th Edition, William Charles Evans, W. Saunders Edinburg, London, New York, Philadelphia, St. Louis, Sydney, Toronto, 2013.
5. Natural Products, Vol I & II, 2nd edn Agrawal O. P., God Publishing House, Meerut, 2004 Edition, 2004.
6. Chemistry of Natural products. Bhat SV, Nagasampagi BA, Meemakshi S. Narosa Publishers House, New Delhi, 2005.
7. Medicinal Natural Products, A Biosynthetic Approach. Dewick Paul M., John Wiley and Sons, West Sussex, 2009.
8. The Organic Constituents of Higher Plants. Their chemistry and interrelationships. Trevis Robinson, Burgess Publishing Company, Minneapolis, USA, 1963.
9. Quality Control, Herbal Drugs, An approach to evaluation of Botanicals. Mukherjee P.K. Business Horizons Pharmaceutical Publishers; 2002
10. The Ayurvedic Pharmacopoeia of India, Part I (Vol. I-V), part II (I & II) Govt. of India Ministry of Health and Family Welfare, Dept. of Indian Systems of Medicine and Homoeopathy, New Delhi 2008.


Principal

11. The Ayurvedic Formulary of India, Vol. I, II and III, Published by Government of India, New Delhi, 1st Edition, 2000.
12. The Wealth of India (Raw Material & Industrial Product), Published by Council of Scientific Research, New Delhi, 1st Edition, 2003.
13. Indian Medicinal Plants, Kirtikar and Basu, 1st Edition, International Book Distributors, Dehradun, 1999.
14. Ayurveda Untravelled, Sharadini Dahanukar and Umila Thatta, 1st Edition, 1996, National Book Trust, New Delhi.
15. Compendium of Indian Medicinal Plant Vol. 1 to 6, Rastogi R. P., Mehrotra H. N., CDRI & NISCOM, 1st Edition, New Delhi, 1999.
16. Indian Herbal Pharmacopoeia, 1st revised Edition, Published by RRI, Jammu and IDMA, Mumbai, 2002.
17. Quality standards of Indian medicinal plants, Volume I to XI (2003 to 2017) Editor: Neeraj Tandon & Parul Sharma, By: Medicinal plant Unit, ICMR, New Delhi.
18. Malati G Chauhan & A. P.G Pillai, Microscopic profile of powdered drugs used in Indian system of medicine, Volume 1, Bark drugs 2005, Institute of Ayurvedic medicinal plant science, Gujarat ayurved unit Jamnagar, CPTA.
19. Malati G Chauhan & A.P.G Pillai, "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.
20. Malati G Chauhan & A.P.G Pillai, " 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, LP. G T. & R.A, Gujarat Ayurved University, Jamnagar.
21. Review on Indian Medicinal Plants, Vol I to XI (2004 to 2012) Editor: A K Gupta & Neeraj Tandon, By: Indian council of medicinal Research (ICMR), New Delhi.
22. R. D Chaudhry, Herbal Drug Industry, Eastern Publications, New Delhi.


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2nd A.M. Sharma College of Pharmacy
VADVA

GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: VII

Subject Name: Cyber Security
Subject Code: 2270006

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	0	3	80	20	0	0

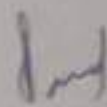
No	Course Content	Hrs
1	<p>Introduction to Cybercrime Definition and Origins of the Word, Cybercrime and Information Security, Who are Cybercriminals? Classifications of Cybercrimes: E-Mail Spoofing, Spamming, Cyber defamation, Internet Time Theft, Salami Attack/Salami Technique, Data Diddling, Forgery, Web Jacking, Newsgroup Spam/Crimes Emanating from Usenet Newsgroup, Industrial Spying/Industrial Espionage, Hacking, Online Frauds, Pornographic Offenses, Software Piracy, Computer Sabotage, E-Mail Bombing/Mail Bombs, Usenet Newsgroup as the Source of Cybercrimes, Computer Network Intrusions, Password Sniffing, Credit Card Frauds, Identity Theft</p>	7
2	<p>Cyberoffenses and Law Introduction, Categories of Cybercrime, How Criminals Plan the Attacks: Reconnaissance, Passive Attack, Active Attacks, Scanning/Scrutinizing gathered Information, Attack (Gaining and Maintaining the System Access), Social Engineering-Classification of Social Engineering, Cyber stalking: Types of Stalkers, Cases Reported on Cyber stalking, How Stalking Works? Cyber cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector, Cloud Computing: Why Cloud Computing? Types of Services, Cybercrime and Cloud Computing, Attacks on mobile devices.</p> <p>Recognizing and Defining Computer Crime, Contemporary Crimes, Computers as Targets, Contaminants and Destruction of Data, Security Policies, WWW policies, Email Security policies, Information Security Standards-ISO, Copyright Act, Patent Law, IPR, Cyber Laws in India; IT Act 2000 Provisions, Intellectual Property Law: Copy Right Law, Software License, Semiconductor Law and Patent Law</p>	11
3	<p>Network Defense tools Firewalls and Packet Filters: Firewall Basics, How a Firewall Protects a Network, basic of Virtual Private Networks, Linux Firewall, Windows Firewall, Snort: intrusion detection system</p>	5
4	<p>Cybercrime: Mobile and Wireless Devices Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era: Types and Techniques of Credit Card Frauds, Security Challenges Posed by Mobile Devices Attacks on Mobile/Cell Phones: Mobile Phone Theft, Mobile Viruses, Mishing, Vishing, Smishing, Hacking Bluetooth, Mobile Devices: Security Implications for</p>	10

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	Organizations: Managing Diversity and Proliferation of Hand-Held Devices, Unconventional/Stealth Storage Devices Threats through Lost and Stolen Devices, Protecting Data on Lost Devices, Educating the Laptop Users Organizational Measures for Handling Mobile Devices-Related Security Issues: Encrypting Organizational Databases, Including Mobile Devices in Security Strategy, Organizational Security Policies and Measures in Mobile Computing Era: Importance of Security Policies relating to Mobile Computing Devices, Operating Guidelines for Implementing Mobile Device Security Policies, Organizational Policies for the Use of Mobile Hand-Held Devices, Laptops: Physical Security Countermeasures	
5	Introduction to Cyber Crime Investigation password Cracking, Keyloggers and Spyware, Virus and Worms, Trojan and backdoors, Steganography, DoS and DDoS attack, SQL injection, Buffer Overflow, Attack on wireless Networks.	5
6	Organizational and Cybersecurity: Introduction to implications of insider, outsider attacks, Cost of cybercrimes and IPR issues, overview of webthreats to organizations, security and privacy implications from Cloud Computing, Over view of Social media : use, security risks and peril for organization	7

References Books:

1. Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives by Nina Godbole and Sunil Belpure, Publication Wiley.
2. Anti-Hacker Tool Kit (Indian Edition) by Mike Shema, Publication Mc Graw Hill.



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GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: VII

Subject Name: Environmental Toxicology and Green Audit
Subject Code: 2270007

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	0	3	80	20	0	0

Sr No	Course Contents	Total Hrs
1.	Concepts and Principles of Ecotoxicology: Principles of Ecology and Toxicology; Dose effect and Dose response relationship, acute toxicity, chronic toxicity, carcinogenicity and mutagenicity; Pathways of toxicants into ecosystem, bioconcentration, biotransfer factors, biomarkers and effects of toxicants; Factors affecting toxicity; Tests for assessing toxicity (carcinogenicity and mutagenesis); Bioassay techniques; Concepts of LD ₅₀ and LC ₅₀	8
2.	Classification of toxicants: Natural and synthetic toxins; Toxic natural products: Mycotoxins, plant toxin, insect toxin, spider toxin and reptile toxin; Toxic inorganic compounds: carbon, nitrogen, silicon, phosphorus and sulfur compounds; Toxicology of Hydrocarbons (Alkanes, unsaturated non-aromatic hydrocarbon and aromatic hydrocarbons); Toxicology of organooxygen compounds, organonitrogen compounds, organosulfur compounds; Toxicology of metals	12
3.	Toxicological Chemistry: The role of environment in carcinogenesis; Metabolic reactions of xenobiotic compounds, Phase I reactions, Phase II reactions of toxicants, Biochemical mechanism of toxicity, Biochemistry of mutagenesis, Biochemistry of carcinogenesis, Ionizing radiation; Risk assessment, Human health risk assessment, and Ecological risk assessment; Regulatory toxicology: Legal approaches to the regulation of toxic substances	14
4.	Green (Environmental) Audit: Sustainable development; Framework of environmental auditing, Nature conservation, Energy, land use planning, conservation audit, Pollution control, Wastes and recycling, community awareness; Management of the environment auditing process and future prospect of environment auditing; Environmental regulatory criteria, standards for environmentally friendly products.	11

Reference Books:

1. Stanley E. Manahan, Toxicological Chemistry and Biochemistry 3rd Edition, Lewis Publishers, CRC Press, 2003.
2. Lorris G. Cockerham and S. Shane. Basic Environmental Toxicology, CRC Press, 1993.
3. Wayne G. Landi, Ming-Ho Yu, Introduction to Environmental Toxicology: Introduction to Environmental Toxicology: Impacts of Chemicals Upon Ecological Systems, Third Edition, CRC Press, 2003.
4. David A. Wright and Pamela Welbourn, Environmental Toxicology. Cambridge University Press, First Edition, 2002.
5. A. K. Shrivastava, Environment Auditing, APH Publishing Corporation.
6. Donald G. Crosby. (1998) Environmental Toxicology and Chemistry. Oxford University Press

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B.Pharm
SEMESTER: VII

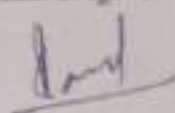
Subject Name: Nutraceuticals
Subject Code: 2270008

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	0	3	80	20	0	0

No	Course Content	Hrs
1	Historical perspective, classification, scope & future prospects. Applied aspects of the Nutraceutical Science. Sources of Nutraceuticals. Relation of Nutraceutical Science with other Sciences, current market trend in nutraceuticals industry, sourcing information of various nutraceuticals through web data mining	8
2	Food as remedies: Nutraceutical remedies for common disorders like arthritis, bronchitis, circulatory problems, hypoglycemia, nephrological disorders, liver disorders, osteoporosis, psoriasis and ulcers etc.	9
3	Nutraceutical rich supplements like green tea, lecithin, mushroom extract, chlorophyll, spirulina, glucosamine, octacosanol, lycopene, carnitine, melatonin, grape products, flaxseed, Soy proteins and soy isoflavones in human health	8
4	Health Food: Dietary fibers, prebiotics and probiotics vegetables, cereals, milk and dairy products as functional foods. Health effects of common beans, capsicum annum, mustards, ginseng, garlic, citrus fruits, fish oils, and sea foods	8
5	Bioavailability enhancers and Herbal beverages and drinks: health drink	3
6	Packaging strategies for nutraceutical products and labeling and claims for nutraceuticals products	3
7	Toxicity studies and regulatory guidelines for nutraceutical products, current Good Manufacturing Practices (cGMPs), DSHEA act and Global regulatory agencies and bodies for nutraceuticals in different countries.	6

References Books:

1. Pathak YV. Handbook of Nutraceuticals Volume I: Ingredients, Formulations, and Applications, CRC Press, 2009. Ed: 1st
2. Aluko RE. Functional Foods and Nutraceuticals, Springer Verlag GMBH, 2012
3. Hildebert Wagner and Sabine Bladt, Plant Drug Analysis: A Thin Layer Chromatography Atlas, New Delhi: Springer (India) Pvt. Ltd., 2nd ed. 1996
4. D'Amelio, Frank S. Sr., Botanical: A Phytocosmetic Desk Reference, New York: CRC Press, I Llc, Boca Raton, Florida, U.S.A. 1999
5. Stephen J. Cutler and Horace G. Cutler, Biologically Active Natural Products: Pharmaceuticals, CRC Press, Boca Rotan London, New York. Washington DC 2000
6. Marc Paye, André O. Barel, Howard I. Maibach, Handbook of Cosmetic Sciences, Informa Press, Tylor and Francis, LLC, 2006
7. Vermeer BJ, Definition In: Peter Elsener, Howard I. Maibach, editors Cosmeceuticals: Drugs vs. Cosmetics, New York, Marcel Dekker, 2000


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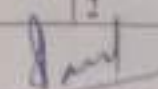
GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: VII

Subject Name: Pharmaceutical Marketing Management
Subject Code: 2270009

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	0	3	80	20	0	0

No	Course Content	Hrs
1	General principles of Marketing and applications to pharmaceutical marketing	30
A	Marketing research:-Healthcare environment, Medical professional organizations, Pharmaceutical professional and industry organizations, Pharmaceutical market size and growth factors, Pharmaceutical marketing environment versus consumer marketing, Tools of research, Opportunities for existing and new innovative products	3
B	Strategic marketing Option :- Active pharmaceutical ingredients (bulk drugs), Over the counter drugs (OTC), Prescription drugs, Biologics & Biopharmaceuticals, Herbal & traditional systems of medicine based products, Medical devices, Surgical products	3
C	Roll of pharmaceutical marketing within organization and medical profession, Marketing organization structure in pharma company	3
D	Product development & Management- Development, Positioning & promotional strategy, Development of effective communication aids, Modern promotion tools, Market segmentation- by indications, by patient profile, by medical practitioners type, by dosage form	4
E	Product Lifecycle management - Marketing mix -4 P's (product, pricing, place & promotion), Post Market stability surveillance	3
F	Sales force management -Recruitment & training, Sales forecasting & targeting, Reporting, Performance appraisal, Incentive types, Customer relation management	4
G	Distribution Management & Logistics -Supply chain, Cold chain, Applications of IT & Management information systems for efficient marketing, controlling expiry & returned goods	3
H	Domestic Market- Indian scenario-Government & Institution supply, hospital & trade supply, Ethical marketing & Franchise (sales promoters) marketing	4
I	International Marketing- Regulated, semi regulated & rest of the world markets, Marketing and manufacturing authorization, Pricing & Inco terms like CIF, FOB, commercial documents, Marketing & distribution strategy, Export incentives, Role of Pharmexil and other Government institutions	3
2	Regulatory Aspects	15
A	Essential drugs, DPCO provisions & implications of pricing in India	2
B	Implications of patents and trademarks on marketing	2
C	Registration of drugs in India, US, Europe and African countries - Dossier preparation	6
D	Pharmacovigilance and Pharmacovigilance program of India (PVPI)	2


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E	Wholesale & Retail licence requirements	1
F	Indian Medical Council (Professional conduct, Etiquette and Ethics) Regulations 2002	1
G	Uniform code of Pharmaceutical Marketing Practices (UCPMP)	1

References Books:

1. Marketing management by Philip Kotler
2. Sales Management by Still, Cundiff and Govoni
3. Managing a Sales Force , Mike T Wilson
4. Drugs and Cosmetic Act and Rules
5. www.cdsc0.nic.in (official website of CDSCO)
6. www.nppaindia.nic.in (official website of NPPA)
7. www.fda.gov (official website of USFDA)
8. www.ema.europa (official website of EMA)
9. www.edqm.eu (official website of EDQM)
10. www.mciindia.org (official website of Medical Council of India)
11. www.pharmaceuticals.gov.in (official website of department of pharmaceuticals)



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1475

GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm

SEMESTER: VII

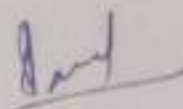
Subject Name: Pharmacovigilance
Subject Code: 2270010

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	0	3	80	20	0	0

No	Course Content	Hrs
1	Pharmacovigilance- Introduction, Scope, Definition, Purpose, Methods, History	03
2	Fundamental Clinical Aspects of ADRs- Definition, Types, Factors, Mechanisms, Seriousness and Severity, causality assessment, Markers, Management Pharmacogenetic causes, ADR in Public Health	11
3	Important ADRs and 'Risk Driving' ADRs of Important Medicines Serious and important ADRs in various organ class, ADR of various anti infective drugs	04
4	Individual Case Safety Reports (ICSRs)- Definition, Types, Contents, Structure, Validity and assessment of ICSRs reports, Role ICSRs in Pharmacovigilance	06
5	Pharmacovigilance in Clinical Trials- Characterization, Pre and post authorisation studies, observational studies	03
6	Counterfeiting, Quality Defects and Medication Errors- Definition of substandard/spurious/falsey labelled/falsified/counterfeit (SSFFC) medicines, Pattern and scale of counterfeiting, Medication error-Definition, types, detections	07
7	Spontaneous ICSR Reporting Systems (SRS) Definition, Potential and limitations of SRS, Forms and formats of ICSR transmission as per various regulatory bodies, descriptive statistics, access and confidentiality	06
8	Signal Detection and Management Definition, Sources, Validation, Assessment, Scope	02
9	Industry and Regulatory Authorities, Mandatory Procedures from Legislation Pharmacovigilance system and SOPs, Benefit risk assessment, crisis management plan, WHO international drug monitoring programme, medDRA, Pharmacovigilance regulation in INDIA, USA, EUROPE, CANADA	03

References Books:

1. Talbot J, Aronson JK (eds.) Stephen's detection and evaluation of adverse drug Reactions
2. Andrews E, Moore N (eds.) Mann's Pharmacovigilance
3. Van Boxtel CJ, Santoso B, Edwards IR (eds.) Drug benefits and risks
4. Rawlins MD Therapeutics, evidence and decision-making



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5. Aronson JK (ed.) Meyler's side effects of drugs
6. Sweetman SC (ed.) Martindale - the complete drug reference
7. World Health Organization WHO model formulary
8. S. K. Gupta Text book of Pharmacovigilance



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GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm

SEMESTER: VII

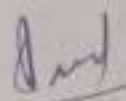
Subject Name: Herbal Cosmetics
Subject Code: 2270011

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	0	3	80	20	0	0

No	Course Content	Hrs
1	Introduction: The scope, historical background and present status of herbal cosmetics, cosmetic market and herbal cosmetics, classification of herbal cosmetics	5
2	Raw materials used for formulation of skin care and hair care cosmetics: source and description of raw materials of natural origin like fixed oils, waxes, gums, hydrophilic colloids, colours, perfumes, protective agents, bleaching agents, preservatives, antioxidants and other ancillary agents used in the cosmetic formulations	10
3	Skin Structure and physiology	3
4	Herbal skin care cosmetics: <ul style="list-style-type: none"> • Cleansing agents - apricot. • Emollients - aloe, almond. • Astringent - amla • Freshening agent - chandan, khus. • Skin Pigmentation - saffron, ambi haldi. 	8
5	Herbs used as antioxidants, free-radical scavenger, antiseptic, antibacterial, anti-wrinkle, anti-fungal	4
6	Hair structure and physiology <ul style="list-style-type: none"> • Herbal hair care cosmetics • Hair grooming : apricot, aloe • Hair growth promoters: brahmi, manjistha, jatamansi. • Hair Tonics: Bavachi, Hibiscus, Amla • Anti-dandruff: tulsi, neem, wheat gram oil, lemon, orange, aritha • Hair colorants: henna, amla, bhringaraja (<i>E. alba</i>), chamomile • Hair cleansing: ritha, shikakai, amla 	10
7	Regulatory guidelines: Compliance of Drug & Cosmetic Act 1940 with reference to provisions for packaging and labelling (Rule 150 A, schedule S), permitted colors, flavors etc. BIS guidelines for cosmetic products and raw materials	5

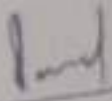
References Books:

1. Marvin Balsam, Edward Sagarin; Cosmetic Science and Technology Vol I, II, III Ed. 2nd, John Wiley & Co. England
2. Chopra RN, Indian Herbs


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3. The Wealth of India: Raw Materials (11 Vol. + 2 Suppl.). Head, NISCIR, Dr. K. S. Krishnan Marg, Pusa Campus New Delhi-110 012, India. 1950.
4. Bare P., Cosmetics Analysis selective methods with techniques.
5. Behl PN, Srivastava G. Herbs Useful in Dermatological Therapy. Ed. 2nd New Delhi, India: CHS Publishers. 2002
6. Hand Book of herbal products Vol I & II by NIR Board of Technologist, National Institute of Industrial Research.
7. Trease and Evans Pharmacognosy: William Charles Evans Revised with the assistance of Daphne Evans Ed. 16th Elsevier 2009.


PRINCIPAL

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Sri S.M. Tripathi College of Pharmacy
2021

GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: VII

Subject Name: Green Chemistry
Subject Code: 2270012

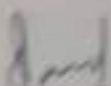
Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	0	3	80	20	0	0

Sr. No	Course Contents	Total Hrs
1.	Introduction to Green Chemistry: <ul style="list-style-type: none"> • Definition. • Need for Green Chemistry & eco efficiency. • Goals of Green Chemistry. • Limitations/Obstacles in the pursuit of the goals of Green Chemistry. • Twelve principles of Green Chemistry with their explanations and examples. • Inception of Green Chemistry. • Designing a green synthesis – Prevention of waste / byproducts – Atom economy. • Awards for Green Chemistry & international organizations promoting green chemistry 	10
2.	Designing Green Synthesis <ul style="list-style-type: none"> • Designing and choice of starting materials/solvents/reagents • Bio catalysts • Polymer Supported Catalysts • Green solvents, solvent less processes, immobilized solvents and ionic liquids, energy requirements for reactions - use of microwaves, ultrasonic energy • Avoidance of unnecessary derivatization • Careful use of blocking/protecting groups & use of catalytic reagents • Microwave-assisted organic synthesis (MAOS) 	15
3.	Green Reactions: <ul style="list-style-type: none"> • Green Synthesis of the following compounds: adipic acid, catechol, BHT, 4-aminodiphenylamine, benzyl bromide, acetaldehyde, citral, ibuprofen, paracetamol. • Microwave assisted reactions in water: <ul style="list-style-type: none"> ○ Hofmann Elimination, ○ Hydrolysis (of benzyl chloride, benzamide, n-phenyl benzamide) ○ Oxidation (of toluene, alcohols). ○ Fries rearrangement, ○ Claisen Rearrangement, ○ Diels Alder Reaction, ○ Decarboxylation. • Microwave assisted solid state reactions: Deacetylation, Saponification of esters • Reductions, synthesis of nitriles from aldehydes; anhydrides from dicarboxylic acids 	15

	<p>acid</p> <ul style="list-style-type: none"> • Ultrasound assisted reactions: Esterification, saponification, substitution reactions, Alkylations, oxidation, reduction, coupling reaction, Cannizzaro reaction, Strecker synthesis, Reformatsky reaction. 	
4.	<p>Future Trends in Green Chemistry</p> <ul style="list-style-type: none"> • Oxidation reagents and catalysts: Biomimetic, multifunctional reagents. • Combinatorial Green Chemistry. • Proliferation of solventless reactions. • Noncovalent Derivatization & Green Chemistry Applications. • Green chemistry in sustainable development 	5

Reference Books:

1. M.A. Ryan & M. Tinnesand, *Introduction to Green Chemistry*, American Chemical Society, Washington (2002).
2. V.K. Ahluwalia & M.R. Kidwai: *New Trends in Green Chemistry*, Anamalaya Publishers (2005).
3. P.T. Anastas & J.K. Warner: *Oxford Green Chemistry- Theory and Practical*, University Press (1998).
4. A.S. Matlack: *Introduction to Green Chemistry*, Marcel Dekker, (2001).
5. M.C. Cann & M.E. Connolly: *Real-World cases in Green Chemistry*, American Chemical Society, Washington (2000).


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2023
 Dr. S.M. Bhatia College of Pharmacy
 127

GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm

SEMESTER: VII

Subject Name: Agronomy and Forestry of Medicinal Plants
Subject Code: 2270013

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	0	3	80	20	0	0

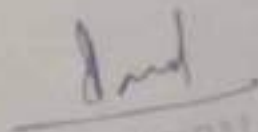
No	Course Content	Hrs
1	Ecosystem system structure. Ecology, diversity, and conservation of plants and ecosystems in India. Phytogeographical regions and vegetation of India	5
2	The Indian Forest Act, 1927; The National Forest Policy 1894, 1952 and 1988; Forests extent, basis for classification and distribution in India; geographical distribution and salient features of major forest types	5
3	Role of forests in national economy	3
4	The cultivation of medicinal plants in agroforestry systems	4
5	Biodiversity; Principles of conservation of biological diversity in-situ and ex-situ. Causes of loss of biodiversity. Biodiversity in relation to global environmental changes; biodiversity hot spots in India and world impact of cultivation and gathering of medicinal plants on biodiversity. The Indian Biodiversity Act 2002; biodiversity and economics with special reference to India	10
6	The Forest Conservation Act, 1980. The Wildlife Protection Act, 1972; Methods of conservation, role of national parks, wildlife sanctuaries, biosphere reserves, national and global conservation measures, institutions and conventions	5
7	Guidelines on the conservation of medicinal plants, WHO, IJCN, WWF & TRAFFIC	3
8	Definition, object and scope of silviculture. Silviculture of important species - acacia, eucalyptus, dalbergia, tectona, shorea, pterocarpus, anacardium, santalum, quercus etc	5
9	Importance of medicinal and aromatic plants in human health, national economy and related industries; classification of medicinal and aromatic plants according to botanical characteristics and uses	5

References Books:

1. Chadha KL & Gupta R. 1995. Advances in Horticulture. Vol. II. Medicinal and Aromatic Plants. Malhotra Publ.
2. Das NR. 2007. Introduction to Crops of India. Scientific Publ.
3. Handa SS. 1984. Cultivation and Utilization of Medicinal Plants. ERL, CSIR, Jammu.
4. Hussain A. 1984. Essential Oil Plants and their Cultivation. CIMAP, Lucknow.
5. Hussain A. 1993. Medicinal Plants and their Cultivation. CIMAP, Lucknow.
6. ICAR 2006. Hand Book of Agriculture. ICAR, New Delhi.
7. Kumar N, Khader MD, Abdul, Rangaswami JBM & Irulappan 1997. Introduction to Spices, Plantation Crops, Medicinal and Aromatic Plants. Oxford & BHI.
8. Prajapati ND, Parohit SS, Sharma AK & Kumar T. 2003. A Hand Book of Medicinal Plants: A Complete Source Book. Agrabia.


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9. Sharma R. 2004. Agro-Techniques of Medicinal Plants. Daya Pub. House.
10. Azal CK. And Kapur BM, Cultivation and Utilization of Medicinal Plants, RRI, Jammu, 1st Edition, 1989.
11. Azal CK And Kapur BM, Cultivation and Utilization of Aromatic Plants, RRI, Jammu, 1st Edition, 1989.
12. Handa SS, and Kaul MK: Supplement to Cultivation and Utilization of Medicinal Plants, 1996, RRI, CSIR Publication, Jammu Tawi.
13. Handa SS and Kaul MK.: Supplement to Cultivation and Utilization of Aromatic Plants, 1996, RRI, CSIR Publication, Jammu Tawi.



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Shri G. M. Dandia College of Pharmacy
2424

GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: VII

Subject Name: Instrumental and Process Validation
Subject Code: 2270014

Theory	Teaching Scheme			Evaluation Scheme			
	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	0	3	80	20	0	0

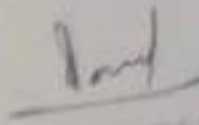
Sr. No.	Contents	Hours
1	<p>Pharmaceutical Process Validation</p> <p>Introduction to pharmaceutical validation: definition, manufacturing process model, scope of validation, advantage of validation, organization for validation, validation master plan, process validation as Quality assurance tool.</p> <p>Types of Process validation: prospective, concurrent, retrospective and revalidation.</p> <p>Validation of tablet manufacturing process and manufacturing process for sterile products</p> <p>Equipment qualification: Design qualification, Installation qualification, Operational qualification, Performance qualification. Qualification of equipments (e.g. Dry powder mixers, and Autoclave)</p> <p>Cleaning validation: cleaning of equipment, cleaning of facilities.</p>	18
2	Instrumentation of HPLC, HPTLC and GC. Validation of HPLC and GC instruments.	7
3	<p>HPLC Method Development</p> <p>Basics of separation including Column resolution, Plate number, Plate height, Selectivity factor, Capacity factor and their optimization.</p> <p>Selection of detector and column</p> <p>Mobile phase optimization including selection of correct pH value</p>	10
4	<p>Bio-analytical HPLC method development and validation</p> <p>Biological sample preparation: Protein precipitation, liquid liquid extractions, solid phase extractions and membrane separations</p> <p>LC/MS – Hints and recommendations on optimization and troubleshooting</p>	5
5	<p>Laboratory Automation</p> <p>Principle of automation, automated instruments, types of automated analytical systems, process control, flow injection analysis.</p>	5

REFERENCES:

1. Pharmaceutical Process Validation, A. H. Wachter and R. A. Nash, Drugs and Pharmaceutical Sciences Series, Vol. 129, Marcel Dekker Inc., 2011, New York.
2. Validation of Aseptic Pharmaceutical Processes, F.J. Carleton and J.P. Agalloco, Marcel Dekker Inc., 1986, New York.
3. Cleaning Validation Manual: A Comprehensive Guide for the Pharmaceutical and Biotechnology Industries by S. I. Haider and E. S. Asif, CRC Press, Taylor and Francis Group, 2010, Florida.
4. Practical HPLC Method Development, Second edition, L. R. Snyder, J. J. Kirkland and J. L. Glajch, A Wiley Interscience Publication, 1997, USA.
5. HPLC Made to Measure, S. Kromidas, Wiley-VCH Verlag GmbH & Co. KGaA, 2006, Weinheim.

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6. Instrumental Analysis, D. A. Skoog, F. J. Holler, S. R. Crouch, Cengage Learning India Private Limited, 2012, New Delhi.
7. Instrumental Methods of Analysis, Seventh edition, H. H. Willard, L. L. Merritt, J. A. Dean, F. A. Settle, CBS Publishers & Distributors Pvt. Ltd., 2009, New Delhi.



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SCPTL
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Mumbai

GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: VII

Subject Name: Quality by Design (QbD) and Process Analytical Technology (PAT)
Subject Code: 2270015

Theory	Teaching Scheme			Evaluation Scheme			
	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	0	3	80	20	0	0

S.No.	Topic	Hours
1	Introduction to QbD: History, Current approach and its limitations. Why QbD is required, Advantages, Elements of QbD, Terminology: QTPP, CMA, CQA, CPP, RLD, Design space, Design of Experiments, Risk Assessment and mitigation/minimization.	2
2	Pharmaceutical Development: Introduction, Pharmaceutical Development, Submission of Pharmaceutical Development And Related Information in Common Technical Documents (CTD) Format, Design of experiments -Methods and applications Optimization techniques: Concept of optimization, optimization parameters, classical optimization, Statistical designs, Question Based Review (QBR).	10
3	Quality Risk Management: Introduction- What is quality? Relevance of quality with respect to pharmaceuticals, Scope, Principles of Quality Risk Management ICH Q9, HACCP, FMEA, General Quality Risk Management Process.	3
4	Pharmaceutical Quality Management: Pharmaceutical Quality System, Management Responsibility, Continual Improvement of Process Performance And Product Quality, Continual Improvement of the Pharmaceutical Quality System.	5
5	Detailed case study of QbD for immediate release dosage forms, Modified release dosage forms. Emphasis should be given to prototype QbD for various dosage forms considering manufacturing process variables, raw materials and desired attributes.	15
6	Process Analytical Technology: Introduction, Scope, Background, PAT Framework, PAT Tools, Risk-Based Approach, Integrated Systems Approach, Real Time Release, Strategy For Implementation, Regulatory Approach, Examples of PAT Implementation.	10

References:

1. ICH Guidelines
2. FDA Guidelines

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Dr. S. N. Shrivastava College of Pharmacy
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GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm

SEMESTER: VII

Subject Name: Innovations in Conventional Drug Delivery System
Subject Code: 2270016

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	0	3	80	20	0	0

No	Course Content	Hrs
1	Innovation in Tablets (Fast dispersible tablet, matrix tablet, orodispersible tablet, sublingual tablet, soluble tablet, osmotic tablet etc)	10
2	Innovations in capsules (capsule shell and fill materials)	5
3	Innovations in pelletization and pellets	3
4	Innovations in semisolids	3
5	Innovations in parenterals including pre-filled syringes	6
6	Innovations in ophthalmic drug delivery	5
7	Innovations in aerosols drug delivery	4
8	Innovations in solutions	3
9	Innovations in dispersive systems (suspensions and emulsions)	6

References Books:

1. Novel drug delivery systems. Y. W. Chien
2. Novel drug delivery system. N.K. Jain and others.
3. Novel drug delivery system. R. K. Khar and others.
4. Current updates available from web resources.

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GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm

SEMESTER: VIII

Subject Name: Dosage form Design II
Subject Code: 2280001

Theory	Teaching Scheme			Evaluation Scheme			
	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	3	6	80	20	80	20

No	Course Content	Hrs
1	Controlled and sustained release dosage forms Design of oral sustained release systems: Biological factors, Physicochemical factors Diffusional systems: -Reservoir system, Lag time, Burst effect, Matrix system, Effect of porosity and tortuosity Dissolution controlled system, Cube route dissolution equation, Diffusion layer controlled dissolution. Bioerodible and Combination of diffusion and dissolution systems. Design, development and evaluation of oral and parenteral controlled release formulations.	8
2	Novel drug delivery system (a) Modified drug delivery systems: Fundamentals, rational of modified release drug delivery, factors influencing the design and performance, pharmacokinetic and pharmacodynamic basis for modified drug delivery systems, estimation of loading and maintenance dose. (b) Design and development of oral modified release dosage forms: Matrix tablets, microspheres, hydrogels, osmotic pressure controlled systems, gastro retentive systems, colon targeting. (c) Fabrication of parenteral drug delivery systems: Parenteral emulsions & parenteral suspensions, microspheres, liposomes, niosomes, nanoparticles. (d) Formulation and evaluation of Transdermal drug delivery systems. (e) A brief study of site specific and targeted drug delivery systems, transmucosal and ocular drug delivery systems.	22
3	Pharmacokinetics (a) Definition and scope, significance of plasma drug concentration measurement. (b) Compartment model: Pharmacokinetics of drug absorption Zero order and first order absorption rate constant using Wagner-Nelson and Loo-Riegelman method. (c) Volume of distribution and distribution coefficient. (d) Compartment kinetics-one compartment and two compartment models. Determination of pharmacokinetic parameters from plasma and urine data after drug administration by intra vascular and oral route. (e) Curve fitting (Method of Residuals), regression procedures. (f) Clearance concept, mechanism of renal clearance, clearance ratio, determination of renal clearance. (g) Hepatic elimination of drugs, first pass effect, extraction ratio, hepatic clearance, biliary excretion, extrahepatic circulation. (h) Non-linear pharmacokinetics with special reference to one compartment model after I.V. drug administration, Michaelis Menten Equation, detection of nonlinearity (Saturation mechanism). (i) Numericals related to pharmacokinetic parameters using one compartmental model.	10
4	Clinical Pharmacokinetics a) Definition and scope b) Dosage adjustment in patients with and without renal and hepatic failure. c) Pharmacokinetic drug interactions and their significance in combination therapy	5

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Practical - 2280P1

1.	Preparation and evaluation of matrix tablet of BCS class I drug with erosion and diffusion based mechanisms.
2.	Preparation and evaluation of tablet coating
3.	Preparation and evaluation of osmotic drug delivery system
4.	Preparation and evaluation of floating drug delivery system
5.	Preparation and evaluation of buccal tablet
6.	Preparation and evaluation of buccal film
7.	Preparation and evaluation of transdermal patch
8.	Preparation and evaluation of colon drug delivery system
9.	Preparation and evaluation of Sodium alginate beads
10.	Preparation and evaluation of in situ gel
11.	Preparation and evaluation of microparticles by solvent change method
12.	Calculation of absorption rate by residual method
13.	Calculation of absorption rate by Wagner Nelson method
14.	Calculation of elimination rate by urinary excretion method

References Books:

- 1 Applied Biopharmaceutics and Pharmacokinetics by Leon Shargel, Susanna Wu-Pong and Andrew B. C. Yu.
- 2 Pharmacokinetics by Milo Gibaldi and Donald Perrier
- 3 Remington's Pharmaceutical Sciences, Mack Publishing Company, Easton, Pennsylvania.
- 4 Clinical Pharmacokinetics: Concepts and Applications by Rowland and Tozer, Lippincott Williams & Wilkins.
- 5 Controlled Drug delivery, Fundamentals and Applications by J.R. Robinson & Univent Lee, Marcel Dekker Inc.
- 6 Novel Drug Delivery Systems by Y. W. Chian Ed. James Swarbrick, Marcel Dekker.
- 7 Handbook of Pharmaceutical excipients, Royal society of Great Britain, U.K. Stability Studies, Marcel Dekker.



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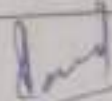
GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: VIII

Subject Name: Pharmaceutical Technology II
Subject Code: 2280002

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	3	6	80	20	80	20

No	Course Content	Hrs
1	<p>Tablet (a) Definition, Advantages and disadvantages, Introduction to types of tablets, formulation of different types of tablets; excipients, granulation techniques, Directly compressible excipients, machinery for large scale granulation and compression, physics of tablet making, compression and compaction, In process controls, processing problems and remedies.</p> <p>(b) Evaluation (Pharmacopoeial and nonpharmacopoeial test) and equipments. Brief outline on manufacturing method and evaluation of mouth dissolving tablets, buccal tablets, floating tablets, tablets of colon drug delivery, matrix tablets.</p> <p>(c) Coating of Tablets: Objectives, types of coating, film forming materials, formulations of coating solution, equipments for coating, coating process, evaluation of coated tablets, coating defects, specialized coating processes.</p> <p>(d) Pharmaceutical Tablet Compression Tooling: Terminology, tablet design, specification and information required, use and care of the tooling, problem solving.</p>	15
2	<p>Capsules</p> <p>Hard Capsules: Definitions, advantages, disadvantages, Ideal requirements, Production of Hard capsules (Gelatin and nongelatin e.g. vegetable), Capsule storage, size of capsules, formulation and methods of capsule filling, problems and remedies, quality control, climatic control in capsule department, LP capsules.</p> <p>Soft Gelatin Capsules: Formulation of shell and capsule cost, quality control with special emphasis on current dissolution testing. Microcapsules/Microspheres: Importance of microcapsule and microsphere in pharmacy, methods of preparation: Phase separation, coacervation, multicorifice centrifugal methods, spray congealing, polymerization, complex emulsion, Air suspension technique, coating pan and other techniques, evaluation of microcapsules, Applications of biodegradable and nonbiodegradable polymers in Microcapsules/Microspheres.</p>	10
3	<p>Extrusion and Pelletization :</p> <p>Factors affecting pellet properties, Cold extrusion, Melt extrusion, Applications of extrusion in pharmacy (including preparation of solid solution), selective equipments used for extrusion and pelletization, Use of polyethylene oxide and Eudragit in melt extrusion, Use of MCC in pelletization</p>	7
4	<p>Supercritical fluids :</p> <p>Introduction to supercritical fluids, Pharmaceutical applications of supercritical fluids in extraction, size reduction, preparation of inclusion complexes, preparation of solid dispersions, etc., Equipments for SCF processing.</p>	8


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Pharmaceutical Packaging: Definition, Packaging components, types, specifications and methods of evaluation, stability aspects of packing, Primary and secondary packaging, packaging materials, containers and closures and tamper-evident packaging, packaging equipment, Regulatory requirements in pharmaceutical packaging.	5
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Practical - 2009/10

Practical 7 list/week	
1.	Filling of powder granules pellets or hard granule capsule and its evaluation.
2.	Preparation of gelatin microcapsules by simple coacervation method
3.	Preparation of pellets by extrusion and spheronization
4.	Formulation and evaluation of controlled release pellets
5.	Preparation and evaluation of tablets employing direct compression
6.	Preparation and evaluation of tablets employing wet granulation
7.	Preparation and evaluation of tablets employing dry granulation (slugging)
8.	Preparation and evaluation of Soluble Supero Tablet
9.	Preparation and evaluation of Paracetamol tablet or any MILD tablet
10.	Preparation and evaluation of any calcium supplement tablet (eg or lactate, $CaCO_3$, DCP etc)
11.	Preparation and evaluation of any antibiotic tablet
12.	Preparation and evaluation of iron supplement tablet (eg $FeSO_4$)
13.	Preparation and evaluation of Chewable Aspirin tablet
14.	Preparation and evaluation of Fast Dispersible tablet using Effor-coat agent.
15.	Preparation and evaluation of Fast Dispersible tablet using superdisintegrant

References Books:

1. The Theory and Practice of Industrial Pharmacy by L. Lachman, H. Lieberman and J. Kang
2. Pharmaceutical Dosage Forms and Drug Delivery Systems by Ansel & others
3. Pharmaceutics: The Science of Dosage Form Design by Michael E. Aulton
4. Gennert, Alfonso R., Remington: The Science and Practice of Pharmacy, Vol-I & II, Lippincott Williams & Wilkins, New York.
5. Pharmaceutical Dosage Forms: Tablets: Vol.1, Vol. 2 and Vol.3, Ed. by Lieberman, Leon Lachman and Joseph B. Schwartz, Marcel Dekker Inc., New York
6. Modern Pharmaceutics by Gilbert S. Banker and Christopher T. Rhodes, Marcel Dekker, Inc., New York.
7. Latest editions of IP, BP, USP.

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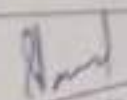
GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: VIII

Subject Name: Pharmaceutical Chemistry - I (Medicinal Chemistry - III)
Subject Code: 2240003

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	3	6	40	20	40	20

Sr. No.	Course content	Teaching Hours To be allotted
1	<p>Introduction, history, 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.</p> <p>Drugs acting on Cardiovascular System:</p> <p>Cardiotonic Agents SAR: Cardiac glycosides Synthesis: Dobutamine</p> <p>Antihypertensive Agents SAR: ACE Inhibitors, Dihydropyridines Synthesis: Nifedipine, Amlodipine, Atenolol, Metoprolol, Captopril, Hydralazine.</p> <p>Antiarrhythmic Agents Synthesis: Lidocaine, Flecainide.</p> <p>Antianginal Agents Synthesis: Glyceryltrinitrate, Isosorbidedinitrate</p> <p>Antihyperlipidemic agents: SAR: HMG CoA Reductase inhibitors Synthesis: Clofibrate</p> <p>Coagulants and Anticoagulants Synthesis of warfarin</p> <p>Antiplatelet Agents</p> <p>Thrombolytic Agents</p> <p>Plasma expanders</p>	<p>4</p> <p>8</p> <p>3</p> <p>2</p> <p>4</p> <p>2</p> <p>2</p> <p>1</p> <p>1</p>
2	<p>Diuretics: SAR: Thiazide diuretics, 5-Sulfamoyl benzoic acid derivatives. Synthesis: Hydrochlorothiazide, Acetazolamide, Furosemide, Ethacrynic acid</p>	4


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3	Endocrine system	
	Antidiabetic agents: Synthesis: Glipizide, Metformin, Pioglitazone, Tolbutamide, Glimipride.	5
	Thyroid Hormones and Antithyroid Drugs Synthesis: Methimazole, Carbimazole.	2
	Steroids and Therapeutically related compounds Nomenclature and stereochemistry of steroids Adrenocorticoids – Mineralocorticoids, Glucocorticoids Estrogens, Progestins and Androgens SAR: Estrogens and Adrenocorticoids, Progestins, Androgens	4
4	Anti-obesity drugs	1
5	Immunomodulators	2

Practical – 22800P3

Sr. No.	Content	No. of practical hours
1	Synthesis, Reaction monitoring and purification of following organic compounds: a) p-Nitro aniline from Acetanilide b) Benzoic acid from benzoin c) Benzamide from Benzaldehyde d) m-Nitrophenol from Nitrobenzene e) p-Aminophenol from Nitrobenzene f) Chalcone from Benzaldehyde and Acetophenone g) Barbituric acid from Urea and Dimethyl malonate	33
2	Characterization of synthesized compounds with the help of UV and IR spectroscopy.	12

References Books:

1. J. N. Delagado and W. A. R. Remers, 11thedn, 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, Oxford.
4. Daniel Ledwith, Strategies for organic drug synthesis and design, John Wiley and Sons USA
5. L. Finar, Organic chemistry Vol. I and Vol. II, ELBS/Longman, London
6. Vogel's Text books practical organic chemistry, ELBS/Longman, London

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GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: VIII

Subject Name: Pharmacology and Pharmacotherapeutics - IV
Subject Code: 2280004

Theory	Teaching Scheme			Evaluation Scheme			
	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	3	6	80	20	80	20

Sr. No	Course Content	Total Hrs.
1.	Definition, epidemiology, etiology, pathophysiology, signs and symptoms, diagnosis, complications, treatment and management of following diseases/conditions: <ul style="list-style-type: none"> • Hypertension • Coronary heart disease • Congestive heart failure • Cardiac arrhythmias • Thrombosis • Dyslipidemia • Acute and Chronic renal failure. • Anemia 	(20) 3 3 2 2 2 2 4 2
2.	Pharmacology of following class of drugs:- <ul style="list-style-type: none"> • Diuretics and Antidiuretics • Hematinics and Erythropoietin • Drugs Affecting Coagulation and Bleeding: <ul style="list-style-type: none"> Coagulants Anticoagulants including direct thrombin inhibitors Fibrinolytics Antifibrinolytics Antiplatelet drugs • Plasma Expanders 	(8) 2 2 3 1


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3	Definition, epidemiology, etiology, pathophysiology, signs and symptoms, diagnosis, complications, treatment and management of following diseases/conditions: <ul style="list-style-type: none"> • Diabetes mellitus and Hypoglycaemia • Thyroid and Parathyroid disorders • Erectile dysfunction • Menstrual cycle disorders • Bone disorders • Obesity 	(1 3 2 1 3 2 1
4	Pharmacology of following class of drugs: <ul style="list-style-type: none"> • Estrogens, Antiestrogens, and SERM, Aromatase inhibitors, Progestins, and antiprogestins • Hormonal contraceptives • Androgens and antiandrogens • Oxytocics and Tocolytics 	(5 2 1 1 1

Practical - 22800P4

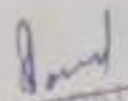
1.	Introduction to general principles of bioassay, pharmacopoeial bioassays and biostandardization of various drugs
2.	Alternatives to animal experiments (High throughput screening, refinement, reduction, replacement, rehabilitation, in vitro pyrogen test, embryonic stem cell test, local lymph node assay for skin sensitization, skin patch test in human, neutral red uptake assay, carcinogenicity and toxicity tests using cell lines, developmental neurotoxicity tests)
3.	Bioassay of Acetylcholine using Chick/Rat ileum by Graphical method
4.	Bioassay of Acetylcholine using Chick/Rat ileum by matching, method
5.	Bioassay of Acetylcholine using Chick/Rat ileum by three point method
6.	Bioassay of Histamine using Chick/ Guinea pig by matching method
7.	Bioassay of Histamine using Chick/ Guinea pig by three point method
8.	Bioassay of Atropine using Chick/Rat ileum by Graphical method
9.	Simulation Experiments on Cardiovascular System: Effects of Various Drugs on Isolated Frog Heart. Case studies (questions based on history, etiology, symptoms, investigations, medications, adverse effects, drug interactions, pharmacists' advice)
10.	To evaluate case study of Hypertension (minimum 3 cases)
11.	To evaluate case study of Congestive Heart failure (minimum 2 cases) To evaluate case study of Angina pectoris (minimum 2 cases)

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12	To evaluate case study of thyroid disorders (minimum 3 cases)
13	To evaluate case study of renal failure (minimum 3 cases)
14	To evaluate case study of anaemia (minimum 3 cases)
15	To evaluate case study of Diabetes mellitus (minimum 3 cases)

References Books:

1. Rang, H.P. and Dale, M.M. Pharmacology, 5th edition, 2010. Publisher : Churchill Livingstone.
1. Tripathi K.D., Essentials of medical pharmacology 6th ed, 2010, Jaypee brothers medical publishers pvt. ltd.
2. Goodman Gilman A., Rall T.W., Nies A.I.S. and Taylor, P. Goodman and Gilman's The Pharmacological Basis of therapeutics, 12th edition, 2011. Mc Graw Hill, Pergamon Press.
3. Katzung, B.G. Basic and Clinical Pharmacology, 8th Edition, McGraw Hill, New York, 11th edn, 2009
4. Satoskar, R.S. and Bhandarkar, S.D. Pharmacology and Pharmacotherapeutics, 20th edition (single volume), 2010, Popular, Dubai
5. Kulkarni S.K. Handbook of experimental pharmacology, 3rd edition, 2009, Vallabh Prakashan, New Delhi.
6. Clinical pharmacy and therapeutics . Roger Walker and Cate Whittlesea
7. Textbook of therapeutics. Drug and disease management. Eric T Herfindal Dick R Gourley
8. Fundamentals of experimental Pharmacology. M.N.Ghosh. Hilton and Co.


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GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: VIII

Subject Name: Pharmacognosy-VI
Subject Code: 2280005

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	3	6	80	20	80	20

Sr. No	Course Content	Total Hrs.
1.	Preparation of Herbal Extracts and their standardization: Introduction to different methods of preparation of plant extracts. Preparation of standardized plant extracts and principles of Garcenia, Garlic, Turmeric, Ashwagandha and Amla.	7
2.	Evaluation of Phytopharmaceuticals: Phytopharmaceutical evaluation and modern analytical techniques for analysis of herbal drugs.	6
3	Isolation, identification and analysis of phytoconstituents: <ul style="list-style-type: none"> a. Terpenoids: β-carotenoids, Menthol, Citral, Artemisin, Vitamin A b. Glycosides: Sennosides, Diosgenin, Glycyrrhetic acid and Rutin c. Alkaloids: Atropine, Quinine, Reserpine, Morphine, Ephedrine, Caffeine d. Resin: Podophlotoxin, Curcumin e. Antibiotic: Penicillin, Streptomycin 	18
4	Herbal Drug Industry: Scope, Study of infrastructure, Staff requirement, Project profiles, Plant and equipment, Processing, Research and development and pilot scale up techniques. Quality assurance and concept of Schedule T, GMP and ISO-9000 in herbal drug industry.	7
5	Phytopharmacovigilance	2
6	Herbal drugs for modern diseases: Recent developments of natural products used as Anticancer agents, Antidiabetics, Hepatoprotectives, Antiasthmatic, Hypolipidemic, lythotryptic, Immunomodulators, Tranquilisers, Memory enhancer, Hypnotics	5

Practical - 22800P5

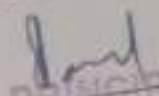
1. Isolation of Diosgenin from Fenugreek by preparative TLC and identification by TLC
2. Isolation of Diosgenin from Fenugreek by column chromatography.
3. Estimation of Diosgenin by quantitative TLC.


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4. Estimation of Diosgenin by colorimetric method.
5. Isolation of Ephedrine and identification by TLC.
6. Estimation of Glycyrrhizinic acid by colorimetric method.
7. Isolation of Triammonium Glycyrrhizinate from Glycyrrhiza.
8. Estimation of carbohydrates in crude drugs/ extracts
9. TLC study of flavonoids of lemon peel, estimation of total flavonoids and isolation hesperidin.
10. Estimation of Total Phenolics and tannins from Harde.
11. Estimation of Total Phenolics and tannins in Trifala.
12. Preparation and evaluation of Amla extract.
13. Preparation and evaluation of Curcuma extract

References Books:

1. Pharmacognosy: C. K. Kokate, A. P. Purohit, S. B. Gokhale, Nirali Prakashan Pune, 42nd edition, 2008.
2. Trease and Evans Pharmacognosy. 16th Edition, William Charles Evans, W. Saunders, Edinburg, London, New York, Philadelphia, St. Louis, Sydney, Toronto, 2013.
3. Textbook of Industrial Pharmacognosy, A. N.Kalia, CBS Publishers & Distributors Pvt. Ltd., 1st Rev. Edition, 2011.
4. Herbal Drug Industry, R. D Chaudhry, Eastern Publications, New Delhi.
5. Natural Products as Medicinal Agents, Ed. J. L. Beal and E. Reinhard, Hippocratos Verlog Stuttgart, 1982
6. Chemistry of Natural products. S. V. Bhat, B. A. Nagasampagi, S. Meenakshi, Narosa Publishing House, New Delhi, 2005.
7. Medicinal plants glycosides, Sims, Toronto.
8. Natural Products, Vol I & II, O.P. Agrawal, Goel Publishing House, Meerut, 28th Edition, 2004.
9. Modern Methods of Plant Analysis, K. Peach and M. V. Tracey, Vol.1-4, Narosa Publisher House, New Delhi
10. Practical Pharmacognosy, Technique and Experiment, C. K. Kokate and S. B. Gokhale, Nirali Prakashan, Pune, 8th edition, 2005.
11. The Organic Constituents of Higher Plants. Their chemistry and interrelationships, Trevor Robinson, Burges Publishing Company, Minneapolis, USA, 1963.
12. Pharmacognosy: Phytochemistry Medicinal Plants, Jean Bruneton, 2nd Edition, Intercept Publications, Ltd., Editions TEC & DOC Paris, 1999.
13. Quality Control, Herbal Drugs, An approach to evaluation of Botanicals, P. K. Mukherjee, Business Horizons Pharmaceutical Publishers; 2002


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14. The Practical Evaluation of Phytopharmaceutics, K. R. Brain and R. D. Turner, Wright-Scientechica, Bristol.
15. Plant Drug Analysis: A Thin Layer Chromatography Atlas, H. Wagner, S Bladt, Springer, New York, 2nd Edition, 2007.
16. Thin Layer Chromatography – A Laboratory Hand Book, E. Stahl, Springer (I) Pvt. Ltd., 2nd Edition, 2007
17. WHO Publication.
18. The Wealth of India (Raw Material & Industrial Product), Council of Scientific Research, New Delhi, 1st Edition, 2005.
19. Indian Medicinal Plants, Kirtikar and Basu, 1st Edition, volume I to IV International Book Distributors, Dehradun, 1999.
20. The Ayurvedic Pharmacopocia of India, Part I, (Vol. I-V), part II (I & II) Govt. of India, Ministry of Health and Family Welfare, Dept. of Indian Systems of Medicine and Homocopathy, New Delhi 2008.
21. The Ayurvedic Formulary of India, Vol. I, II and III, Published by Government of India, New Delhi, 1st Edition, 2000.
22. Indian Herbal Pharmacopocia, 1st revised Edition, Published by RRL, Jammu and IDMA, Mumbai, 2002.
23. Quality Standards of Indian Medicinal Plants, Volume I to XI (2003 to 2013) Editor: Neeraj Tandon & Parul Sharma; By: Medicinal Plant Unit, ICMR, New Delhi.
24. Clark, E.C.G., Isolation and Identification of Drugs, The Pharmaceutics Press, London, 2nd Edition, 1986.
25. Laboratory Handbook for the fractionation of Natutal extracts, Peter Houghton and Anala Raman, Chapman & Hall, Madras, 1st Edition, 1998.
26. British Herbal Pharmacopocia, Published by British Herbal Medicines Association, 4th Edition, 1996.
27. Phytochemical reference standards of selected Indian Medicinal Plants, Vol I & II (2010 to 2012) Editor: Neeraj Tandon & Parul Sharma By: Indian Council of Medical Research, New Delhi.
28. Compendium of Indian Medicinal Plant Vol. 1 to 6, by Rastogi Ram F., Mehrotra B. N., CDRI & NISCOM, 1st Edition, New Delhi, 1998.


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GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: VIII

Subject Name: Computer Applications in drug discovery
Subject Code: 2280006

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	0	3	80	20	0	0

Sr. No	Course Content	Total
1.	<p>Introduction</p> <p>A. Introduction to drug discovery concept / process and importance of drug design approaches in drug discovery. Various approaches to drug discovery</p> <p>B. Ligand Databases for Computer-Aided Drug Design</p> <p>1. Preparation of Ligand Libraries for Computer-Aided Drug Design.</p> <p>2. Representation of Small Molecules as "SMILES".</p> <p>3. Small Molecule Representations for Modern Search Engines: InChIKey.</p> <p>C. Target Data Bases for Computer-Aided Drug Discovery/Design</p>	2 4 2
2.	<p>Structure-Based Computer-Aided Drug Design (SBDD)</p> <p>A. Preparation of a Target Structure</p> <p>1. Comparative Modeling</p> <p style="padding-left: 20px;">Template identification and alignment.; Model building; Model refinement and evaluation.; Model data bases.</p> <p>2. Binding Site Detection and Characterization.</p> <p style="padding-left: 20px;">Geometric method.; Energy-based approaches ; Pocket matching; Molecular dynamics-based detection.</p> <p>B. Representing Small Molecules and Target Protein for Docking Simulations</p> <p>C. Sampling Algorithms for Protein-Ligand Docking</p> <p style="padding-left: 20px;">Systematic Methods : Molecular Dynamics Simulations; Monte Carlo Search with Metropolis Criterion ; Genetic Algorithms, Incorporating Target Flexibility in Docking.</p> <p>D. Scoring Functions for Evaluation Protein-Ligand Complexes</p> <p style="padding-left: 20px;">Force-Field or Molecular Mechanics-Based Scoring Functions; Empirical Scoring Functions; Knowledge-Based Scoring Function; Consensus-Scoring Functions.</p> <p>E. Structure-Based Virtual High-Throughput Screening.</p> <p>F. Atomic-Detail/High-Resolution Docking</p> <p>G. Binding Site Characterization</p> <p>H. Pharmacophore Model</p> <p style="padding-left: 20px;">Virtual Screening Using a Pharmacophore Model; Multitarget Inhibitors Using Common Pharmacophore Models; Dynamic Pharmacophore Models That Account for Protein Flexibility.</p>	2 2 2 4 3 2 1 1 3


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3	<p>Ligand-Based Computer-Aided Drug Design</p> <p>A. Molecular Descriptors/Features Functional Groups. Prediction of Psychochemical Properties Electronegativity and partial charge; Polarizability; Octanol/water partition coefficient. Converting Properties into Descriptors; Binary molecular fingerprints; 2D description of molecular constitution; 3D Description of molecular configuration and conformation.</p> <p>B. Quantitative Structure-Activity Relationship Models Multidimensional QSAR: 4D and 5D Descriptors; Receptor-Dependent 3D/4D-QSAR; Linear Regression and Related Methods; Quantitative Structure-Activity Relationship Application in Ligand-Based Computer-Aided Drug Design.</p> <p>C. Selection of Optimal Descriptors/Features</p> <p>D. Pharmacophore Mapping Superimposing Active Compounds to Create a Pharmacophore Pharmacophore Feature Extraction; Pharmacophore Algorithms and Software Packages</p>
4	<p>Prediction and Optimization of Drug Metabolism and Pharmacokinetics Properties Including Absorption, Distribution, Metabolism, Excretion, and the Potential for Toxicity Properties</p> <p>Compound Library Filters; Lead Improvement: Metabolism and Distribution; Prediction of Human Ether-a-go-go related Gene Binding; Drug Metabolism and Pharmacokinetics/Absorption, Distribution, Metabolism, and Excretion and the Potential for Toxicity Prediction Software Packages and Algorithms.</p>

References Books:

1. H. Smith & H. J. William – Introduction to the Principal of Drug Design, John Wright & Sons Ltd.
2. Burger Medicinal Chemistry – The Basis of Medicinal Chemistry by Manfred S. Wolff, Part – I, John Wiley & Sons.
3. W. O. Foye – Principals of Medicinal Chemistry, Lipincott Williams and Wilkins.
4. C. Hansch and Leo – Comprehensive Medicinal Chemistry Vol. 4, Pergamon Press.
5. E. H. Kerns and L. Di – Drug like properties, concepts, structure design and methods, Academic Press.
6. Molecular Modeling in Drug Design by Cohen N. C.
7. D. C. Young – Computational Drug Design, John Wiley & Sons, Inc.

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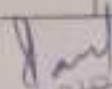
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B.Pharm
SEMESTER: VIII

Subject Name: Pharmacy Practice
Subject Code: 2280007

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	0	3	80	20	0	0

No	Course Content	Hrs
1	Introduction to daily activities of a clinical/ community/ hospital pharmacist	1
2	Prescription processing: Accurate interpretation of prescription orders. Appropriateness of medication choice, dosage form, dosage, route of administration, regimen and duration of therapy. Review drug-drug/ food interaction and drug allergies Compliance issues (adherence) and financial consideration	5
3	Medication review: 3 Significance, components, collection and interpretation of patient-specific information, assessment of therapeutic goals, and identification of drug related problems, clinical progress review	3
4	Drug utilisation evaluation (DUE) : Definition, objectives, DUE cycle, types of DUE, Role of pharmacist in DUE	2
5	Communication skills: Dialogue and interview techniques, verbal and nonverbal listening, probing and gathering information	2
6	Participation in ward round Goals and objectives, ward rounds-the Indian scenario, pre-ward round preparation, intervention and communication during ward round, ward round follow-up	2
7	Patient counselling: Patient counselling on self diagnostic/monitoring tools: Home blood glucose monitor, blood pressure monitoring and home pregnancy test kits Patient counselling on OTC medications: Patient counselling on prescription medications: Direction for proper use of medicine Duration of therapy and onset of action Management of common adverse effects, interaction and missed doses Storage and handling requirements Patient counselling to promote adherence to regimens and therapy: Strategies to optimize adherence, identification of under-utilization and over-utilization of medications	4


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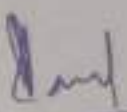
8	Drug information: Selection of suitable drug information resources: Primary, secondary and tertiary resources, Journals, Cochrane collaborative library, Medline, Answering drug information questions	3
9	Medication and patient safety practices: Essential Drugs concept and Rational Drug Therapy Development of Therapeutic guidelines; Meaning, need for guideline, development, evidences for effectiveness and limitations of guideline Therapeutic guidelines for management of various diseases (Asthma, Hypertension, Tuberculosis) Dispensing errors Prescription Audit Pharmacovigilance- adverse drug reaction monitoring and reporting	10
10	Promotion of healthy life style and preventive health (immunization and tobacco, alcohol cessation etc.)	2
11	Paediatric pharmacy practice: Dose calculation, pharmacokinetic aspects of drug therapy, therapeutic drug monitoring in paediatrics	2
12	Geriatrics pharmacy practice: Precaution in medication, pharmacokinetic and dynamic changes with ageing, common problems in the elderly and role of clinical pharmacist	2
13	Pharmacy practice in pregnant and lactating women: Estimation of risks during pregnancy and lactation, dietary supplements requirement, pharmacokinetic and dynamic aspects, discontinuation of medications associated with withdrawal	3
14	Inventory control: Purchasing, Pricing, Outdated medications, Return to wholesaler and Return to stock>Returns from patients	2
15	Quality assurance of pharmacy services	2

Recommended 7 days (2hr/day) visit to multi specialities hospital to understand concept of pharmacy practice

Pharmacy practice teaching shall be accomplished by relevant case studies

Reference Books:

1. A textbook of Clinical pharmacy practice- Parthasarathi G., 2nd edition-2012.
2. Clinical Pharmacy and Therapeutics Roger walker and Clive Edwards, Churchill Livingstone Edinburgh, 3rd edition-2006.
3. Davidson's Principle and Practice of Medicine, EDs Christopher, Haslett, Edwin R. Chilvers.
4. Textbook of Therapeutics Drug Disease Management- Eric T. Herfindal and Dick R. Gourley, 7th edition.
5. Harrison's Principles of Internal medicine- Vol 1 and 2 Braunwald, 17th edition, Eugene & Others.
6. Melmon and Morrells Clinical Pharmacology, 4th Edition - S George Carrythers.
7. Clinical Pharmacology- P.N. Bennett, M. J. Brown, 9th edition-2003.
8. A text book of clinical pharmacology and therapeutics- James M. Ritter, Lionel D. Lewis- 5th edition-2008.


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GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm
SEMESTER: VIII

Subject Name: Bioavailability and Therapeutic Drug Monitoring
Subject Code: 2280008

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	0	3	80	20	0	0

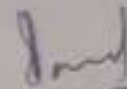
No	Course Content	Hrs
1	Relative and absolute bioavailability, bioequivalence, first pass clearance, Objectives of BA studies	2
2	Rate and extent of absorption, Factors affecting bioavailability(physicochemical and formulation related)	2
3	Methods and parameters of assessing bioavailability, Determination of AUC, Pharmacodynamic and pharmacokinetic models, Invitro dissolution and Bioavailability, Theories of dissolution, Invivo - invitro correlation studies, Techniques for enhancing Bioavailability	6
4	Study designs and analysis of BA-BE studies (protocol preparation of BA-BE studies as per CDSCO , Schedule Y guidelines, GCP guidelines)	4
5	TDM- introduction and definition, Recommendations and uses of TDM, Target drug ranges for TDM	2
6	Collection and storage of samples of body fluids, Sample preparation (Extraction, de-proteinization), Problems of interference of biological matrix	4
7	Criteria for selection of method for TDM : Physicochemical parameters of drug and sample related parameters	3
8	Techniques used in TDM: Physical methods HPLC, HPTLC, GC: Sensitivity and selectivity of detection with respect to applications for TDM and related pharmacoeconomics. Immunoassays RIA, ELISA, FPIA, EMITH, NIHA: Sensitivity and selectivity of detection with respect to applications for TDM and related pharmacoeconomics	9
9	TDM of specific drugs- digoxin, gentamicin, lidocaine, lithium, theophylline, phenytoin, phenobarbitone, carbamazepine, valproic acid, addictive drugs, immunosuppressants Study of clinical pharmacokinetics, general guidelines, sample collection, time of sample collection, clinical comments, clinical monitoring parameters, usual dosing parameters, common toxicities, adverse drug reactions and drug interactions, techniques used for estimation, importance, interpretation of results of above mentioned drugs	12


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10	Role of clinical pharmacist in TDM	1
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Reference Books:

1. Michael Makoid, Philip Vuchetich, Umesh Banakar. Basic Pharmacokinetics, First edition. Pkinbook.
2. L. Shargel, and A. Yu, Applied Biopharmaceutics and Pharmacokinetics, Appleton and Large, Norwalk, CT, 1993.
3. Shargel Leon and Alan Mutnick. Comprehensive Pharmacy Review. Wolters Kluwer/Lippincott Williams and Wilkins, 2007.
4. Atkinsons Arthur. Principles of Clinical Pharmacology. 3rd edition. Academic Press. 2012.
5. Parthasarathi G, Karin Nyfort-Hansen, Milap Nahata. A textbook of Clinical Pharmacy practice. 2nd edition. University Press.
6. Bauer L. A. Applied Clinical Pharmacokinetics. Mc Graw Hill Professional.
7. Wagner J.G. Pharmacokinetics for the Pharmaceutical Scientist, Technomic Publications. 1993.
8. M. Gibaldi and D. Perrier, Pharmacokinetics, J. Swarbrick, ed., Marcel Dekker, NY
9. M. Gibaldi, Biopharmaceutics and Clinical Pharmacokinetics, 3rd edition. Lea & Febiger, Philadelphia.
10. P.G.Welling, F.L.S. Tse and S.V. Dighe (eds) *Pharmaceutical Bioequivalence*, Marcel Dekker Inc. New York, USA 1991.
11. Mike Hallworth, Nigel Kapps. Therapeutic Drug Monitoring and clinical biochemistry. ACB Venture. 1993.
12. Daniel Robinson, William J. Taylor. Simkin Handbook of Therapeutic Monitoring. 2nd edition. Harvey Whitney Books. 1993.
13. Evans WE, Schentag JJ and Jusko WJ. Applied pharmacokinetics, principles of therapeutic drug monitoring. 3rd edition. Applied therapeutics Inc.
14. B. Widdop. Therapeutic drug monitoring. Churchill Livingstone. 1985.
15. Irving Sunshine. Recent developments in TDM and clinical toxicology. Marcel Dekker. 1992.
16. Leonardo D. Azevedo Calderon. Chromatography- The most versatile method of chemical analysis. CC BY 3.0 license. © The Author(s)
17. Ganesh R. Naik. Applied biological Engineering . Principles and practice. InTech. 2012.
18. Michael Hallworth. Ian Watson. TDM Clinical guide. Abbott.


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GUJARAT TECHNOLOGICAL UNIVERSITY

B.Pharm

SEMESTER: VIII

Subject Name: Food Analysis
Subject Code: 2280009

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	0	3	80	20	0	0

Sr No	Course Content	Teaching hrs
1-	Introduction to Instrumentation Techniques;	
a.	Centrifuge techniques: Zonal, density, gradient and ultra-centrifugation techniques and their applications.	2
b.	Electrophoresis: zonal, paper, gel electrophoresis and isoelectric focusing and their application	2
c.	Spectroscopy: Basic concepts, Beer-Lambert law & brief description of colourimetry, UV-VIS, IR, NMR, fluorescence, mass spectroscopy, flame photometry and x-ray diffraction.	4
2.	Analysis of chemical constituents, their characterization and significance- moisture, ash, minerals, lipids, fat, proteins, fibre, starch, reducing sugars	5
3.	Analysis of vitamins, pigments, flavours, extraneous matter, pesticides and mycotoxins. Microscopic analysis of foods other methods- potentiometry, enzymatic, immunoassays, thermal analysis. Analysis of genetically modified foods	8
4.	Chromatographic methods for analysis of food and additives like TLC, HPTLC, GLC, HPLC, SFC and Flash chromatography.	5
5.	Legislation for food, the Food safety act, Food standards and nutrition, general chemical and instrumental methods for food analysis.	4
6.	Contaminants in food: contaminants in food material and food additives. Standards for food additives.	4
7.	Analysis of sugar, preservatives, starch products, beverages, chocolate, herbs, spices, cereals, oils and fats, dairy products.	4
8.	Detection of common adulterants, microbial contamination, toxic trace metals, pesticides and insect infestation in food products.	4
9	Stability studies of food products.	3


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References Books:

1. Samuel A. Matz, The Chemistry and Technology of Cereals as Food and Feed, Medtech, Van Nostrand Reinhold/AVI, 115, Fifth Avenue, New York 10003, Ed: 2nd 2013
2. Bernard W. Minifie; Chocolate, Cocoa and Confectionery: Science and Technology, Van Nostrand Reinhold /AVI, 115, Fifth Avenue, New York 10003 Ed.3rd 1989.
3. Peter KV. Handbook of Herbs and Spices: Woodhead Publishing Ltd, 80 High Street, Cambridge, UK 2012
4. Deshpande SS, Handbook of Food Toxicology, Indus Therapeutic Inc. Heyderabad, India; Marcel Dekker, Inc., 270, Medisone Avenue, New York, NY 10016, 2002
5. Steven R. Tannenbaum, Nutritional and Safety Aspects of Food Processing, Marcel Dekker, Inc., New York, NY; 1979.
6. Green JH, and Kramer A.; Food Processing Waste Management. AVI Publishing Co., Westport, CT; 214 (1984).



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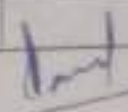
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B.Pharm
SEMESTER: VIII

Subject Name: Hospital Management and Medical Tourism
Subject Code: 2280010

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	0	3	80	20	0	0

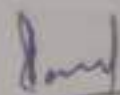
Sr No	Course Content	Teaching hrs
1.	History of hospital as an organization and its structure	
2.	Departments of a Hospital Outpatient department and front office • Nursing services • Radiology and Imaging services • Pathology and Clinical Laboratory services • Operation theatre services • ICU/ CCU/ NICU/ PICU • Cardiac Catheterization services • Emergency Medical Services • Blood Bank services • Surgical and Medical wards • Obstetric and Gynecologic wards and Labor room suite • Central Sterile Supply Department • Medicolegal Services • Laundry and Linen services • Housekeeping services • Biomedical waste disposal • Kitchen and Catering services • Medical Records Department • Accounts and Billing department	
3.	Health Administration in India	
4.	Illness and Infection Control Defining Illness: Direct and indirect causes -Classification and description of disease- Medical asepsis, Nosocomial infection and communicable diseases- Reservoir, carrier and mode of transmission-Infection control measures- Sterilisation and aseptic techniques Infection control committee; purpose, composition and terms of reference	
5.	Services, Health and Hospitals Services, Classification of Service Organisations, Characteristics, Challenges- History of Medicine, Healthcare Revolution, Health, Dimensions of Health, Indicators of Health- Types of Healthcare Organisations, Composition of Health Sector, Types of Care, Pyramidal Structure of Health Services, Hospitals, Types of Hospitals and Role of Hospital in Healthcare, Complexity of Hospital Organisation	
6.	Hospital Management: Levels and Roles Governing Board, Executive Board and Advisory Board- CEO, Medical Administration, Nursing Administration and Hospital Administration- Middle Level Managers in Hospital and their Responsibilities- Structuring Hospital Organisation	
7.	Current Issues in Healthcare Accreditation-Tele health-Health Tourism-Health Insurance and Managed Care- Disaster	
8.	Herbal Drug/Intellectual Property Rights (IPR).	


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References Books:

1. S. Srinivasan (ed.), Management Process in Health Care (Voluntary Health Association of India, New Delhi)
2. C.M. Francis and et al., Hospital Administration (Jaypee Brothers Medical Publishers Pvt. Ltd., New Delhi)
3. Sana's Guidelines for Hospital Infection Control - By Mohd. S. Khan -Jaypee Brothers, New Delhi.
4. Hospital Waste Management & it's Monitoring - By Madhuri Sharma Jaypee Brothers, New Delhi.
5. Medical Stores Management - By Shakti Gupta & Sunil Kant - Jaypee Brothers, New Delhi.
6. Medical Records, Organisation & Management - By G.P. Mogli Jaypee Brothers, New Delhi.
7. Guidelines on Effective Hospital Administration- Dr. P.V.Bokil
8. Emergency Medical Services & Disaster Management - By D.K. Dave& Shakti Gupta - Jaypee Brothers, New Delhi.
9. Syed Amin Tabish, Hospital and Health services administration - principles and practice, oxford university press, New Delhi, 2001.
10. James A.F.Stoner, R.Edward Freeman and Denier R. Gilbert Jr., Management, Prentice Hall India, New Delhi, 1997.
11. Kountz Harold, Heinz Wehrich, Management - A global perspective, 19th edition, Mc Graw Hill International, New Delhi, 2005.
12. Srinivasan A.V. Japanese management - The Indian context, Tata Me Oraw Hill, New Delhi, 2000.
13. Koontz Harold, Heinz Wehrich, Essentials of management, Mc Graw Hill Intenational, New Delhi, 2004.
14. L.M.Prasad, Principles and practice of Management, 6th edition, Sultan Chand Pilblisher, New Delhi, 2001.



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B.Pharm

SEMESTER: VIII

Subject Name: Drug Approval Process
Subject Code: 2280011

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	0	3	80	20	0	0

Sr No	Course Content	Teaching hrs
1.	Basics in drug approval process: Various phases of drug development and approval including clinical and nonclinical development.	3
2.	Overview on: Orange book, Freedom of information, Inactive Ingredient Guide and Drug Master File.	7
3.	Types of Approval: INDA, NDA and ANDA. Content, format and application. Concept of para I to IV and generic exclusivity. Special emphasis on approval under 505 (b) (2).	10
4.	Drug Approval in India: Requirements and guidelines from CDSCO.	4
5.	Drug Approval in Developed Countries and Rest of World (Row) markets: Common Technical Document (CTD) and brief introduction to various regulatory agencies like USFDA, MCA, TGA, MHRA, ANVISA, WHO and ICH.	14
6.	Scale Up and Post Approval Changes (SUPAC) guidance: SUPAC-IR, MR and SS	4
7.	Approval of Biopharmaceuticals: Difference from drug approval and concept of bio-similarity.	3

References Books:

- The guidance documents shall be procured from the website of the respective government


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B.Pharm
SEMESTER: VIII

Subject Name: Intellectual Property Rights and Patents
Subject Code: 2280012

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	0	3	80	20	0	0

Sr No	Course Content	Teaching hrs
1.	Concept and definition of IPR	03
2.	Definition of patent, Types of Patents, The essential elements for innovation to be patentable	12
3.	Indian patent act 1970 and its all subsequent amendments, Non patentable invention as per Indian patent act	10
4.	Recent litigation and judgements related to pharmaceutical patents	08
5.	Concept and genesis of GATT and WTO	05
6.	Establishment of WIPO and its function	04
7.	TRIPS agreement and its impact on international trade	03

References Books:

1. W.R. Cornish, Intellectual Property, Sweet & Maxwell, London (2000)
2. Terrell On Patent, 2000
3. P. Narayana, Patent Law, Wadhwa Publication.
4. Merges, Patent Law and Policy: Cases and Materials, 1996
5. Brian C. Reid, A Practical Guide to Patent Law, 2nd Edition, 1993
6. Brinkhof (Edited), Patent Cases, Wolters Kluwer
7. Prof. Willem Hoyng & Frank Eijsvogels, Global Patent Litigation, Strategy and Practice, Wolters Kluwer
8. Feroz Ali Khader, The Law of Patents – with a special Focus on Pharmaceuticals in India, LexisNexis Butterworths Wadhwa, Nagpur.
9. N.S. Gopalakrishnan & T.G. Agitha, Principles of Intellectual Property (2009), Eastern Book Company, Lucknow


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B.Pharm
SEMESTER: VIII

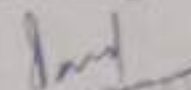
Subject Name: Medical Writing and coding
Subject Code: 2280013

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	0	3	80	20	0	0

Sr No	Course Content	Teaching hrs
1.	Introduction to Medical Coding	
2.	Introduction to Diagnosis Coding	
3.	Introduction to ICD-10-CM coding.(the International Classification of Diseases, Tenth Revision, Clinical Modification) ICD-10-CM Coding and Structure	
4.	Reimbursement	
5.	Introduction to Current Procedural Terminology (CPT) CPT Coding and Structure	
6.	Evaluation and Management (E/M) Coding	
7.	Surgery and Integumentary System Coding	
8.	Anesthesia CPT Codes	
9.	Cardiovascular, Respiratory, Musculoskeletal Systems	
10.	Radiology and Pathology Coding	
11.	Introduction to Documentation (Medical History) - Health Information Management and Documentation	
12.	Medical Examination, Decision Making, Selecting the Correct Code	
13.	Issues with Fraud and Abuse	

References Books:

1. International statistical classification of diseases and related health problems. - 10th revision, edition 2010. World Health Organization, ISBN 978 92 4 154834 2.
2. Carol J. Buck, Workbook for Step-By-Step Medical Coding, 2015 Edition, Elsevier - Health Sciences Division. ISBN 9780323279802.
3. BarCharts Inc, Medical Coding: ICD-10-CM, ISBN 9781423218722.
4. American Medical Association, CPT 2014 Standard Edition (Current Procedural Terminology (Standard))1st Edition


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B.Pharm
SEMESTER: VIII

Subject Name: Commerce of herbs and Phytoconstituents
Subject Code: 2280014

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
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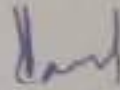
Sr No	Course Content	Teaching hrs
1.	Contribution of natural products in modern drug discovery: overview of drug molecules discovered from natural products; detailed study of following in drug discovery: vinca alkaloids, morphine, atropine, δ -tubocurarine, ephedrine, artemisinin, camptothecin, taxol, curcumin, diosgenin, papain etc.	5
2.	World-wide trade in medicinal plants: withania, senna, liquorice, echinacea, ginseng, aloe, ipecac, boswellia, guggulu etc	5
3.	Industrially important aromatic plants and their derived products.	5
4.	Herbal Drug Trade: WHO guidelines on good agricultural and collection practices (GACP) for medicinal plants. Geneva; WHO guidelines on good manufacturing practices for the manufacture of herbal medicines; International trade, drug registration for export import.	5
5.	Production, supply and distribution.	5
6.	Wild harvesting, cultivated material.	5
7.	Constraints to the development of trade.	5
8.	Herbal Drug/Intellectual Property Rights (IPR).	5
9.	Medicinal plant based industries in indigenous system of medicine (ISM), standardization.	5

References Books:

1. Atal CK and Kapoor LD; CSIR, 1982, Cultivation and utilization of Medicinal plants.
2. Handa SS, 1996, CSIR, Supplement to cultivation and utilization of Medicinal plants.
3. Atal CK and Kapoor LD, CSIR, 1982, Cultivation and utilization of Aromatic plants.


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4. Handa SS and Kaul CL; CSIR, 1998, Supplement to cultivation and utilization of Aromatic plants.
5. Chaudhary RD, Herbal Drug Industry, Eastern Publications, New Delhi.



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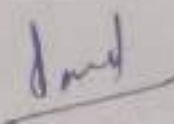
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B.Pharm
SEMESTER: VIII

Subject Name: Genetic engineering and gene therapy
Subject Code: 2280015

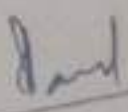
Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	0	3	80	20	0	0

Sr No	Course Content	Teaching hrs
1.	Introduction to genetic engineering, basis of genetic engineering (gene organization, gene expression, genes and genomes)	2
2.	Isolation of DNA and RNA, handling and quantification of nucleic acids, Radiolabelling of nucleic acids, nucleic acid hybridisation, gel electrophoresis, DNA sequencing	5
3.	Types and uses of - Restriction enzymes, DNA modifying enzymes, DNA ligases	2
4.	Host cells and vectors (Host cell types, Plasmid vectors, bacteriophage vectors, vectors for use in eukaryotic cells, DNA delivery methods (transformation, transfection, packaging phase DNA invitro))	6
5.	Cloning strategies (cloning from mRNA, cloning from genomic DNA, advanced cloning strategies)	3
6.	Polymerase chain reaction ((methodology- features of PCR, primer designing and DNA polymerases for PCR) ,PCR techniques, processing of PCR products and applications of PCR)	5
7.	Genetic selection (use of chromogenic substrates), screening method (immunological screening for expressed genes), analysis of cloned genes (blotting techniques and DNA sequencing)	3
8.	Applications of ribozymes, antisense-oligonucleotide based therapy	3
9.	Genetic engineering and biotechnology products (proteins, enzymes, therapeutic products, DNA vaccines (against cancer and viruses))	3
10.	Applications of gene manipulation: diagnosis and characterization of medical conditions, treatment using rDNA technology , DNA profiling, Transgenic plants, Transgenic animal models (including knock out models)	4
11	Gene therapy for hematopoietic disorders, cardiovascular diseases, respiratory conditions, cancer, neurological diseases, inborn errors of metabolism, HIV infection, skin and systemic disorders, childhood onset blindness, immunodeficiencies, pain management	9


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References Books:

1. Gene and cell therapy. Nancy Smyth Templeton. Marcel Dekker Inc. 2004.
2. Gene therapy- tools and potential applications. Francisco Martin Molina. Intech publications, 2013.
3. Nicholl Desmond ST, "An Introduction to Genetic Engineering" Cambridge University Press, 2002.
4. Concepts of genetics- William S Klug. Macmillan 1994.
5. Emery's Elements of Medical Genetics- Peter D Turnpenny, Sian Ellard. Churchill Livingstone. 2007
6. Pharmaceutical biotechnology by O Kayser and R. H. Muller. Wiley - VCH Verlag GmbH & Co. KGaA.
7. Old RW and Primrose SB .Sixth edition, "Principles of gene manipulation ", BlackWell Scientific Publications, 2001.
8. Gene cloning and DNA analysis. T.A. Brown. 6th edition. Wiley Blackwell Publications.
9. Biotechnology – U. Satyanarayan



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B.Pharm

SEMESTER: VIII

Subject Name: Current advances in Novel Drug Delivery Systems

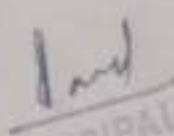
Subject Code: 2280016

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	0	3	80	20	0	0

No	Course Content	Hrs
	Basics, polymers/excipients used, Formulation, Innovations, Evaluation of	
1.	Vesicular drug delivery system like liposomes, niosomes etc.	7
2.	Multi unit drug delivery systems like microspheres, microcapsules, pellets, beads, minitables etc.	7
3.	Transdermal drug delivery systems, sonophoresis, iontophoresis	9
4.	Mucoadhesive films, patches, diskette, strips	5
5.	Nanoparticulate drug delivery system	7
6.	Self emulsifying drug delivery system	7
7.	In situ gels	3

References Books:

1. Lachman L., Liberman H. A., Kanig J. L., The theory and practise of industrial pharmacy. 2nd Edition 1991, Varghese publishing house,
2. Remington: the science and practice of pharmacy.
3. James Swarbrick, James C. Boylan, Encyclopedia of Pharmaceutical Technology, Martel Dekker.
4. G.S.Banker, Modern Pharmaceutics.
5. Robinson & Lee, Controlled Drug Delivery: Fundamentals and applications.
6. Y. W. Chein, Novel drug delivery systems.
7. N.K. Jain and others, Novel drug delivery system.
8. R. K. Khar and others, Novel drug delivery system.
9. Current updates/ articles available from web resources.


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B.Pharm

SEMESTER: VIII

Subject Name: Elementary Mathematics

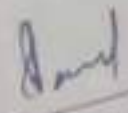
Subject Code: 2280017

Teaching Scheme				Evaluation Scheme			
Theory	Tutorial	Practical	Total	Theory		Practical	
				External	Internal	External	Internal
3	0	0	3	80	20	0	0

No.	Course Content	Hrs
		(45)
1.	Algebra: Equation reducible to quadratic, simultaneous (linear & quadratic), Determinants, properties of solution of simultaneous equations by Cramer's rule, matrices, definition of special kind of matrices, arithmetic operations on matrices, pharmaceutical applications of determinants & matrices, Evaluation of En1, En2 & En3 mensuration & its pharmaceutical applications.	8
2.	Measures of dispersion: Range, average deviation, standard deviation, probability & probability distribution.	6
3.	Permutation, combination, AP and GP	8
4.	Trigonometry: Measurement of angle, T-ratios, addition, subtraction & transformation formulae, Application of logarithm in pharmaceutical computation.	7
5.	Analytical plans geometry: Distance between two points in plane, areas of triangle, equation of straight line, slope of line, intercept of line, linear inequality for two variables.	8
6.	Calculus: Differential: Definition, standard derivative & use of standard derivative Integral: Difference between differential & integral, standard integral, use of standard integral Differential equation: Order, degree, variable separable method, homogenous, linear differential equation, pharmaceutical applications on differential equation.	8

References Books:

1. Remedial Mathematics by Gupta & Prabhakar; Pragati Prakashan
2. Remedial Mathematics for Pharmacy by R.C.Kachot; Mahajan Prakashan
3. College Mathematics by Kai L. NILSON, Barnes & Noble inc.


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Reference Books:

- 1 Coppola D P, 2007. Introduction to International Disaster Management, Elsevier Science (B/H), London.
2. Manual on natural disaster management in India, M C Gupta, NIDM, New Delhi
3. An overview on natural & man-made disasters and their reduction, R K Bhandari, CSIR, New Delhi
4. World Disasters Report, 2009. International Federation of Red Cross and Red Crescent, Switzerland
5. Encyclopedia of disaster management, Vol I, II and III. Disaster management policy and administration, S L Goyal, Deep & Deep, New Delhi, 2006
6. Encyclopedia of Disasters – Environmental Catastrophes and Human Tragedies, Vol. 1 & 2, Angus M. Gunn, Greenwood Press, 2008
7. Disasters in India Studies of grim reality, Anu Kapur & others, 2005, 283 pages, Rawat Publishers, Jaipur
8. Management of Natural Disasters in developing countries, H.N. Srivastava & G.D. Gupta, Daya Publishers, Delhi, 2006, 201 pages
9. Natural Disasters, David Alexander, Kluwer Academic London, 1999.
10. Disaster Management Act 2005, Publisher by Govt. of India.
11. Publications of National Disaster Management Authority (NDMA) on Various Templates and Guidelines for Disaster Management NIDM Publications
12. High Power Committee Report, 2001, J.C. Pant
13. Disaster Mitigation in Asia & Pacific, Asian Development Bank
14. National Disaster Management Policy, 2009, Government of India
15. Disaster Preparedness Kit, American Red Cross
16. Bryant Edwards (2005): Natural Hazards, Cambridge University Press, U.K.
17. Carter, W. Nick, 1991: Disaster Management, Asian Development Bank, Manila.
18. Sahni, Pardeep et.al. (eds.) 2002, Disaster Mitigation Experiences and Reflections, Prentice Hall of India, New Delhi.
19. Roy, P.S. (2000): Space Technology for Disaster management: A Remote Sensing & GIS Perspective, Indian Institute of Remote Sensing (NRSA) Dehradun.
20. Sharma, R.K. & Sharma, G. (2005) (ed) Natural Disaster, APH Publishing Corporation, New Delhi.
21. Kasperson, J.X., R.E. Kasperson, and B.L. Turner III (Eds.), 1995. Regions at Risk: Comparisons of Threatened Environments, United Nations University Press, Tokyo
22. Singh Satendra (2003): Disaster Management in the Hills, Concept Publishing Company, New Delhi.
23. Taori, K (2005) Disaster Management through Panchayati Raj, Concept Publishing Company, New Delhi.

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