C. U. SHAH UNIVERSITY

Faculty: - Pharmaceutical Sciences
Department: Pharmaceutics & Pharmaceutical Technology
Semester: IV
Name of Subject: Physical Pharmacy -II (Theory)
Subject Code: 4PS04PHP2

Teaching & Evaluation Scheme:-

Sr. No	Branch Code	Subject Code	Subject Name	Teaching hours/ week				Credit	Evaluation Scheme/ Semester							
									Theory				Practical			Total
									Sessional Exam		University Exam		Internal		University	
				Th	Tu	Pr	Total		Marks	Hrs	Marks	Hrs	Pr	TW	Pr	
1	04	4PS04PHP2	Physical Pharmacy -II	3	0	3	6	4.5	20	1	70	3	20	--	70	200
									10 (CEC)	--			10 (CEC)	--		

Objectives: - The objectives of Physical Pharmaceutics are: To develop the knowledge behind the basic physical parameters which involves in pharmaceuticals.

Prerequisites: - To have a more thorough theoretical background in many of the topics covered in this course; students should have basic knowledge of physical properties of substance.

Course Content:-

Sr. No.	Course Contents	Hours
1	**Micromeritics:** Particle size and distribution, methods for determining particle size, particle shape and surface area, methods for determining surface area, derived properties of powders.	8
2	**Rheology:** Newtonian system, Non-Newtonian systems, thixotropy in formulation, determination of rheological properties, applications in pharmacy.	8
3	**Flow of Powders:** Introduction, methods to determine, factors affecting powder flow, pharmacopoeial specification of angle of repose, hausner's ratio, carr's index.	6
4	**Kinetics :** Rates and orders of reactions, physical and chemical degradation of pharmaceutical drugs and products, influence of temperature and other factors on reaction rates, accelerated stability study, Introduction to ICH guidelines.	10
5	**Complexation and Protein Binding:** Metal complexes, organic molecular complexes, Inclusion complex, protein binding	7
6	**Polymer science** Pharmaceutical applications of polymers, types of polymers, polymers in drug delivery systems, Introduction to synthetic polymers used in pharmacy	6
	Total	45

Faculty: - Pharmaceutical Sciences
Department: Pharmaceutics & Pharmaceutical Technology
Semester: IV
Name of Subject: Physical Pharmacy -II (Practical)
Subject Code: 4PS04PHP2

1. To determine the true density, bulk density and tapped density of given powder.
2. To determine the flow properties of powders by Carr's Index.
3. To determine the flow properties of powders by Hausner's ratio.
4. To determine the percentage porosity of given powder.
5. To determine the angle of repose of the given sample.
6. To determine the angle of repose of the given granules at different concentration of glidant.
7. To determine Particle Size and Size Distribution by sieving method.
8. To determine the average particle size of the given powder and to study their size distribution by microscopy.
9. To demonstrate the sedimentation method using Andersen pipette for measurement of particle size.
10. To determine the viscosity of given sample by Oswald's viscometer.
11. To determine the effect of temperature on viscosity by Oswald's viscometer.
12. To determine the effect of concentration on viscosity by Oswald's viscometer.
13. To determine the reaction rate constant and half life of an ester (methyl acetate or ethyl acetate) in 0.5 N hydrochloric acid at room temperature.
14. To determine the reaction rate constant and half life period of ethyl acetate in 0.025 N sodium hydroxide solution at room temperature.
15. To evaluate the Complexation behavior of caffeine and p-amino benzoic acid.

Learning Outcomes:-

- The course would help the student to achieve more confidence in terms of physical Pharmaceutics which is the basic requirement in pharmaceuticals.

Teaching & Learning Methodology:-

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

Books Recommended:

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, Lloyd 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, 8th edition, Bailliere Tindall, London, 2005.

E resources:

1. weitzlab.seas.harvard.edu/links/tutorials/introductiontorheology2.pdf
2. www.ich.org/
3. http://www.rxtimes.com/improving-powder-flow-during-pharmaceutical-operations/
4. http://www.gardco.com/pages/density/powderangle.cfm
5. http://www.pharmpro.com/articles/2007/07/handling-powder-flow-problem
6. http://www.collectionscanada.gc.ca/obj/s4/f2/dsk3/SSU/TC-SSU-07032006115722.pdf

C. U. SHAH UNIVERSITY

Faculty: - Pharmaceutical Sciences
Department: Pharmaceutics & Pharmaceutical Technology
Semester: IV
Name of Subject: Pharmaceutical Legislations & Ethics (Theory)
Subject Code: 4PS04PLE1

Sr. No	Branch Code	Subject Code	Subject Name	Teaching hours/ week				Credit	Evaluation Scheme/ Semester							
									Theory				Practical			Total
									Sessional Exam		University Exam		Internal		University	
				Th	Tu	Pr	Total		Marks	Hrs	Marks	Hrs	Pr	TW	Pr	
1	04	4PS04PLE1	Pharmaceutical Legislations & Ethics	2	0	0	2	2	20	1	70	3	--	--	--	100
									10 (CEC)	--			--	--		

Objectives: - The objectives of Pharmaceutical Legislations & Ethics are: To develop the knowledge behind the basic Pharmaceutical legislation, ethics and act which involves in pharmaceutical. It also provides the information regarding Drug Policy in various places in pharmacy.

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

Course Content:-

Sr. No	Course Contents	Hours
1	Pharmaceutical ethics and Pharmacy Act 1948	4
2	Medicinal and toilet preparations (excise duties) act, 1955	3
3	Narcotic drugs and psychotropic substances act 1985 and rules	4
4	Prevention of cruelty of Animal Act	2
5	Poison Act, The insecticides Act	2
6	Delhi Shop Establishment Act, The Factories Act, The industries (Development and Regulation) Act	2
7	Drug Policy 2002	3
8	Drug and Cosmetic act	4
9	Drug Price Control act	2
10	Drug and Magic Remedy act, Medical Termination of Pregnancy.	2
11	Patents Act and Trade and Merchandise Act	2
	Total	30

NOTE: The teaching of all the above acts should cover the latest amendments.

Learning Outcomes:-
The course would help the student to achieve more confidence in terms of Pharmaceutical Ethics and law.

Teaching & Learning Methodology:-

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

Books Recommended:

1. A text book of forensic pharmacy by B. M. Mithal, Vallabh Prakashan.
2. Drugs and cosmetics act 1940 by Vijay Mallik Eastern Book Company.
3. Pharmaceutical Jurisprudence by G.K. Jani, Atul Prakashan. Hospital Pharmacy by Hassan, Henry Kimpton Publishers, London.
4. Hospital Organization and Management by Kurt Dan and Jonathan S. Ratich, 4th Edition, CBS Publishers.
5. Drug and Cosmetic act and Rules by Vijay Mallik.
6. Remington: The Science and Practice of Pharmacy, Latest Education by Mack Publishers.
7. Hospital Pharmacy: Dr. R. K. Goyal and Parikh, B. S. Shah Publication.

E-Resources:

1. http://www.uspto.gov
2. http://ep.espacenet.com
3. http://www.wipo.int/pctdb/en
4. http://www.google.com/advanced_patent_search
5. http://india.bigpatents.org

C. U. SHAH UNIVERSITY

Faculty: - Pharmaceutical Sciences
Department: Pharmaceutical Chemistry and Pharmaceutical Analysis
Semester: IV
Name of Subject: Pharmaceutical Chemistry-IV (Medicinal Chemistry-I) (Theory)
Subject Code: 4PS04PCH4

Teaching & Evaluation Scheme:-

Sr. No	Branch Code	Subject Code	Subject Name	Teaching hours/ week				Credit	Evaluation Scheme/ Semester							
									Theory				Practical			
									Sessional Exam		University Exam		Internal		University	Total
				Th	Tu	Pr	Total		Marks	Hrs	Marks	Hrs	Pr	TW	Pr	
1	04	4PS04PCH4	Pharmaceutical Chemistry-IV (Medicinal Chemistry-I)	3	0	3	6	4.5	20	1	70	3	20	--	70	200
									10 (CEC)	--			10 (CEC)	--		

Objectives: -

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

Prerequisites:-

- Basic understanding of concepts related to Synthetic chemistry and heterocyclic compound

Course outline:

Sr. No.	Course contents	Hours
1.	An introduction to the subject of medicinal chemistry History and development of medicinal chemistry, Drug therapy	2
2.	Physiochemical properties of drug molecules influencing biological activity • Solubility, Partition coefficient, Hydrogen bonding, Complexation, Ionisation, Redox potential, Surface activity and protein binding • Stereochemical features of drugs: geometric and optical isomers Bioisosterism	10
3	**Drug metabolism:** introduction, phase I and II metabolic reactions, biological and environmental factors affecting drug metabolism, pro-drugs & related concepts, importance of cytochrome in drug metabolism **Drug receptor interaction:** basic introduction for receptor, transduction mechanisms and illustrative examples.	06
4	A study history, development, structure activity relationship, mechanism of action and synthesis* of following classes of drugs (*Synthesis of drugs mentioned in each category) Drugs acting on respiratory tract a. Antiasthmatics b. Expectorants	27

	c. Antitussive agents d. Respiratory stimulants e. Mucolytics f. Decongestants Drugs acting on gastrointestinal tract a. Antacids b. Antisecretary (Ranitidine) c. Proton pump inhibitors (Omeprazole) d. Antiemetics e. Antidiarrhoeal f. Laxatives g. Prokinetics h. Antispasmodics and drug modifying intestinal motility i. Drugs for irritable bowel syndrome j. Local colorectal preparations k. Enzymes, carminatives and hepatobiliary preparations iii. Autocoids a. Histamines and antihistamines, Histamine receptors, H_1 antagonists, H_2antagonists (histamines, diphenhydramine, tripelenamine, chlorcylclizine, trimeprazine, chlorpheniramine, promethazine, cyproheptadiene, antazoline, cetrizine) b. Eicosanoids: history and discovery, eicosanoids biosynthesis, drug action mediated by eicosanoids, eicosanoids approved for human clinical use. iv. Diagnostic agents: Radiopharmaceuticals, Radiological contrast media (diphenoxylate, diatrizoic acid, sodium iothalamate)	
	Total	45

C. U. SHAH UNIVERSITY

Faculty: - Pharmaceutical Sciences
Department: Pharmaceutical Chemistry and Pharmaceutical Analysis
Semester: IV
Name of Subject: Pharmaceutical Chemistry-IV
(Medicinal Chemistry-I) (Practical)
Subject Code: 4PS04PCH4

Detailed Syllabus (Practical):

No.	Aim of the Practical
1	Organic spotting of binary mixtures of solid + solid (water insoluble compounds) mixture type along with identification of the type of mixture, chemical separation, identification of the individual components, establishment of the identity of the separated components with the help of derivative preparation and TLC.(Minimum 7)
2	Preparation of stereo models of some selected drugs.
3	1. Synthesis of 2-methyl benzimidazole from *o*-phenylene diamine
	2. Synthesis of benzotriazole from *o*-phenylenediamine
	3. Synthesis of benzimidazole from *o*-phenylene diamine
	4. Synthesis of pthalamide from pthalic anhydride

Students learning outcomes/objectives:

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

Instructional methods and pedagogy:

- Using blackboard and one-way communication from a teacher to a student. Using an overhead and LCD projector

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
4. Daniel Lednicer, Strategies for organic drug synthesis and design, John Wiley and Sons USA
5. B. N. Ladu, H. G. Mandel and E. L. Way. Fundamentals of drug metabolism and

disposition. William and Willkins co. Baltimore
6. I. L. Finar. Organic chemistry Vol. I and Vol. II. ELBS/Longman, London
7. Vogels Text books practical organic chemistry, ELBS/Longman, London
8. Mann and Saunders, Practical organic chemistry, Orient Longman, UK
9. Shriner, Hermann, Morill, Curtin and Fusion. The systematic identification of organic compounds, John Wiley and Sons
10 Strategies for Organic Drug Synthesis & Design by Daniel Lednicer, John Wiley & sons, USA.
11. Practical Organic Chemistry by Mann & Saunder,, Orient Longman, London.

C. U. SHAH UNIVERSITY

Faculty: - Pharmaceutical Sciences
Department: Pharmaceutical Chemistry and Pharmaceutical Analysis
Semester: IV
Name of Subject: Pharmaceutical Biochemistry- II (Theory)
Subject Code: 4PS04PBC2

Teaching & Evaluation Scheme:-

Sr. No	Branch Code	Subject Code	Subject Name	Teaching hours/ week				Credit	Evaluation Scheme/ Semester							
									Theory				Practical			Total
									Sessional Exam		University Exam		Internal		University	
				Th	Tu	Pr	Total		Marks	Hrs	Marks	Hrs	Pr	TW	Pr	
1	04	4PS04PBC2	Pharmaceutical Biochemistry II	3	0	2	5	4	20	1	70	3	20	--	70	200
									10 (CEC)	--			10 (CEC)	--		

Objectives: -

- This course is designed as an introduction to the organic structure of living systems. Lecture will address details of Proteins, nucleic acid, and enzymes and their metabolism.An understanding of biochemistry is a useful background for many areas of scientific study.It relates the studies of biology and chemistry, allowing an integration of knowledge from both areas of coursework

Prerequisites:-

- Basic understanding of concepts enzymes, biomolecules and basic chemistry

Course outline:-

Sr. No.	Course contents	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
	Total	45

C. U. SHAH UNIVERSITY

Faculty: - Pharmaceutical Sciences
Department: Pharmaceutical Chemistry and Pharmaceutical Analysis
Semester: IV
Name of Subject: Pharmaceutical Biochemistry- II (Practical)
Subject Code: 4PS04PBC2

Detailed Syllabus (Practical):

1	Identification of various proteins (Gelatine, 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…) Thin Layer Chromatography (TLC).
16	To estimate calcium in serum.
17	Colourimetirc analysis of Bilirubin and cholesterol in plasma.
18	Estimation of uric acid in urine.

Learning Outcomes:-

The students are expected to

- Learn the biochemistry aspects specifically, the metabolism, nitrogen and sulphur cycles, gene code in protein formation, chemistry basic information regarding DNA and its replication, RNA types and its transcription and translation etc.
- Understand basic idea of enzymes, protein, vitamins and biological oxidation process in living cells.
- Understand concept of chemistry of living systems which will further help in understanding of drug interaction in the body, drug-protein binding etc.

Teaching Methodology:-

- The faculty shall explain the lectures using black board, using Over Head Projector, Multimedia projector.

Books recommended:

1. E. E. Conn and P. K. Stump, 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. Zubay, 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. McLauchlan, Varley's Practical clinical biochemistry, Heinemann professional publishing.
12. P. G. Tikekar, Practical Biochemistry.

C. U. SHAH UNIVERSITY

Faculty: - Pharmaceutical Sciences
Department: Pharmacognosy
Semester: IV
Name of Subject: Pharmacognosy-III (Theory)
Subject Code: 4PS04PCOG3

Teaching & Evaluation Scheme:-

Sr. No	Branch Code	Subject Code	Subject Name	Teaching hours/ week				Credit	Evaluation Scheme/ Semester							
									Theory				Practical			
									Sessional Exam		University Exam		Internal		University	Total
				Th	Tu	Pr	Total		Marks	Hrs	Marks	Hrs	Pr	TW	Pr	
1	04	4PS04COG3	Pharmacognosy III	3	0	3	6	4.5	20	1	70	3	20	--	70	200
									10 (CEC)	--			10 (CEC)	--		

Objectives: - The main objective of this course is to familiarize the students with the basic aspects of Pharmacognosy. Knowledge regarding exploiting the full potential of herbs may be gained from this course.

Prerequisites:-The students should have a clear concept of Botany.

Course outline:-

Sr. No	Course Contents	Hours
1	Enzymes: Biological sources, preparation, identificatoion test and uses of following Diastase, Papain, Pepsin, Trypsin, Pancreatin	05
2	Study of the biological sources, cultivation, collection, commercial varieties, chemical constituents, substitutes, adulterants, uses, diagnostic macroscopic and microscopic features and specific chemical tests of following groups of drugs containing glycosides: i. Saponins: Liquorice , ginseng, dioscorea, Senega, Sarsaparila, Quillaia ii. Cardioactive sterols: Digitalis , squill, strophanthus, Thevetia iii. Anthraquinone cathartics: Aloe, senna , rhubarb, cascara, Cassia iv. Bitter glycosides: Gentian, picrorrhiza, chirata , kalmegh, Quassia v. Coumarins: Psoralea , Ammi majus , Ammi visnaga vi. Cyanogenetic glycosides: Almond, Linseed vii. Isothiocyanate glycosides: Mustard, Black mustard viii. Flavanoids: Rutagraveolens	25
3	Resins: Study of drugs containing resins and resins combination like Podophyllum, Jalap, Capsicum, Myrrh, Asafetida, Benzoin, Turmeric, Ginger.	10
4	Tannins : Study of tannins containing drugs like Gambir, Black catechu	5
	Total	45

Faculty: - Pharmaceutical Sciences
Department: Pharmacognosy
Semester: IV
Name of Subject: Pharmacognosy-III (Practical)
Subject Code: 4PS04PCOG3

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

1. General chemical tests for Resin, tannins and glycosides.
2. Identification of crude drugs listed in theory.
3. Microscopic study of underlined important glycoside containing crude drugs.

Learning Outcomes:-

- The student would have gained knowledge regarding herbal drugs, i.e: carbohydrates lipids as well as volatile oils which is of almost importance.

Teaching Methodology:-

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

Books Recommended:

1. Pharmacognosy, Trease G.E. and Evans, W.C., Bailliere Tindall, Eastbourne, U.K
2. Pharmacognosy, Kokate C.K., Purohit A.P. and Gokhale S.B, Nirali Prakashan.
3. Study of Crude drugs, Iyengar M.A.and Nayak S.G.K. Manipal Power Press, Manipal.
4. Anatomy of Crude Drugs, Iyengar M.A.and Nayak S.G.K, Manipal Power Press, Manipal.
5. Practical Pharmacognosy, Kokate C.K., Vallabh Prakashan.
6. The chemotaxonamy of Plants. Smith P.M, Edinburgh.
7. Quality Control of Plants. WHO publication.
8. A Text book of Pharmacognosy: C. S. Shah, J. S. Quadry, B. S. Shah Prakashan, Ahmedabad. 13th Edition, 2007-08.
9. 4. Textbook of Pharmacognosy: T. E. Wallis, CBS Publishers and Distributors, New Delhi, 5th Edition, reprinted, 2003.

C. U. SHAH UNIVERSITY

Faculty: - Pharmaceutical Sciences
Department: Pharmacology
Semester: IV
Name of Subject: Pharmacology I (Theory)
Subject Code: 4PS04COL1

Teaching & Evaluation Scheme:-

Sr. No	Branch Code	Subject Code	Subject Name	Teaching hours/ week				Credit	Evaluation Scheme/ Semester							
									Theory				Practical			Total
									Sessional Exam		University Exam		Internal		University	
				Th	Tu	Pr	Total		Marks	Hrs	Marks	Hrs	Pr	TW	Pr	
1	04	4PS04COL1	Pharmacology I	3	0	3	6	4.5	20	1	70	3	20	---	70	200
									10 (CEC)	--			10 (CEC)			

Objective of Course: Introductory exploration and analysis of selected topics in pharmacology with a specific theme indicated by course title listed in a syllabus. This subject will take three times for credit as long as different topics are selected. (3 lecture hours)

Prerequisites: pharmacology studies required in a fourth semester, it is the base (core) of the major subjects in pharmaceutical studies like Bio pharmaceutics and Biochemistry.

Course outline:-

Sr. No.	Course Contents	Hours
1	**General pharmacology** a. Introduction and scope of pharmacology b. Sources of drugs and nomenclature of drugs c. Dosage forms and routes of administration. d. **Pharmacokinetics:** Drug absorption and bio- avaibility of a drug Distribution, Biological half life and its significance, drug distribution, drug metabolism, drug excretion, Methods prolonging the duration of action of a drug e. **Pharmacodynamics:** Mechanism of drug action, site of drug action, drug receptors, dose response relationship, combined effects of drugs, f. **Drug interactions:** Classify drug interaction based on mechanisms (pharmacokinetic types and pharmacodynamic types), drug food interaction. g. **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, mutagenecity, teratogenicity, carcinogenicity, photosensitivity, drug withdrawal reactions, drug tolerance and dependence. h. **Development of new drugs:** Animal Toxicity study (acute, sub-acute and chronic), clinical trials (various Phases)	24
2	**Pharmacology of peripheral Nervous system** a. Neurohumoral transmission (autonomic and somatic)	14

	b. Parasympathomimetics, Parasympatholytics, Sympathomimetics, adrenergic receptor and neuron blocking agents c. Ganglionic stimulants and blocking agents Neuromuscular blocking agents. d. Anaesthetics: Local anaesthetics	
3	**Autacoids** a. Histamine, 5-HT and their antagonists. b. Prostaglandins, Thromboxane and Leukotrienes. c. Pentagastrin, Cholecystokinin, Angiotensin, Bradykinin and substance P	07
	Total	45

C. U. SHAH UNIVERSITY

Faculty: - Pharmaceutical Sciences
Department: Pharmacology
Semester: IV
Name of Subject: Pharmacology I (Practical)
Subject Code: 4PS04COL1

Detailed Syllabus (Practical):

Sr. No	Course Contents
1	**Introduction to experimental pharmacology** a. Preparation of different solutions for experiments. Drug dilutions, use of molar and W/V solutions in experimental pharmacology. b. Common laboratory animals. c. Legal regulations for the use of experimental animals. d. Anaesthetics used in animal studies. e. Instruments in experimental pharmacology. f. Some common and standard techniques for drug administration (intravenous injection, intra gastric administration). g. Collection of blood samples. Euthanasia of laboratory animals.
2	**To record the concentration response curve:** a. To record the concentration response curve (CRC) of acetylcholine using rat ileum/chicken preparation. b. To study the effect of atropine on concentration response curve (CRC) of acetylcholine using rat/chicken ileum preparation. c. To record the concentration response curve (CRC) of Histamine on guinea pig/chicken ileum. d. To study the effect of mepyramine on concentration response curve (CRC) of Histamine using guinea pig /chicken ileum preparation
3	To study the effects of BaCl2, physostigmine, and papaverine using rat/guinea pig/chicken ileum preparation
4	**Demonstration Experiments** a. Experiments on urinary excretion of drugs/their metabolites. b. To study the effects of autonomic drugs on rabbits eye c. To study the effects of autonomic drugs on rabbits eye. d. To study the effect of hepatic microsomal enzyme inhibitors and inducers on pentobarbitone sleeping time e. To study the effects of various drugs on rat funds preparation. f. To study the effects of various drugs on rat anococcygeus muscle preparations. g. To study the effects of various drugs on rat vas deference preparations.

Learning Outcomes:

- Define and correctly use scientific terminology in regard to human body and processes.
- Apply principles of scientific inquiry, differentiate a theory from a hypothesis, and differentiate fact from opinion in regard to use of drugs in different human system.
- Describe and practice laboratory safety guidelines relating to working with drugs, experimental animals and body fluids.

- Show proficiency in taking lab practical exams, responding to questions quickly and accurately, effectively handling the pressure of a timed exam.

Teaching & Learning Methodology:-

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

Books Recommended:

1. Guyton Rang, H.P. & Dale, M.M. Pharmacology. 4th edition, 1999. Publisher: Churchill Living stone.
2. Katzung, B.G. Basic and clinical pharmacology. Latest edition. Publisher: Prentice Hall, Int.
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 McGraw Hill, Pergamon press.
4. Satoskar, R.S. and Bhadarkar, S.D. Pharmacology and Pharmacotherapeutics. 16th edition (single volume), 1999. Publisher: Popular, Dubai.
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.

C. U. SHAH UNIVERSITY

Faculty: - Pharmaceutical Sciences
Department: General
Semester: IV
Name of Subject: Professional Communication Skill
Subject Code: 4PS04PCS1

Teaching & Evaluation Scheme:-

Sr. No	Subject Code	Subject Name	Teaching hours/ week				Credit	Evaluation Scheme/ Semester							
								Theory				Practical			
								Sessional Exam		University Exam		Internal		University	Total
			Th	Tu	Pr	Total		Marks	Hrs	Marks	Hrs	Pr	TW	Pr	
1	4PS04PCS1	Professional Communication Skill	2	0	0	2	2	20	1	70	3	---	---	---	100
								10 (CEC)	--						

Objectives: - To impart basic skills of communication in English through intensive practice to the students of Pharmacy so as to enable them to function confidently and effectively in that language in the professional sphere of their life.

Prerequisites: - English is an International Language so basic knowledge of English is desirable.

Course Content:-

Sr. No	Course Contents	Hours
1	**Grammar vocabulary- 2** • Homonyms, Homophones • Direct –Indirect • Causal words. • Synonyms, antonyms	04
2	**Basic Fundamentals of Communication** • Meaning, definition, objectives & Characteristics /nature of Communication • Non-verbal Communication • Communication Process, flow of Communication • Introduction to Professional Communication • Principles of Professional Communication • Ethos, Pathos, Logos, Kairos in Professional Communication Communication Networks	06
3	**Business & Technical Letter Writing** • Introduction to Letter Writing • Personal Letter Vs Business Letter • Style of writing Business Letter • Principles of writing Business Letter • Layout of Business Letter • Types of Letter – Inquiry, order, quotation, claim & adjustment, sales, credits & Circular	06

4	**Report Writing & Research Paper** • Introduction to Report, Importance, Objectives of report • Characteristics of Report • Types of Report • Lay out & Structure of report • Project-(Mini Report Submission) • Introduction to Research Paper? How to write it? How to publish in the Journal?	06
5	**Proposal Writing** • Introduction to Proposal, Definition & Purpose of Proposal • Types, Characteristics of Proposal • Structure of Proposal	04
6	**Interviews:** • Introduction • Objectives of interviews. • Types of interviews. • Preparation and process	02
7	**Resume building:** • Job specific resume. • Resume pack. • How to draft Forwarding Letter	02
	Total	30

Learning Outcomes:-

The course would help the student to achieve more confidence in terms of conversation/communication.

Teaching & Learning Methodology:-

The topics must be conveyed through plenty of examples. Lecture classes must be conducted as lecture-cum-tutorial classes. It is a course that aims to develop skills and therefore "practical" in orientation. Plenty of exercises of various kinds must be done by the students both inside and outside the classroom. The teacher must not depend on a single or a set of two or three text books, but choose his/her materials from diverse sources. Keeping in view the requirements of his/her students, the teacher may have to prepare some teaching and exercise material. For practice in listening, good tape recorders can be used if the more advanced facilities (for example, language laboratory) are not available. In fact they can be used very fruitfully. The teacher must function as a creative monitor in the class-room. Minimum time should be spent in teaching phonetic symbols, stress, intonation, etc. The aim should be to enable the students to find out for him/herself the correct pronunciation of a word from a learner's dictionary. In teaching speaking, emphasis should be on clarity, intelligibility and reasonable fluency rather than on "correct" pronunciation of words. Classroom presentation and group discussion sessions should be used to teach speaking.

Books Recommended:

1. Mark McCormack : "Communication"
2. John Metchell " How to write reports"

3. S R Inthira & V Saraswathi " Enrich your English – a) Communication skills b) Academic skills " Publisher CIEFL & OUP
4. R.C. Sharma and K. Mohan , "Business Correspondence and Report Writing " , Tata McGraw Hill , New Delhi , 1994
5. L. Gartside , "Model Business Letters" , Pitman , London, 1992
6. Longman, "Longman Dictionary of Contemporary English" (or 'Oxford Advanced Learner's Dictionary of Current English', OUP, 1998.
7. Maxwell Nurnberg and Rosenblum Morris, "All About Words", General Book Depot, New Delhi , 1995

E-Resources:

1. www.edufind.com/english/grammar/
2. www.englishclub.com › Learn English
3. www.englishgrammarsecrets.com/
4. www.englishleap.com/grammar