Sanjivani Rural Education Society'

Sanjivani College of Pharmaceutical Education and Research,

Kopargaon

(An Autonomous Institute Affiliated to Savitribai Phule University Pune)

(Approved by AICTE, PCI New Delhi)

NBA and **NAAC 'A' Accredited, CII Platinum & NIRF Rank**

Detailed Syllabus structure and Syllabus for the First Year B. Pharm

Choice Based Credit System (CBCS)

Effective for F. Y. B. Pharm from Academic Year 2022-2023

Table-I: Course of study for Semester I

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP101T	Human Anatomy and Physiology I– Theory	3	1	4
BP102T	Pharmaceutical Analysis I – Theory	3	1	4
BP103T	Pharmaceutics I – Theory	3	1	4
BP104T	Pharmaceutical Inorganic Chemistry – Theory	3	1	4
BP105T	Communication skills – Theory	2	-	2
BP106RBT BP106RMT	Remedial Biology/ Remedial Mathematics – Theory	2	-	2
BP107P	Human Anatomy and Physiology – Practical	4	-	2
BP108P	Pharmaceutical Analysis I – Practical	4	-	2
BP109P	Pharmaceutics I – Practical	4	-	2
BP110P	Pharmaceutical Inorganic Chemistry – Practical	4	-	2
BP111P	Communication skills – Practical	4	-	1
BP112RBP	Remedial Biology – Practical	4	-	1
BP107MLC	Functional English-I	02	-	-
Total		**34/36$/40#**	**4**	**27/29$/30#**

#Applicable ONLY for the students who have studied Mathematics/Physics/Chemistry at HSC and will be appearing for the Remedial Biology (RB) course**.**

$Applicable ONLY for the students who have studied Physics/Chemistry/Botany/Zoology at HSC and will be appearing for the Remedial Mathematics (RM) course**.**

Table-II: Course of study for Semester II

Course Code	Name of the course	No. of hours	Tutorial	Credit points
BP201T	Human Anatomy and Physiology II – Theory	3	1	4
BP202T	Pharmaceutical Organic Chemistry I – Theory	3	1	4
BP203T	Biochemistry – Theory	3	1	4
BP204T	Pathophysiology – Theory	3	1	4
BP205T	Computer Applications in Pharmacy – Theory	3	-	3
BP206T	Environmental sciences – Theory	3	-	3
BP207P	Human Anatomy and Physiology II – Practical	4	-	2
BP208P	Pharmaceutical Organic Chemistry I– Practical	4	-	2
BP209P	Biochemistry – Practical	4	-	2
BP210P	Computer Applications in Pharmacy – Practical	2	-	1
BP207 MLC	Functional English-II	2	-	-
Total		**32**	**4**	**29**

SEMESTER I

Syllabus of First Year B. Pharm. (CBCS)

SUBJECT: BP101T. Human Anatomy and Physiology I
(THEORY 45 HOURS)

Teaching Scheme	**Examination Scheme:**
Lectures: 03Hr/Week	In SEM Exam:25 Marks
Practical:	End SEM Exam:75 Marks
Tutorials: 01Hr/Week	Continuous Assessment: 10 Marks
Credits: 4	Total Marks: 100 Marks

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.

Course Objectives:

Upon completion of the course a student shall be able to understand -

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

Course Outcomes:

CO's	**Course Outcomes**	**Bloom Taxonomy**	
		Level	**Descriptor**
CO1	basic concepts of human body and cellular level of organization	1	Recall facts and basic concept
CO2	Tissue levels of organization, structure and function of skin	2	Explain ideas or concept
CO3	skeletal systems, bones and joints and their functions	2	Explain ideas or concept
CO4	Composition and function of blood and lymphatic system	2	Explain ideas or concept
CO5	Classification, structures and functions of peripheral nervous system and special senses including skin	2	Explain ideas or concept
CO6	complete cardiovascular system	2	Explain ideas or concept

Mapping of Course Outcomes to Program Outcomes:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
CO1	3	-	-	2	-	-	-	-	-	-	3
CO2	3	-	-	2	-	-	-	-	-	-	3
CO3	3	-	-	2	-	-	-	-	-	-	3
CO4	3	-	-	2	-	-	-	-	-	-	3
CO5	3	-	-	2	-	-	-	-	-	-	3
CO6	3	-	-	2	-	-	-	-	-	-	3

Course Content

Syllabus of First Year B. Pharm. (CBCS)

Unit	Details	Hrs	References
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, Molecular biology definition & Introduction of concept, PCR (reverse transcription and real time), ELISA, Western blotting (4Hrs) Cell division, cell junctions. General principles of cellcommunication, intracellular signalling pathway activation byextracellular signal molecule, Forms of intracellular signalling: 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	1.Ross & Wilson Anatomy and Physiology 2.Tortora's Principles of Anatomyand Physiology. 3.Basic anatomy and Physiology by Dr.N. Murgesh 4. Human anatomy and Physiologyby S. Chaudhari and A. Chaudhari 5. Essential Pathology by Harsh Mohan 6.Human Physiology by Pearson Publications. 7. Elements of Biotechnology by Dr. P K Gupta Rastogi Publications
2	• **Integumentary system** Structure and functions of skin. Disorders of skin (1 Hr) • **Skeletal system** Divisions of skeletal system, types of bone, salient features and functions of bones of axial and appendicular skeletal systemOrganization of skeletal muscle, physiology of muscle contraction, neuromuscular junction • **Joints** Structural and functional classification, types of joints movements and its articulation	10	1.Gray's Anatomy and Physiologyby Richard Drake and Wayan Vogel 2.B.D. Chourasia's Human anatomy Volume 3. 3.Ross & Wilson Anatomy and Physiology 4.Tortora's Principles of Anatomyand Physiology. 5.Basic anatomy and Physiology by Dr.N. Murgesh 6.Human Physiology by Pearson Publications.
3	• **Body fluids and blood** • Body fluids, composition and functions of blood, hemopoeisis, formation of hemoglobin, anemia, mechanisms of coagulation,blood grouping, Bombay Blood Group (1Hr.),Rh factors, transfusion, its significance and disorders of blood, Reticuloendothelial system. • **Lymphatic system** Lymphatic organs and tissues, lymphatic vessels, lymph circulation and functions of lymphatic system	10	1.Ross & Wilson Anatomy and Physiology 2.Tortora's Principles of Anatomyand Physiology. 3.Basic anatomy and Physiology by Dr.N. Murgesh 2.Human anatomy and Physiologyby V.N Raje 3. Human anatomy and Physiology Dr.S.B. Bhise and Dr.A.V. Yadav 4. Human anatomy and Physiologyby S. Chaudhari and A. Chaudhari

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. Eye Donation (1Hr)	8	1. B.D. Chourasia's Human anatomy Volume 3. 2.Ross & Wilson Anatomy and Physiology 3.Tortora's Principles of Anatomy and Physiology. 4.Basic anatomy and Physiology by Dr.N. Murgesh 5. Eye Donation : i) Online literature from impact factor journals for updated literature and animated videos from Internet
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 heartbeat, its regulation by autonomic nervous system, cardiac output, cardiac cycle. Regulation of blood pressure, pulse, electrocardiogram and disorders of heart. Heart Transplantation (1Hr.) Non-Pharmacological activity for disorders of the heart. (1 Hr.)	7	1.Ross & Wilson Anatomy and Physiology 2.Tortora's Principles of Anatomy and Physiology. 3.Basic anatomy and Physiology by Dr.N. Murgesh 2.Human anatomy and Physiologyby V.N Raje 3. Human anatomy and Physiology Dr.S.B. Bhise and Dr.A.V. Yadav 4. Human anatomy and Physiologyby S. Chaudhari and A. Chaudhari 5. Heart Transplantation: Online literature from impact factor journals for updated literature and animated videos from Internet ii) For Further reading Clinical Guide to Heart Transplantation by Jon Kobashigawa- available online as pdf book 6. Essentials of Medical Pharmacology By K.D.Tripathi. (8^{th} Edition)
	TOTAL	**45**	

Syllabus of First Year B. Pharm. (CBCS)

Human Anatomy and Physiology I (Practical)
4 Hours / Week
SUBJECT: BP107P Human Anatomy and Physiology I
(PRACTICAL 60 HOURS)

Teaching Scheme	**Examination Scheme:**
	In SEM Exam:15 Marks
Practical: 04Hr/Week	End SEM Exam:35 Marks
Credits: 2	Total Marks: 50 Marks

Course Outcomes:

CO's	**Course Outcomes**	**Bloom Taxonomy**	
		Level	**Descriptor**
CO 1	Compound microscope, epithelial, connective, muscular andnervous tissue	1	Recall facts andbasic concept
CO 2	axial and appendicular bones	1	Explain ideas or concept
CO 3	hemocytometry, RBC and WBC count	2,3,4	Understanding, Applying, Analyzing
CO 4	bleeding time and clotting time	3,4	Applying, Analyzing
CO 5	haemoglobin content and blood group detection	3,4	Applying, Analyzing
CO 6	ESR, heart rate, pulse rate and blood pressure	3,4	Apply, Analyzing

Mapping of Course Outcomes to Program Outcomes:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
CO1	3	-	-	2	-	-	-	-	-	-	3
CO2	3	-	-	2	-	-	-	-	-	-	3
CO3	3	-	-	2	-	-	-	-	-	-	3
CO4	3	-	-	2	-	-	-	-	-	-	3
CO5	3	-	-	2	-	-	-	-	-	-	3
CO6	3	-	-	2	-	-	-	-	-	-	3

Course Content

Sr. No.	**Name of Experiment**	**Duration**	**References**
1.	Study of compound microscope.	**4**	1.Practical Anatomy and Physiology by Dr.R. K Goyal and Dr.N.M Patel 2.Text book of Medical physiology- Arthur C, Guytonand John. E. Hall. 3.Human Physiology by Dr. C.C. Chatterjee.

2.	Microscopic study of epithelial and connective tissue	**4**	1.Practical Anatomy and Physiology by Dr.R. K Goyaland Dr.N.M Patel 2.Text book of Medical Physiology- Arthur C, Guytonand John. E. Hall. 3.Human Physiology by Dr. C.C. Chatterjee.
3.	Microscopic study of muscular andnervous tissue	**4**	1.Practical Anatomy and Physiology by Dr.R. K Goyaland Dr.N.M Patel 2.Text book of Medical Physiology- Arthur C, Guytonand John. E. Hall. 3.Human Physiology by Dr. C.C. Chatterjee.
4.	Identification of axial bones	**4**	1.Practical Anatomy and Physiology by Dr.R. K Goyaland Dr.N.M Patel 2.Text book of Medical Physiology- Arthur C, Guytonand John. E. Hall. 3.Human Physiology by Dr.C.C. Chatterjee.
5.	Identification of appendicular bones	**4**	1.Practical Anatomy and Physiology by Dr.R. K Goyaland Dr.N.M Patel 2.Text book of Medical Physiology- Arthur C, Guytonand John. E. Hall. 3.Human Physiology by Dr. C.C. Chatterjee.
6.	Introduction to hemocytometry.	**4**	1.Laboratory Manual & Journal of Physiology byDr.V.G. Ranade. 2.Practical Anatomy and Physiology by Dr.R. K Goyal and Dr.N.M Patel
7.	Enumeration of white blood cell (WBC) count	**4**	1.Practical Physiology by G.K. Pal 2. Laboratory Manual & Journal of Physiology byDr.V.G. Ranade. 3.Practical Anatomy and Physiology by Dr.R. K Goyaland Dr.N.M Patel
8.	Enumeration of total red bloodcorpuscles (RBC) count	**4**	1.Practical Physiology by G.K.Pal 2. Laboratory Manual & Journal of Physiology byDr.V.G. Ranade. 3.Practical Anatomy and Physiology by Dr.R. K Goyaland Dr.N.M Patel
9.	Determination of bleeding time	**4**	1.Practical Physiology by G.K.Pal 2. Laboratory Manual & Journal of Physiology byDr.V.G. Ranade. 3.Practical Anatomy and Physiology by Dr.R. K Goyaland Dr.N.M Patel
10.	Determination of clotting time	**4**	1.Practical Physiology by G.K.Pal 2. Laboratory Manual & Journal of Physiology byDr.V.G. Ranade. 3.Practical Anatomy and Physiology by Dr.R. K Goyaland Dr.N.M Patel
11.	Estimation of haemoglobin content	**4**	1.Practical Physiology by G.K.Pal 2. Laboratory Manual & Journal of Physiology byDr.V.G. Ranade. 3.Practical Anatomy and Physiology by Dr.R. K Goyaland Dr.N.M Patel
12.	Determination of blood group.	**4**	1.Practical Physiology by G.K.Pal 2. Laboratory Manual & Journal of Physiology byDr.V.G. Ranade. 3.Practical Anatomy and Physiology by Dr.R. K Goyal

13.	Determination of erythrocytesedimentation rate (ESR).	**4**	1.Practical Physiology by G.K.Pal 2. Laboratory Manual & Journal of Physiology byDr.V.G. Ranade. 3.Practical Anatomy and Physiology by Dr.R. K Goyaland Dr.N.M Patel
14.	Determination of heart rate and pulserate.	**4**	1.Practical Physiology by G.K.Pal 2. Laboratory Manual & Journal of Physiology byDr.V.G. Ranade. 3.Practical Anatomy and Physiology by Dr.R. K Goyaland Dr.N.M Patel
15.	Recording of blood pressure.	**4**	1.Practical Physiology by G.K.Pal 2. Laboratory Manual & Journal of Physiology byDr.V.G. Ranade. 3.Practical Anatomy and Physiology by Dr.R. K Goyaland Dr.N.M Patel
16	Visit to blood bank	**4**	----
17	ECG Recording Human/Animal	**4**	----
18	Preparation of Histological slides	**4**	1.A Book of Biological Techniques by Dr. Kishore R Pawar and Dr. Ashok E. Desai, Nirali Prakashan
19	Hospital Visit	**4**	----

Syllabus of First Year B. Pharm. (CBCS)

SUBJECT: BP102T. PHARMACEUTICAL ANALYSIS I

(THEORY 45 HOURS)

Teaching Scheme	**Examination Scheme:**
Lectures: 03Hr/Week	In SEM Exam:25 Marks
Practical:	End SEM Exam:75 Marks
Tutorials: 01Hr/Week	Continuous Assessment: 10 Marks
Credits: 4	Total Marks: 100 Marks

Scope

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

Course Objectives:

Upon completion of the course a student shall be able to understand -

- The principles of volumetric and electrochemical analysis.
- Carry out various volumetric and electrochemical titrations.
- Develop analytical skills.

Course Outcomes:

CO's	**Course Outcomes**	**Bloom Taxonomy**	
		Level	**Descriptor**
CO 1	The students should be able to understand the fundamentals of analytical chemistry and Pharmaceutical analysis - Definition and scope: i) Different techniques of analysis ii) Methods of expressing concentration iii) Primary and Secondary standards.	1	Recall facts and basic concept
CO 2	To clarify basic principles of Pharmaceutical Analysis: Errors : Sources of errors, types of errors, methods of minimizing errors, accuracy, precision and significant figures	2	Explain ideas or concept
CO 3	To explain basic concepts and principles of aqueous and non-aqueous acid base titrations.	3	Apply
CO 4	To clarify different terms, types and basic principles and Understand the applications of precipitation, Complexometric titration and gravimetric analysis.	3	Apply
CO 5	To clarify different terms, types and basic principles and Understand the applications of Redox Titrations	3	Apply
CO 6	To understand the basic concepts of Electrochemical methods of analysis, e.g. Conductometry, Potentiometry, Polarography and Refractometry	3	Apply

Mapping of Course Outcomes to Program Outcomes:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
CO1	3	-	1	-	-	-	-	-	-	-	1
CO2	2	1	-	-	-	-	-	-	-	-	2
CO3	2	-	1	2	-	-	-	-	-	-	1
CO4	2	-	1	2	-	-	-	-	-	-	1
CO5	2	-	1	2	-	-	-	-	-	-	1
CO6	2	-	1	2	-	-	-	-	-	-	1

Syllabus of First Year B. Pharm. (CBCS)

COURSE CONTENTS

Unit	Details	Hrs	References
1	**(a) Pharmaceutical analysis**- Definition andscope 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 cericammonium sulphate **(b)Errors:** Sources of errors, types of errors,methods of minimizing errors, accuracy, precision and significant figures (c)Pharmacopoeia, Sources of impurities inmedicinal agents, limit tests.	**10**	**1.** Vogel, A. I., A Textbook of Quantitative Chemical Analysis, ThamesPolytechnic, London, Longman Group, UK Ltd. 2. Indian Pharmacopoeia, Ministry ofHealth and Family Welfare, Controller of Publications Edition, New Delhi. **3.** Skoog, A. D. West, D. M. et al. Fundamentals of Analytical Chemistry. 8/ Ed. Thomson Brookslcole. **4.** Kar Ashutosh, Pharmaceutical Drug Analysis, Minerva Press,New Delhi.
2	**Acid base titration**: Theories of acid baseindicators, classification of acid base titrations and theory involved intitrations of strong, weak, and very weak acids and bases, neutralization curves • **Non aqueous titration**: Solvents, acidimetryand alkalimetry titration and estimation of Sodium benzoate and EphedrineHCl	**10**	**1.** Vogel, A. I., A Textbookof Quantitative Chemical Analysis, Thames Polytechnic, London, Longman Group, UK Ltd. **2.** Connors K. A., A Textbook of Pharmaceutical Analysis, Third Edition, JohnWiley and Sons. **3.** Christian G.D,Analytical Chemistry, 6/Ed,John Wiley & Sons.
3	• **Precipitation titrations**: Mohr's method, Volhard's, Modified Volhard's, Fajans method, estimation of sodiumchloride. • **Complexometric titration**: Classification,metal ion indicators, maskingand demasking reagents, estimation of Magnesium sulphate, and calcium gluconate. • **Gravimetry**: Principle and steps involved in gravimetric analysis. Organic and inorganic precipitants, Ostwald's ripening, Degree of supersaturation (Von Weimarn ratio), Purity ofthe precipitate: co-precipitation and post precipitation, Estimation of barium sulphate, Assay of Aluminium by oxinereagent • **Nitrite titrations**: Basic Principles, methodsand application of diazotisation titration, Concept of external indicator, Assay of Sulphacetamide sodium	**10**	**1.** Beckett, A.H. and Stenlake J. B., Practical Pharmaceutical Chemistry,Vol I, Stahlome Press, University of London. Vogel, A. I., A Textbook of Quantitative Chemical Analysis, ThamesPolytechnic, London, Longman Group, UK Ltd. **3.** Connors K. A., A Textbook of Pharmaceutical Analysis, Third Edition, JohnWiley andSons. **4.** Christian G. D, Analytical Chemistry, 6/Ed,John Wiley & Sons. **5.** Day R. A. & Underwood A. L. Quantitative Analysis.5/Ed., Prentice Hall of IndiaPvt.Ltd.New Delhi. **6.** Skoog, A. D. West, D. M.et al. Fundamentals of Analytical Chemistry. 8/ Ed.Thomson Brookslcole.

4	**Redox titrations** (a) Concepts of oxidation and reduction:Oxidising and reducing agents, Standard reduction potential, Nernst equation, Redox titration curve and Equivalence point Types of redox titrations (Principles and applications) Permanganometry (Assay of hydrogen peroxide), Cerimetry (Assay of Paracetamol and Dried Ferrous sulphate),, Iodimetry (Assay of Ascorbic acid API),, Iodometry (Assay of potassium permanganate), Bromatometry (Assay of Isoniazid), Dichrometry (Iron),, Titration with potassium iodate (Assay of Potassium iodide)	**8**	**1.** Beckett, A.H. and Stenlake J. B., Practical Pharmaceutical Chemistry,Vol I, Stahlome Press, University of London. **2.** Vogel, A. I., A Textbook of Quantitative Chemical Analysis, ThamesPolytechnic, London, Longman Group, UK Ltd. **3.** Connors K. A., A Textbook of Pharmaceutical Analysis, Third Edition, JohnWiley and Sons. **4.** Christian G. D., Analytical Chemistry, 6/Ed,John Wiley & Sons. Day R. A. & Underwood A. L. Quantitative Analysis. 5/Ed., Prentice Hall of IndiaPvt. Ltd. New Delhi. **6.** Skoog, A. D. West, D. M.et al. Fundamentals of Analytical Chemistry. 8/ Ed.Thomson Brookslcole.
5	• **Electrochemical methods of analysis** • **Conductometry**- Introduction, Conductivitycell, Conductometric titrations, applications. • **Potentiometry -** Electrochemical cell, construction and working of reference (Standard hydrogen, silver chlorideelectrode and calomel electrode) and indicator electrodes (metal electrodes and glass electrode), methods to determine end pointof potentiometric titration (aqueous acid-base titrations -Strong acidvs strong base, strong acid vs weak base, weak acid vs strong base, weak acid vs weak base) and applications. • **Polarography** - Principle, Ilkovic equation, construction and working of dropping mercury electrode and rotating platinum electrode, Current Voltage curve (Polarogram), supporting electrolyte, Oxygen wave, polarographic maxima, factors affecting limitingcurrent, half wave potential, applications, Pulse polarography-Normal pulse polarography, Differential pulse polarography and square wavepolarography	**7**	**1.** Willard Merit. Dean Settle, Instrumental Methodsof Analysis, 7/Ed, CBS Publisher & Distributor. Sharma, B. K. Instrumental Methods ofChemical Analysis, GoelPublishing House.
	TOTAL	**45**	

Reference Books (Latest Editions to be adopted):

BP108P. PHARMACEUTICAL ANALYSIS (Practical)
4 Hours / Week
SUBJECT: BP108P PHARMACEUTICAL ANALYSIS I
(PRACTICAL 60 HOURS)

Teaching Scheme	**Examination Scheme:**
Lectures:	In SEM Exam:15 Marks
Practical: 04Hr/Week	End SEM Exam:35 Marks
Tutorials:	Continuous Assessment:
Credits: 2	Total Marks: 50 Marks

Course Outcomes:

CO's	**Course Outcomes**	**Bloom Taxonomy**	
Upon completion of this course students will be able to		**Level**	**Descriptor**
CO 1	Understand Fundamentals and practical aspects of analytical chemistry andprinciples of electrochemical analysis of drugs	1	Recall facts and basic concept
CO 2	Carryout various volumetric and electrochemical titrations and develop analytical skills	2	Explain ideas or concept
CO 3	Clarify basic principles of standardization and errors	3	Apply
CO 4	Explain basic concepts and principles of Preparation and standardization of Sodium hydroxide, Sulphuric acid, Sodium thiosulfate, Potassium permanganate, Ceric ammonium sulphate	3	Apply
CO 5	Clarify different terms, types and basic principles of Assays	3	Apply
CO 6	Understand the basic concepts and applications of Electrochemical Method	3	Apply

Mapping of Course Outcomes to Program Outcomes:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
CO1	3	-	1	-	-	-	-	-	-	-	1
CO2	2	-	1	-	-	-	-	-	-	-	2
CO3	2	-	1	2	-	-	-	-	-	-	1
CO4	2	-	1	2	-	-	-	-	-	-	1
CO5	2	-	1	2	-	-	-	-	-	-	1
CO6	2	-	1	2	-	-	-	-	-	-	1

COURSE CONTENT

Sr. No.	**Name of Experiment**	**Duration**	**References**
I	**Preparation and standardization of** (1) Aq. Sodium Hydroxide I. P. (2) Aq. Sulphuric Acid I. P./ Aq. Hydrochloric Acid I. P. (3) Aq. Sodium Thiosulfate I. P. (4) Aq. Potassium Permanganate I. P. (5) Aq. Ceric Ammonium Sulphate I.P.	**16**	**1.** Indian Pharmacopoeia Beckett A. H., Stenlake J. B., Practical Pharmaceutical Chemistry, Vol. I & II, 2nd edition, Athlone Press, University of London, London,1970 **2. 3.** Vogel A.I., Textbook of Quantitative Inorganic Analysis,2nd edition, Longman Green andCo., London, 1951

II	**Assay of the following compoundsalong with Standardization of Titrant** (1) Ammonium chloride by acid basetitration (2) Ferrous sulphate by Cerimetry (3) Copper sulphate by Iodometry /Sodium metabisulphite (4) Calcium gluconate bycomplexometry (5) Hydrogen peroxide byPermanganometry (6) Sodium benzoate by non-aqueoustitration (7) Sodium Chloride by precipitationtitration (8) Assay of Aspirin (Back titration) **(9)** Assay of Sulphacetamide sodium(Nitrite titration) **(10)** Assay of Ascorbic acid(Iodimetry)	**24**	**1.** Indian Pharmacopoeia **2.** Beckett A. H., Stenlake J. B., Practical Pharmaceutical Chemistry, Vol. I & II, 2nd edition, Athlone Press, University of London, London, 1970 **3.** Vogel A.I., Textbook of Quantitative Inorganic Analysis, 2nd edition, Longman Green and Co., London, 1951
III	**Determination of Normality byelectro-analytical methods** (1) Conductometric titration of strongacid against strong base (2) Conductometric titration of strong acid and weak acid against strong base **(3)** Potentiometric titration of strongacid against strong base **(4)** Potentiometric titration of weakacid against strong base	**10**	**1.** Indian Pharmacopoeia **2.** Beckett A. H., Stenlake J. B., Practical Pharmaceutical Chemistry, Vol. I & II, 2nd edition, Athlone Press, University of London, London, 1970 **3.** Vogel A.I., Textbook of Quantitative Inorganic Analysis,2nd edition, Longman Green and Co., London, 1951
IV.	**Measurement of refractive index ofsome samples** (Glycerol, Water, Rectified Spirit,Castor Oil I. P.)	**6**	**1.** Indian Pharmacopoeia **2.** Beckett A. H., Stenlake J. B., Practical Pharmaceutical Chemistry, Vol. I & II, 2nd edition, Athlone Press, University of London, London, 1970 **3.** Vogel A.I., Textbook of Quantitative Inorganic Analysis,2nd edition, Longman Green and Co., London, 1951
V	**Gravimetric analysis** (1) Determination of Barium asBarium sulphate	**4**	**1.** Indian Pharmacopoeia **2.** Beckett A. H., Stenlake J. B., Practical Pharmaceutical Chemistry, Vol. I & II, 2nd edition, Athlone Press, University of London, London, 1970 **3.** Vogel A.I., Textbook of Quantitative Inorganic Analysis,2nd edition, Longman Green and **3.** Co., London, 1951

Syllabus of First Year B. Pharm. (CBCS)

SUBJECT: BP103T. PHARMACEUTICS I
(THEORY 45 HOURS)

Teaching Scheme	**Examination Scheme:**
Lectures: 03Hr/Week	In SEM Exam:25 Marks
Practical:	End SEM Exam:75 Marks
Tutorials: 01Hr/Week	Continuous Assessment: 10 Marks
Credits: 4	Total Marks: 100 Marks

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.

Course Objectives:

Upon completion of the course a student shall be able to understand -

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 dosages

Course Outcomes:

CO's	**Course Outcomes**	**Bloom Taxonomy**	
	Upon completion of this course students will be able to	**Level**	**Descriptor**
CO 1	To know the historical background and profession of pharmacy andbasics of pharmaceutical dosage forms.	2	Recall facts and basic concept
CO 2	To understand the importance of prescription and posology	2	Explain ideas or concept
CO 3	To figure out pharmaceutical equations and comprehend how liquid and powder dose forms are made.	3	Apply
CO 4	To formulate liquid dose formulations that are both monophasic and biphasic.	3	Apply
CO 5	To clarify the ideas of suppositories and pharmaceuticals	3	Apply
CO 6	To formulate and evaluate semi solid dosage forms.	3	Apply

Mapping of Course Outcomes to Program Outcomes:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
CO1	3	-	1	-	-	-	-	-	-	-	2
CO2	2	1	-	3	-	-	-	-	-	-	2
CO3	3	-	2	2	-	-	1	-	-	-	1
CO4	3	-	1	2	-	-	-	-	-	-	1
CO5	2	1	2	2	-	-	-	-	-	-	2
CO6	3	-	1	2	-	-	1	-	-	-	1

Syllabus of First Year B. Pharm. (CBCS)

COURSE CONTENTS

Unit	Details	Hrs	References
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, JP and ExtraPharmacopoeia. **Prescription**: Definition, Parts of prescription, handling ofPrescription and Errors in prescription. **Dosage forms**: Introduction to dosage forms, classification anddefinitions **Posology**: Definition, Factors affecting posology. Pediatric dose calculations based on age, body weight and body surface area.	10	1. H.C. Ansel et al., Pharmaceutical Dosage Formand Drug Delivery System, Lippincott Williams and Walkins, 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.
2	**Pharmaceutical calculations:** Weights and measures – Imperial & Metricsystem, 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 dosageforms. Excipients used in formulation of liquid dosage forms. Solubility enhancement techniques	10	1. H.C. Ansel et al., Pharmaceutical Dosage Formand Drug Delivery System, Lippincott Williams and Walkins, New Delhi. 2. Carter S.J., Cooper and Gunn's. Tutorial Pharmacy, CBS Publications, New Delhi. 3. Alfonso R. Gennaro Remington. The Science and Practice of Pharmacy, Lippincott Williams, New Delhi.
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, suspending agents, Preparation of suspensions; Flocculated and Deflocculated suspension & stability problems and methods to overcome **Emulsions**: Definition, classification, emulsifying agent, test for the identification of type ofEmulsion, Methods of preparation & stability problems and methods to overcome.	10	1. H.C. Ansel et al., Pharmaceutical Dosage Formand Drug Delivery System, Lippincott Williams and Walkins, 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. E.A. Rawlins, Bentley's TextBook of Pharmaceutics, English LanguageBook Society, Elsevier Health Sciences, USA.

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	1. H.C. Ansel et al., Pharmaceutical Dosage Formand Drug Delivery System, Lippincott Williams and Walkins, New Delhi. 2. Carter S.J., Cooper and Gunn's-Dispensing for Pharmaceutical Students, CBS publishers, New Delhi. 5. M.E. Aulton, Pharmaceutics, The Science& Dosage Form Design, Churchill Livingstone, Edinburgh
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	1. H.C. Ansel et al., Pharmaceutical Dosage Formand Drug Delivery System, Lippincott Williams and Walkins, 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. 6. Lachmann. Theory and Practice of Industrial Pharmacy, Lea& Febiger Publisher, The University ofMichigan.
	TOTAL	**45**	

Syllabus of First Year B. Pharm. (CBCS)

BP109P. PHARMACEUTICS (Practical)
4 Hours / Week
(PRACTICAL 60 HOURS)

Teaching Scheme	**Examination Scheme:**
Lectures:	In SEM Exam:15 Marks
Practical: 04Hr/Week	End SEM Exam:35 Marks
Tutorials:	Continuous Assessment:
Credits: 2	Total Marks: 50 Marks

Course Outcomes:

CO's	**Course Outcomes**	**Bloom Taxonomy**	
	upon completion of this course students will be able to	**Level**	**Descriptor**
CO 1	To keep in mind the principles that go into making proper, liquid, and semi-solid dosage forms.	2	Recall facts and basic concept
CO 2	To test monophasic liquid dose formulations for both internal and exterior use.	2	Explain ideas or concept
CO 3	To make biphasic liquid dosage forms	3	Apply
CO 4	To design powders and granules.	2	Apply
CO 5	To manufacture semi-solid dosage forms.	2	Apply
CO 6	To formulate suppositories.	3	Apply

Mapping of Course Outcomes to Program Outcomes:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
CO1	3	-	1	-	-	-	-	-	-	-	3
CO2	2	2	2	-	-	-	-	-	-	-	2
CO3	2	-	1	2	-	2	-	-	-	-	1
CO4	2	2	1	2	-	-	-	-	-	-	1
CO5	2	-	2	2	-	-	-	-	-	-	2
CO6	2	3	1	2	-	2	-	-	-	-	1

COURSE CONTENT

Sr. No.	**Name of Experiment**	**Hrs.**	**References**
I	**Monophasic Liquid Dosage Form** a) Syrup IP'66 b) Compound syrup of Ferrousphosphate BPC'68 c) Piperazine citrate elixir d) Paracetamol pediatric elixir e) Terpin Hydrate Linctus IP'66 f) Iodine Throat Paint (MandlesPaint) g) Strong solution of ammonium acetate h) Cresol with soapsolution i) Lugol's solution j) Iodine gargle k) Chlorhexidine mouthwash	**10**	1. Indian pharmacopoeia. 2. Carter S.J., Cooper and Gunn's-Dispensing for Pharmaceutical Students, CBS publishers, New Delhi. 3. Carter S.J., Cooper and Gunn's. Tutorial Pharmacy, CBSPublications, New Delhi

II	**Biphasic Liquid Dosage Form** Calamine lotion Magnesium Hydroxide mixture Aluminimum Hydroxide gel Turpentine Liniment Liquid paraffin emulsion Castor oil emulsion	**20**	1. Indian pharmacopoeia. 2. Carter S.J., Cooper andGunn's-Dispensing for Pharmaceutical Students, CBS publishers, New Delhi. 3. Carter S.J., Cooper and Gunn's. Tutorial Pharmacy, CBSPublications, New Delhi 4. Francoise Nieloud and Gilberte Marti-Mestres: Pharmaceutical Emulsions and Suspensions, Marcel Dekker, INC, New York.
III	**Solid Dosage Forms** ORS powder (WHO) Effervescent granules Dusting powder Divided powders	**10**	1. Indian pharmacopoeia. 2. Carter S.J., Cooper andGunn's-Dispensing for Pharmaceutical Students, CBS publishers, New Delhi. 3. Carter S.J., Cooper and Gunn's. Tutorial Pharmacy, CBSPublications, New Delhi
IV.	**Suppositories** Glycero gelatin suppository Coca butter suppository Zinc Oxide suppository	**10**	1. Indian pharmacopoeia. 2. Carter S.J., Cooper andGunn's-Dispensing for Pharmaceutical Students, CBS publishers, New Delhi. 3. Carter S.J., Cooper and Gunn's. Tutorial Pharmacy, CBSPublications, New Delhi
V	**Semisolids** Sulphur ointment Non staining-iodine ointment withmethyl salicylate Carbopol gel	**10**	1. Indian pharmacopoeia. 2. Carter S.J., Cooper andGunn's-Dispensing for Pharmaceutical Students, CBS publishers, New Delhi. 3. Carter S.J., Cooper and Gunn's. Tutorial Pharmacy, CBSPublications, New Delhi

Syllabus of First Year B. Pharm. (CBCS)

SUBJECT: BP104T. PHARMACEUTICAL INORGANIC CHEMISTRY (THEORY 45 HOURS)

Teaching Scheme	**Examination Scheme:**
Lectures: 03Hr/Week	In SEM Exam:25 Marks
Practical:	End SEM Exam:75 Marks
Tutorials: 01Hr/Week	Continuous Assessment: 10 Marks
Credits: 4	Total Marks: 100 Marks

Scope

This course deals with the concepts and monographs of inorganic drugs and pharmaceuticals.

Course Objectives:

Upon completion of the course a student shall be able to understand –

- Know the sources of impurities and methods to determine the impurities in drugs and pharmaceuticals.
- Understand the medicinal and pharmaceutical importance of inorganic compounds.

Course Outcomes:

CO's	**Course Outcomes**	**Bloom Taxonomy**	
	upon completion of this course students will be able to	**Level**	**Descriptor**
CO 1	Know the history and concept of pharmacopoeia and its editions.	1	Recall factsand basic concept
CO 2	know the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals	2	Explainideas or concept
CO 3	Explain the method of preparation, assay, properties, medicinal uses of acids, bases, buffers, extra and intracellular electrolytes.	3	Apply
CO 4	Explain the method of preparation, assay, properties, medicinal usesof dental products, acidifiers, antacids, cathartics, expectorants, emetic and haematinics.	3	Apply
CO 5	Explain the method of preparation, assay, properties, medicinal uses of antimicrobial agents, astringents, poisons and antidots	3	Apply
CO 6	Describe the properties, storage condition and application of radiopharmaceuticals.	3	Apply

Mapping of Course Outcomes to Program Outcomes:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
CO1	3	1	3	2	-	2	2	-	2	2	2
CO2	3	1	1	-	-	2	1	-	2	1	2
CO3	3	2	1	1	-	2	1	-	2	1	2
CO4	3	1	2	2	-	2	1	-	2	1	2
CO5	3	1	2	1	-	2	2	-	2	2	3
CO6	2	2	2	3	1	1	2	-	2	2	1

COURSE CONTENTS

Unit	Details	Hrs	References
1	**Atomic structures and molecules, Basic concepts (University of California Davis)** **a) Impurities in pharmaceutical substances**: History of pharmacopoeia, Sources and types of impurities, Principle, reaction and procedure involved in the limit test for chloride, sulphate, iron, arsenic, lead and heavy metals, modified limit test for chloride and sulphate. **b) Water:** Different official waters including purified water, water for injection, bacteriostatic water for injection and sterile water for injection. Official control test for water **General methods of preparation and assay for compounds superscripted with asterisk (*).** **Properties and Medicinal uses of Inorganic Compounds belonging to the following classes**	10	**1.** Pahrmaceutical inorganic chemistry by G.R.Chatwal, Chapter-4, Pg.No.31 **2.** Pharmaceutical Inorganic Chemistry by Alagarsamy, chapter-5, Pg.No.101. **3.** A text book of Inorganic medicinal chemistry by surendra N. Pandeya. **4.** Text book of Pharmaceutical Chemistry-1(Inorganic) by Mohammed Ali, chapter-15 and 16, pg.no. 237. **5.** Lee J D, Concise Inorganic Chemistry,5th edition.
2	**a) Acids, Bases and Buffers:** Buffer equations and buffer capacity in general. Buffers in pharmaceutical systems. Preparation and stability of buffers, Buffered isotonic solutions Measurements of tonicity, calculations and methods of adjusting isotonicity. **b) 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. **c) Dental products:** Dentifrices Role of fluoride in the treatment of dental caries Desensitizing agents, Calcium carbonate, Sodium fluoride, and Zinc eugenol cement.	10	**1.** Inorganic Pharmaceutical Chemistry by Dr.H.P.Tipnis, Dr.P.S.Dhake. **2.** Pharmaceutical Inorganic chemistry by G.R.Chatwal. chapter-13 & 16, Pg.No.266 & 103 **3.** Pharmaceutical Inorganic chemistry by Alagarsamy. Chapter-3 & 6, pg.no.61, 331 & 351. **4.** Bently and Driver's textbook of pharmaceutical chemistry, chapater-17,pg.no.202. **4.** Text book of pharmaceutical chemistry-I by Mohammed Ali, chapter6,Pg.No.134.
3	**a) Gastrointestinal agents:** **i. Acidifiers:** Definition types and functions Ammonium chloride* and Dil. HCl **ii. Antacid:** Ideal properties of antacids,	10	**1.** Pharmaceutical Inorganic chemistry by G.R.Chatwal, chapter-8, Pg.No.152. **2.** Pharmaceutical Inorganic Chemistry by Alagarsamy,chapter-6, pg.no.168, 189

	combinations of antacids, Sodium Bicarbonate*, Aluminum hydroxide gel, Magnesium hydroxide mixture **iii. Cathartics:** Definition, types and mechanism Magnesium sulphate, Sodium orthophosphate, **b) Protectives and Adsorbents:** Definition, classification and function Kaolin and Bentonite **c) Antimicrobials:** Mechanism, classification, Potassium permanganate, Boric acid, Hydrogen peroxide*, Chlorinated lime*, Iodine and its preparations.		and 233.
4	**Miscellaneous Compounds** **a) Expectorants:** Definition, types and function Potassium iodide, Ammonium chloride **b) Emetics:** Definition, function Copper sulphate*, Sodium potassium tartarate **c) Haematinics:** Definition, function Ferrous sulphate*, Ferrous gluconate **d) Poison and Antidote:** Definition, Sodium thiosulphate*, Activated charcoal, Sodium nitrite **e) Astringents:** Definition, mechanism Zinc Sulphate, Potash Alum	8	**1.** Pharmaceutical Inorganic chemistry by G.R.Chatwal, chapter-12 & 16, pg.no.255& 365. **2.** Pharmaceutical Inorganic Chemistry by Alagarsamy, chapter-6, Pg.No.405, 467 and 469.
5	**Radiopharmaceuticals:** Radio activity, measurement of radioactivity. Properties of α, β, γ radiations, **X-rays** Half-life, Radio isotopes and study of radio isotopes - Sodium iodide^{131}, Indium^{111}, Calcium^{47}, Chromium^{51}, Erbium^{169}, Gallium^{68}, Technetium^{99m}, Storage conditions and precautions Pharmaceutical applications of radioactive substances.	7	**1.** Bently and driver's rent book of pharmaceutical chemistry, chapter-10, Pg.No. 121. **2.** Pharmaceutical Inorganic chemistry, chapter-17, pg.no.34
	TOTAL	**45**	

Reference Books (Latest Editions to be adopted):

Syllabus of First Year B. Pharm. (CBCS)

SUBJECT: BP110P PHARMACEUTICAL INORGANIC CHEMISTRY
PRACTICAL 4 Hours / Week
(60 HOURS)

Teaching Scheme	**Examination Scheme:**
Lectures:	In SEM Exam:15 Marks
Practical: 04Hr/Week	End SEM Exam:35 Marks
Tutorials:	Continuous Assessment:
Credits: 2	Total Marks: 50 Marks

Course Outcomes:

CO's	Course Outcomes	Bloom Taxonomy	
	upon completion of this course students will be able to	**Level**	**Descriptor**
CO 1	Make correct use of various equipment and understand general laboratory practices	1	Recall facts and basic concept
CO 2	Perform limit tests of different common impurities present in pharmaceuticals.	2	Explain ideas or concept
CO 3	Perform identification tests of different common inorganic chemicals used in Pharmaceutical Inorganic Chemistry Lab.	3	Apply
CO 4	Perform the test for purity of different chemicals like swelling power of bentonite, neutralizing capacity of aluminum hydroxide and potassium iodide/	3	Apply
CO 5	Prepare different inorganic compounds used as pharmaceuticals	3	Apply
CO 6	Purify different products by crystallization.	3	Apply

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	2	1	2	-	2	1	2	2	2	3
CO2	3	1	1	2	-	2	1	1	1	2	2
CO3	2	2	2	2	2	2	1	1	1	1	2
CO4	2	2	2	1	1	1	2	1	2	1	2
CO5	2	3	2	2	-	1	2	1	-	2	1
CO6	2	2	2	2	-	2	-	1	-	2	1

COURSE CONTENT

Sr. No.	Name of Experiment	Hrs	References
I	**Calculations of yields, moles and concentrations** **Limit Test of the following:** (1) Chloride (2) Sulphate (3) Iron (4) Arsenic	**24**	1.Practical pharmaceutical chemistry, 4th edition-part one, A.H.Beckett, J.B.Stenlake, CBSPublilshers and distributors, chapter-1, pgno.30-43 2. Indianpharmacopaeia 2007, vol.1, pg.no.76, 77 and 78.

	(5) Lead (6) Heavy metals		
II	**Identification test** (1) Magnesium hydroxide (2) Ferrous sulphate (3) Sodium bicarbonate (4) Calcium gluconate (5) Copper sulphate	**12**	1.Pharmaceutical chemistry inorganic, G.R.Chatwal, Himalaya publishing, house,chapter, 28, pg.no.438-456.
III	**Test for purity** (1) Swelling power of Bentonite (2) Neutralizing capacity of Aluminum hydroxide gel (3) Determination of Potassium iodate and iodine in Potassium Iodide	**12**	1.Swelling power of bentowile,Indian pharmacopoeia, 2018, vol. 2, pg.no.1338 2.Indian pharmacopoeia, 2018, vol.2, pg.no.1186. 3.Indian pharmacopoeia, 2018, vol.3, pg.no.2968.
IV.	**Preparation of Inorganic Pharmaceuticals** (1) Boric acid (2) Potash alum (3) Ferrous sulphate	**12**	1.Bently and driver's text book of pharmaceutical chemistry, pg.no.195, 274. 2.Pharmaceuticalchemistry inorganic G.R.Chatwal. Himalaya publishing house, chapter, 14, pg.no.309.

Syllabus of First Year B. Pharm. (CBCS)

SUBJECT: BP105T. COMMUNICATION SKILLS
(THEORY 30 HOURS)

Teaching Scheme	**Examination Scheme:**
Lectures: 02Hr/Week	In SEM Exam:10 Marks
Practical:	End SEM Exam:35 Marks
Tutorials: 01Hr/Week	Continuous Assessment: 05 Marks
Credits: 2	Total Marks: 50 Marks

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.

Course Objectives:

Upon completion of the course a student shall be able to understand -

1. Understand the behavioural 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

Course Outcomes:

CO's	**Course Outcomes**	**Bloom Taxonomy**	
		Level	**Descriptor**
CO 1	The students should be able to understand the fundamentals of Communication Skills- Definition and The Importance of Communication, The Communication Process – Source, Message, Encoding, Channel, Decoding, Receiver, Feedback, Context	1	Recall facts and basic concept
CO 2	To explain Barriers to communication**:** Physiological Barriers, Physical Barriers, Cultural Barriers, Language Barriers, Gender Barriers, Interpersonal Barriers, Psychological Barriers, Emotional barriers. To clarify Perspectives in Communication**:** Introduction, Visual Perception, Language, Other factors affecting our perspective - Past Experiences, Prejudices, Feelings, Environment	2	Explain ideas or concept
CO 3	To explain Elements of Communication and Communication Styles	3	Apply
CO 4	To explain Basic Listening Skills, Basic Listening Skills, Writing Effectively	3	Apply
CO 5	To learn about Interview Skills and how to give presentations.	3	Apply
CO 6	Students should be able to do group discussions and put forward their views in the group discussion.	3	Apply

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	-	-	1	-	-	1	-	3	3	-	3
CO2		1	-	4	3	2	-	3	2	-	2
CO3					3	2		2	3	-	2
CO4				1	2	2		3	-	-	1
CO5			2	2	2	2		3	-	-	2
CO6			2	2	1			-	-	-	2

COURSE CONTENTS

Unit	Details	Hrs	References
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	07	1Basic communication skillsfor Technology, Andreja. J. Ruther Ford, 2nd Edition, Pearson Education, 2011 2. Communication skills, Sanjay Kumar, Pushpalata, 1stEdition, Oxford Press, 2011 3. Organizational Behaviour, Stephen .P. Robbins, 1stEdition, Pearson, 2013 4. Brilliant- Communication skills, Gill Hasson, 1stEdition, Pearson Life, 2011
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	05	1. The Ace of Soft Skills: Attitude, Communication and Etiquette for success,Gopala Swamy Ramesh, 5thEdition, Pearson, 2013 2. Developing your influencing skills, DeborahDalley, Lois Burton, Margaret, Green hall, 1st Edition Universe of Learning LTD, 2010
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 theMain Point First, Know Your Audience, Organization of the Message	04	1. Communication skills for professionals, Konar nira, 2nd Edition, New arrivals – PHI, 2011 2. Personality developmentand soft skills, Barun K Mitra, 1st Edition, Oxford Press, 2011 3. Soft skill for everyone,Butter Field, 1st Edition, Cengage Learning india pvt.ltd, 2011

4	**Interview Skills:** Purpose of an interview, Do's and Dont's of an interview **Giving Presentations:** Dealing with Fears, Planning your Presentation, Structuring Your Presentation, Delivering Your Presentation, Techniques of Delivery	05	1. Soft skills and professional communication,Francis Peters SJ, 1st Edition,Mc Graw Hill Education, 2011 2.Effective communication, John Adair, 4th Edition, Pan MacMillan, 2009
5	**Group Discussion:** Introduction, Communication skills in group discussion, Do's and Dont's of group discussion	04	1. Bringing out the best in people, Aubrey Daniels, 2nd Edition, Mc Graw Hill,1999
	TOTAL	**30**	

Reference Books (Latest Editions to be adopted):

Syllabus of First Year B. Pharm. (CBCS)

SUBJECT: BP111P COMMUNICATION SKILLS
2 Hours / Week (PRACTICAL HOURS)

Teaching Scheme	**Examination Scheme:**
Lectures:	In SEM Exam:05 Marks
Practical: 02Hr/Week	End SEM Exam:15 Marks
Tutorials:	Continuous Assessment:05
Credits: 1	Total Marks: 25 Marks

Course Outcomes:

CO's	**Course Outcomes**	**Bloom Taxonomy**	
	upon completion of this course students will be able to	**Level**	**Descriptor**
CO 1	Students should understand basics of communication effectively by meeting people, Asking Questions, Making Friends, What did you do?	1	Recall facts and basic concept
CO 2	Student should understand the way and need of communication effectively either by verbal and nonverbal method	2	Explain ideas or concept
CO 3	Should able to talk in front of the people by learning the proper Pronunciation i. e Consonant Sounds, Vowel Sounds	3	Apply
CO 4	Students should understand the importance of advanced learning such as direct speech/indirect speech, figures of speech.	3	Apply
CO 5	Able to attain interviews effectively with proper communication skills	3	Apply
CO 6	Able to write effectively his/her view, listen to other and able to discuss in group regarding topic.	3	Apply

Mapping of Course Outcomes to Program Outcomes:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
CO1						1		3	2	2	3
CO2		1	-	4	3	2	-	3	2	-	2
CO3					3	2		2	3	-	2
CO4				1	2	2		3	-	-	1
CO5			2	2	2	2		3	-	-	2
CO6		3		3		2	3		2		2

COURSE CONTENT

Sr. No.	**Name of Experiment**	**Hrs**	**References**
I	Students should understand basics ofcommunication effectively by meeting people, Asking Questions, Making Friends, What did you do?	**2**	1Basic communication skills for Technology, Andreja. J. Ruther Ford, 2nd Edition, Pearson Education, 2011 2. Communication skills, SanjayKumar, Pushpalata, 1stEdition, Oxford Press, 2011 3. Organizational Behaviour, Stephen .P. Robbins, 1stEdition,Pearson, 2013 4. Brilliant- Communication skills, Gill Hasson, 1stEdition,Pearson Life, 2011

II	Student should understand the wayand need of communication effectively either by verbal and non verbal method	**2**	1. The Ace of Soft Skills: Attitude, Communication andEtiquette for success, Gopala Swamy Ramesh, 5thEdition, Pearson, 2013 2. Developing your influencingskills, Deborah Dalley, Lois Burton, Margaret, Green hall, 1st Edition Universe ofLearning LTD, 2010
III	Should able to talk in front of the people by learning the proper Pronunciation i. e Consonant Sounds,Vowel Sounds	**2**	1. Communication skills forprofessionals, Konar nira, 2nd Edition, New arrivals – PHI, 2011 2. Personality development andsoft skills, Barun K Mitra, 1stEdition, Oxford Press, 2011 3. Soft skill for everyone, ButterField, 1st Edition, Cengage Learning india pvt.ltd, 2011
IV.	Students should understand the importance of advanced learning suchas direct speech/indirect speech, figures of speech.	**2**	1. Soft skills and professional communication, Francis Peters SJ, 1stEdition, Mc Graw Hill Education, 2011 2. Effective communication, John Adair, 4thEdition, Pan MacMillan,2009
V	Able to attain interviews effectivelywith proper communication skills	**2**	12. Bringing out the best inpeople, Aubrey Daniels, 2ndEdition, Mc Graw Hill,1999
VI	Able to write effectively his/her view ,listen to other and able to discuss ingroup regarding topic.	**2**	8. Personality development andsoft skills, Barun K Mitra, 1stEdition, Oxford Press, 2011

Syllabus of First Year B. Pharm. (CBCS)

BP106RBT

Remedial Biology (Theory) **30 Hours**

Course Objectives:
To get the learner acquainted with the facets of biology in the plant and animal kingdom.

Course Outcomes:
The learner should be able to:
1. Understand the classification and features of plant and animal kingdom.
2. Know the anatomy and physiology of plants.
3. Appreciate the anatomy & physiology in animals especially the human body

Unit	Details	Hours
1	Living world: • Definition and characters of living organism • Diversity in the living world • Binomial nomenclature • Five kingdoms of life and basis of classification. Salient features of Monera, Potista, Fungi, Animalia and Plantae, Virus	**5**
2	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 & dicotylidones	**2**
3	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	**7**
4	Excretory products and their elimination • Modes of excretion • Human excretory system- structure and function • Urine formation • Rennin 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	**7**

	Human reproduction • Parts of female reproductive system • Parts of male reproductive system • Spermatogenesis and Oogenesis Menstrual cycle	
5	Plants and mineral nutrition • Essential mineral, macro, and micronutrients • Nitrogen metabolism, Nitrogen cycle, biological nitrogen fixation Photosynthesis Autotrophic nutrition, photosynthesis, Photosynthetic pigments, Factorsaffecting photosynthesis	**5**
6	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 organelle, cell division Tissues Definition, types of tissues, location, and functions.	**4**
	TOTAL	**30**

Textbooks and Reference books (Latest Editions to be adopted):

1. Gokhale S.B, Kalaskar M.G, Kulkarni Y.A, Remedial Biology (Pharmaceutical Biology), 1st edition, Nirali Prakashan, Pune, 2017.
2. Seetharam P.L, Thulajappa Y, Chavan R.R, Textbook of Biology,1st edition, Expert Educational Publishers, Bangalore, 1995.
3. Naidu B.V.S, Renukumar B.M, Textbook of Biology, 1st edition, Sri Renuka Publications, Davangere, 1972.
4. Naidu B.V.S, Murthy P.K, Textbook of Biology, 1st edition, Prakash Sahithye, Bangalore, 1972.
5. Dutta A.C, Botany for Degree students, 6th edition, MKM Publishers Pvt. Ltd, New Delhi, 1998.
6. Ayyar E.M; T N Ananthakrishnan, A Manual of Zoology, 5th edition, S. Viswanathan Pvt. Ltd, Madras, 1992.
7. Gokhale S.B, Kalaskar M.G, Kulkarni Y.A, A Practical book of Remedial Biology, 1stedition, Nirali Prakashan, Pune, 2018.

Syllabus of First Year B. Pharm. (CBCS)

BP112RBP

Remedial Biology (Practical)

Course Objectives:
To give the learner preliminary knowledge of biology.

Course Outcomes
The learner should be able to:
1. Have knowledge of microscope and microscopic study of tissues.
2. Identify plant parts and modification.
3. Explain some body processes.

Unit	Details
1	Introduction to experiments in biology a) Study of Microscope b) Section cutting techniques c) Mounting and staining d) Permanent slide preparation
2	Study of cell and its inclusions
3	Study of stem, root, leaf, seed, fruit, flower and their modifications
4	Detailed study of frog by using computer models
5	Microscopic study and identification of tissues pertinent to stem, root, leaf, seed, fruit and flower
6	Identification of bones
7	Determination of blood group
8	Determination of blood pressure
9	Determination of tidal volume

Reference Books (Latest Editions to be adopted):

1. Kale. S.R. and Kale R.R, Practical Human Anatomy and Physiology,10th edition, Nirali Prakashan, Pune, 2020.
2. Gokhale S.B., Kokate C.K. and Shriwastava, S.P. A Manual of Pharmaceutical biology practical.
3. Shafi M, Biology practical manual according to National core curriculum. Biology forum of Karnataka.

Syllabus of First Year B. Pharm. (CBCS)

BP106RMT

REMEDIAL MATHEMATICS (Theory) 30 Hours

Course Objectives:

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.

Course Outcomes:

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

Unit	Details	Hours
1	**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 **1. Logarithms** Introduction, Definition, Theorems/Properties of logarithms, Common logarithms, Characteristic and Mantissa, worked examples, application of logarithm to solve pharmaceutical problems. ***2.*** **Function***:* Real Valued function, Classification of real valued functions, **3. Limits and continuity**: Introduction, Limit of a function, Definition of limit of a function (ε - δ definition), $\lim_{x\to a}\frac{x^n-a^n}{x-a}=na^{n-1}$, $\lim_{\theta\to 0}\frac{\sin\theta}{\theta}=1$,	6
2	**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	6
3	**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 a^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	6

4	**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 substitution, Method of Partial fractions, Integration by parts, definiteintegrals, application	**6**
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** **1. 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**
	TOTAL	**30**

Reference Books (Latest Editions to be adopted):

1. Shanti Narayan, Mittal P.K, Differential Calculus, revised edition, S. Chand and Co. Pvt. Ltd, New Delhi,2013.
2. Panchaksharappa Gowda D. H , Pharmaceutical Mathematics with application to Pharmacy, 1st Edition, PharmaMed Press, 2014
3. Shanti Narayan, Mittal P.K, Integral Calculus, 11th edition, S. Chand and Co. Pvt. Ltd, 2013.
4. Grewal B. S, Higher Engineering Mathematics, 44th edition, Khanna Publishers, New Delhi, 2020.

Syllabus of First Year B. Pharm. (CBCS)

BP107MLC- FUNCTIONAL ENGLISH I (2hrs/week)

Teaching Scheme	**Examination Scheme:**
Lectures: 02Hr/Week	**Term End Exam: 35 Marks**
Practical: 02Hr/Week	Continuous Assessment:15
Credits: 0	Total Marks: 50 Marks

Course Objectives:

- to enable the learner to communicate effectively and appropriately in real-life situations
- to develop and integrate the use of listening, speaking, reading and writing skills in reality
- to enrich receptive and productive skills of the learners

Course Outcomes (CO's):

The Learners will be able to:

CO's	Course Outcomes	Bloom's Taxonomy	
		Level	Descriptor
CO 1	✓ apply the linguistic parameters learnt in everyday speaking and listening effectively	3	Apply
CO 2	✓ critically listen and interpret ideas or perspectives	3	Apply
CO 3	✓ make effective presentation and participate in discussions	3	Apply

Course Content:

Unit	Content	No. of hrs.
1.	Where are you from? Introductions and greetings; names, countries and nationalities	02
2.	hat do you do? bs, workplaces and school; daily schedules; clock time	03
3.	How much are these? Shopping and prices; clothing and personal items; colours and materials	02
4.	Do you play the guitar? Music, movies and TV programmes; entertainers; invitations and excuses; dates and times	03
5.	What an interesting family! Family members; typical families	02
6.	How often do you run? Sports, fitness activities and exercise; routines	03
7.	We went dancing! Free-time and weekend activities	02
8.	How's the neighbourhood? Stores and places in a city; neighbourhoods; houses and apartments	03
	Total no. of training hours:	**20**

Prescribed Text Book:

S. No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Jack C Richards with Jonathan Hull and Susan Proctor –1	Interchange (Book 1)	Cambridge University Press, Fifth Edition	2019

Reference Books:

S. No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Jack C. Richards	Interchange (Book 1)	Cambridge University Press	2015
2.	Raymond Murphy	Essential English Grammar	Cambridge University Press, Second Edition	2016
3.	Jack C. Richards	Interchange (Book 1)	Cambridge University Press	2016
4.	Barun K Mitra	Effective Technical Communication	Oxford University Press	2017
5.	University of Cambridge	BEC Preliminary 1 (Exam Papers with answers)	Cambridge University Press	2010

Web URL's:

1. www.onestopenglish.com
2. www.britishcouncil.org
3. www.learnenglishtoday.com
4. www.talkenglish.com
5. www.bogglesworldesl.com
6. www.learnenglish.britishcouncil.org/skills/listening/b1-listening
7. www.englishcentral.com/browse/videos?setLanguage=en
8. www.dialectsarchive.com/

SEMESTER II

Syllabus of First Year B. Pharm. (CBCS)

SUBJECT: BP201T. Human Anatomy and Physiology II
(THEORY 45 HOURS)

Teaching Scheme	**Examination Scheme:**
Lectures: 03Hr/Week	In SEM Exam:25 Marks
Practical:	End SEM Exam:75 Marks
Tutorials: 01Hr/Week	Continuous Assessment: 10 Marks
Credits: 4	Total Marks: 100 Marks

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.

Course Objectives:

Upon completion of the course a student shall be able to understand -

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, hemoglobin 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.

Course Outcomes:

CO's	**Course Outcomes**	**Bloom Taxonomy**	
	Upon completion of the course a student shall be able to	**Level**	**Descriptor**
CO1	Understand organization, classification and properties of nervous system and various components of nervous system and central nervous system	2	Explain ideas or concept
CO2	Understand and explain digestive system, formation & role of ATP, creatinine phosphate and BMR	2	Explain ideas or concept
CO3	Understand and explain Respiratory system	2	Explain ideas or concept
CO4	Understand and explain Urinary system	2	Explain ideas or concept
CO5	Understand and explain Endocrine system	2	Explain ideas or concept
CO6	Understand and explain Reproductive system and genetics	2	Explain ideas or concept

Mapping of Course Outcomes to Program Outcomes:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
CO1	3	-	-	2	-	-	-	-	-	-	3
CO2	3	-	-	2	-	-	-	-	-	-	3
CO3	3	-	-	2	-	-	-	-	-	-	3
CO4	3	-	-	2	-	-	-	-	-	-	3
CO5	3	-	-	2	-	-	-	-	-	-	3
CO6	3	-	-	2	-	-	-	-	-	-	3

Syllabus of First Year B. Pharm. (CBCS)

Unit	Details	Hours	References
1	**Nervous system** Organization of nervous system, neuron, neuroglia, classification and properties of nerve fiber, 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	1.Ross & Wilson Anatomy and Physiology 2.Tortora's Principles of Anatomy and Physiology. 3.Basic anatomy and Physiology by Dr.N. Murgesh 4. Human anatomy and Physiology by S. Chaudhari and A. Chaudhari 5.Essential Pathology by Harsh Mohan 6.Human Physiology by Pearson Publications.
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.	08	1.Gray's Anatomy and Physiology by Richard Drake and Wayan Vogel 2.B.D. Chourasia's Human anatomy Volume 3. 3.Ross & Wilson Anatomy and Physiology 4.Tortora's Principles of Anatomy and Physiology. 5.Basic anatomy and Physiology by Dr.N. Murgesh 6.Human Physiology by Pearson Publications.
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	06 04	1.Ross & Wilson Anatomy and Physiology 2.Tortora's Principles of Anatomy and Physiology. 3.Basic anatomy and Physiology by Dr.N. Murgesh 2.Human anatomy and Physiology by V.N Raje 3. Human anatomy and Physiology Dr.S.B. Bhise and Dr.A.V. Yadav

	kidney and urinary tract, physiology of urine formation, micturition reflex and role of kidneys in acid base balance, role of RAS in kidney and disorders of kidney.		4. Human anatomy and Physiology by S. Chaudhari and A. Chaudhari
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.	08	1. B.D. Chourasia's Human anatomy Volume 3. 2.Ross & Wilson Anatomy and Physiology 3.Tortora's Principles of Anatomy and Physiology. 4.Basic anatomy and Physiology by Dr.N. Murgesh
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	07 02	1.Ross & Wilson Anatomy and Physiology 2.Tortora's Principles of Anatomy and Physiology. 3.Basic anatomy and Physiology by Dr.N. Murgesh 2.Human anatomy and Physiology by V.N Raje 3. Human anatomy and Physiology Dr.S.B. Bhise and Dr.A.V. Yadav 4. Human anatomy and Physiology by S. Chaudhari and A. Chaudhari
	TOTAL	**45**	

Syllabus of First Year B. Pharm. (CBCS)

Human Anatomy and Physiology I (Practical)
4 Hours / Week
SUBJECT: BP207P Human Anatomy and Physiology II
(PRACTICAL 60 HOURS)

Teaching Scheme	**Examination Scheme:**
	In SEM Exam:15 Marks
Practical: 04Hr/Week	End SEM Exam:35 Marks
Credits: 2	Total Marks: 50 Marks

Course Outcomes:

CO's	**Course Outcomes**	**Bloom Taxonomy**	
		Level	**Descriptor**
CO 1	integumentary and special senses, nervous system, endocrine system, to determine platelet count, Differential Leukocyte count, Arneath Index, osmotic fragility of RBCs	1,2,3, 4,5	Remember, Understanding, applying, analyzing, Evaluating
CO 2	general neurological examination, function of olfactory nerve	1	Explain ideas or concept
CO 3	different types of taste, visual acuity, reflex activity	3	Apply
CO 4	body temperature, positive and negative feedback mechanism, tidal volume and vital capacity	3	Apply
CO 5	Study of digestive, respiratory, cardiovascular systems, urinary and reproductive systems with the help of models, charts and specimens, Recording of basal mass index	2,3	Understanding , Applying
CO 6	family planning devices and pregnancy diagnosis test, total blood count by cell analyser, vital organs and gonads	2,3	Understanding ,Apply

Mapping of Course Outcomes to Program Outcomes:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
CO1	3	-	-	2	-	-	-	-	-	-	3
CO2	3	-	-	2	-	-	-	-	-	-	3
CO3	3	-	-	2	-	-	-	-	-	-	3
CO4	3	-	-	2	-	-	-	-	-	-	3
CO5	3	-	-	2	-	-	-	-	-	-	3
CO6	3	-	-	2	-	-	-	-	-	-	3

Course Content

Sr. No.	Name of Experiment	Hrs	References
1.	To study the integumentary andspecial senses using specimen, models, etc.,	**4**	1.Practical Anatomy and Physiology by Dr.R. K Goyaland Dr.N.M Patel 2.Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. 3.Human Physiology by Dr. C.C. Chatterjee.
2.	To determine the Platelet count.	**4**	1.Practical Anatomy and Physiology by Dr.R. K Goyaland Dr.N.M Patel 2.Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. 3.Human Physiology by Dr. C.C. Chatterjee.
3.	To perform the differential leukocytecount (DLC).	**4**	1.Practical Anatomy and Physiology by Dr.R. K Goyaland Dr.N.M Patel 2.Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. 3.Human Physiology by Dr. C.C. Chatterjee.
4.	To determine the Arneth index.	**4**	1.Practical Anatomy and Physiology by Dr.R. K Goyal and Dr.N.M Patel 2.Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. 3.Human Physiology by Dr. C.C. Chatterjee.
5.	Determination of osmotic fragility ofRBCs.	**4**	1.Practical Anatomy and Physiology by Dr.R. K Goyaland Dr.N.M Patel 2.Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. 3.Human Physiology by Dr. C.C. Chatterjee.
6.	To study the nervous system using specimen, models, etc.,	**4**	1.Laboratory Manual & Journal of Physiology by Dr.V.G. Ranade. 2.Practical Anatomy and Physiology by Dr.R. K Goyaland Dr.N.M Patel
7.	To study the endocrine system usingspecimen, models, etc.,	**4**	1.Practical Physiology by G.K.Pal 2. Laboratory Manual & Journal of Physiology byDr.V.G. Ranade. 3.Practical Anatomy and Physiology by Dr.R. K Goyaland Dr.N.M Patel
8.	To demonstrate the general neurological examination.	**4**	1.Practical Physiology by G.K.Pal 2. Laboratory Manual & Journal of Physiology byDr.V.G. Ranade. 3.Practical Anatomy and Physiology by Dr.R. K Goyaland Dr.N.M Patel
9.	To demonstrate the function of olfactory nerve.	**4**	1.Practical Physiology by G.K.Pal 2. Laboratory Manual & Journal of Physiology byDr.V.G. Ranade. 3.Practical Anatomy and Physiology by Dr.R. K Goyaland Dr.N.M Patel
10.	To examine the different types of taste.	**4**	1.Practical Physiology by G.K.Pal 2. Laboratory Manual & Journal of Physiology byDr.V.G. Ranade. 3.Practical Anatomy and Physiology by Dr.R. K Goyaland Dr.N.M Patel

11.	To demonstrate the visual activity.	**4**	1.Practical Physiology by G.K.Pal 2. Laboratory Manual & Journal of Physiology byDr.V.G. Ranade. 3.Practical Anatomy and Physiology by Dr.R. K Goyaland Dr.N.M Patel
12.	To demonstrate the reflex activity.	**4**	1.Practical Physiology by G.K. Pal 2. Laboratory Manual & Journal of Physiology byDr.V.G. Ranade. 3.Practical Anatomy and Physiology by Dr.R. K Goyaland Dr.N.M Patel
13.	Recording of body temperature	**4**	1.Practical Physiology by G.K.Pal 2. Laboratory Manual & Journal of Physiology byDr.V.G. Ranade. 3.Practical Anatomy and Physiology by Dr.R. K Goyaland Dr.N.M Patel
14.	To demonstrate positive and negativefeedback mechanism.	**4**	1.Practical Physiology by G.K.Pal 2. Laboratory Manual & Journal of Physiology byDr.V.G. Ranade. 3.Practical Anatomy and Physiology by Dr.R. K Goyaland Dr.N.M Patel
15.	Determination of tidal volume and vital capacity.	**4**	1.Practical Physiology by G.K.Pal 2. Laboratory Manual & Journal of Physiology byDr.V.G. Ranade. 3.Practical Anatomy and Physiology by Dr.R. K Goyaland Dr.N.M Patel
16.	Study of Digestive, respiratory, cardiovascular systems, urinary and reproductive systems with the help ofmodels, charts and specimens.	**4**	1.Practical Anatomy and Physiology by Dr.R. K Goyaland Dr.N.M Patel 2.Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. 3.Human Physiology by Dr. C.C. Chatterjee.
17.	Recording of basal mass index.	**4**	1.Practical Anatomy and Physiology by Dr.R. K Goyaland Dr.N.M Patel Text book of Medical Physiology- Arthur C, Guytonand John. E. Hall. 3.Human Physiology by Dr. C.C. Chatterjee.
18.	Study of family planning devices andpregnancy diagnosis test.	**4**	1.Practical Anatomy and Physiology by Dr.R. K Goyaland Dr.N.M Patel 2.Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. 3.Human Physiology by Dr. C.C. Chatterjee.
19.	Kidney Function Test, Liver FunctionTest	**4**	1) Lehninger's Principles ofBiochemistry by Albert Lehninger, 4/Ed., Palgrave Macmillon. 1)Text Book of Pathology byHarsh Mohan, 5/Ed., Jaypee Brothers Medical Publishers (P) Ltd. 2) Laboratory Medical Technology by PrafullaGodkar. 3) Clinical Biochemistry by S. P. Dandekar 2/Ed
20.	Visit To Blood Bank	**-**	-

Syllabus of First Year B. Pharm. (CBCS)

SUBJECT: (BP202T Pharmaceutical Organic Chemistry – I) (Theory) (45 Hrs)

Teaching Scheme	**Examination Scheme:**
Lectures: 03Hr/Week	In SEM Exam:25 Marks
Practical: 03Hr/Week	End SEM Exam:75 Marks
Tutorials: 01Hr/Week	Continuous Assessment: 10 Marks
Credits: 4	Total Marks: 100 Marks

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

Course Objectives:

Upon completion of the course a student shall be able to -

Write the structure, name and the type of isomerism of the organic compound.
Write the reaction, name the reaction and orientation of reactions.
Account for reactivity / stability of compounds.
Identify / confirm the identification of organic compounds.

Course Outcomes:

CO's	**Course Outcomes**	**Bloom Taxonomy**	
Upon completion of this course students will be able to		**Level**	**Descriptor**
CO 1	Write the structure, name and type of isomerism in the compound	1	Recall facts and basic concept
CO 2	Write the reaction, name the reaction and orientation of reactions	2	Explain ideas or concept
CO 3	Account for reactivity and/or stability of compounds	3	Apply
CO 4	Identify and/or confirm the identification of organic compound	3	Apply
CO 5	explain general method of preparation and reactions of compounds with pharmaceutical interest.	3	Apply
CO 6	Emphasize on definition, type, classification, principles, mechanisms, applications, examples and differences of functional classes.	3	Apply

Descriptor: 1- Recall facts and basic concept, 2- Explain ideas or concept, 3- Apply, 4- Analyze, 5- Evaluate, 6- Create

Mapping of Course Outcomes to Program Outcomes:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
CO1	3	2	3	2	-	1	-	1	-	-	3
CO2	3	1	1	1	-	1	-	-	-	-	1
CO3	3	2	1	2	-	2	2	-	3	2	1
CO4	3	1	1	2	-	1	-	2	-	2	1
CO5	3	1	1	2	-	3	-	-	-	-	1
CO6	3	1	1	2	-	2	-	-	-	1	1

Low-1, Medium-2, High-3

Syllabus of First Year B. Pharm. (CBCS)

COURSE CONTENTS

Unit	Details	Hrs	Reference books
1	**Basic Principles of Organic Chemistry** ***Drawing of organic structures*** Hybridization of atomic orbitals of carbon, nitrogen and oxygen to form molecular orbitals, Types of bonds, bond fission, intermolecular forces, inductive effect, steric effect, electromeric, mesomeric effectand resonance, ***delocalized systems,*** hyperconjugation, concept of tautomerism. Classification, Nomenclature and Isomerism a) Classification of organic compounds i. Compounds containing carbon and hydrogen atoms only: hydrocarbons (alkanes, alkenes alkynes, aromatic hydrocarbons, polynuclear aromatic hydrocarbons, aryl-alkyl hydrocarbons, alicyclic hydrocarbons) ii. Compounds containing carbon, hydrogenand oxygen atoms only (alcohols, phenols, ethers and epoxides, carbonyl compounds, carboxylic acids, esters, anhydrides) iii. Compounds containing carbon,hydrogen and nitrogen atoms only iv. (amines and imine, nitriles, hydrazines,nitro compounds) v. Compounds containing carbon, hydrogen,and halogens with oxygen (alkyl halides, aryl halides, acyl halides) vi. Compounds containing carbon, hydrogen, oxygen and nitrogen atoms only(amides, imides, aldoxime and ketoxime) vii. Compounds containing carbon, hydrogen and sulphur with/without nitrogen, oxygen and halogen. Sulphonicacids, sulphonyl halides. (At least five mono-functional examples ofeach class including aromatic and aliphaticcompounds should be covered with their common names.) b) Common and IUPAC systems of nomenclature of organic compoundsIUPAC nomenclature of all classes of compounds: nomenclature of mono- substituted and poly-substituted compoundsshould be covered. Structural isomerism in organiccompounds	12	1. Organic Chemistry, Robert Thornton Morrison, Robert Neilson Boyd, 6th edition, Doring Kindersley (India) Pvt.Ltd., 2009, Chapter-1. 2. Pharmaceutical Organic Chemistry, Dr. Rama Rao Nadendla, Victory publishers, Chapters- 3,6.

2	**Alkanes*, Alkenes* and Conjugateddienes*** i. Halogenation of alkanes, uses ofparaffins. . Stabilities of alkenes, El and E2 reactions— kinetics, order of reactivity of alkylhalides, rearrangement of carbocations, Saytzeff'sorientation, Hofmann orientation and evidences. Factors affecting El and E2 reactions. iii. Chemical Reactions: Ozonolysis, electrophilic addition reactions of alkenes, Markownikoff's orientation, free radical addition reactions ofalkenes, Anti Markownikoff's orientation iv. Stability of conjugated dienes, Diel's-Alder, 1,2 and 1,4- electrophilic addition,free radical addition reactions of conjugated dienes,allylic rearrangement names.	10	1. Organic Chemistry, Robert Thornton Morrison, Robert Neilson Boyd, 6th edition, Doring Kindersley (India) Pvt. Ltd., 2009, Chapters3,8,9,11. 2. Advanced organic chemistry Reaction and Mechanisms,Maya Shankar Singh, Pearson education (Singapore) Pvt. Ltd- 2005, Chapters 4,5,6. 3. Pharmaceutical Organic Chemistry, Dr.Rama Rao Nadendla, Victory publishers, Chapters 7,9,10,11.
3	**a) Alkyl halides*** i. SN1 and SN2 reactions - kinetics, order ofreactivity of alkyl halides, stereochemistry and rearrangement of carbocations. SN1 versus SN2 reactions, factors affecting SN1 and SN2 reactions. ii. b.Structure and uses of ethylchloride, chloroform, trichloroethylene, dichloromethane, tetrachloromethane and iodoform. **b) Alcohols*** - Qualitative tests, structure and uses of ethyl alcohol, chlorobutanol, cetosteryl alcohol, benzyl alcohol, glycerol, and propylene glycol, *Polyalcohols in pharmaceutical use.*	8	1.Advanced organic chemistry Reactionand Mechanisms, Maya Shankar Singh, Pearson education (Singapore)Pte.Ltd-2005, Chapter- 3. 2. Pharmaceutical Organic Chemistry, Dr. RamaRao Nadendla, Victory publishers, Chapters12,13. 3. Organic Chemistry, Robert Thornton Morrison, Robert Neilson Boyd, 6th edition, DoringKindersley (India) Pvt.Ltd., 2009, Chapters-5,6.
4	**Carbonyl compounds* (Aldehydes andketones)** i. Nucleophilic addition, Electromeric effect, Aldol condensation, Crossed Aldolcondensation, Cannizzaro reaction, Crossed Cannizzaro reaction, Benzoin condensation, and Perkincondensation. ii. Qualitative tests, structure and uses of formaldehyde, paraldehyde, acetone, chloralhydrate, benzaldehyde, vanillin, and cinnamaldehyde.	8	1. Pharmaceutical Organic Chemistry, Dr.Rama Rao Nadendla, Victory publishers, Chapters 16,17. 2. Organic Chemistry, Robert Thornton Morrison, Robert Neilson Boyd, 6th edition, Doring Kindersley (India) Pvt.Ltd., 2009, Chapters18,21.
	a) Carboxylic acids* i. Acidity of carboxylic acids, effect of substituent/s on acidity, qualitative tests for carboxylic acids, amide and ester. Reactionsof interconversion of carboxylic acids, amides and esters. ii. Structure and uses of acetic acid, lacticacid, tartaric acid/s, citric acid, succinic acid, oxalic acid, salicylic		1. Organic Chemistry, Robert Thornton Morrison, Robert Neilson Boyd, 6th edition, Doring Kindersley (India) Pvt.Ltd., 2009, Chapters 19,20,22,23. 2. Pharmaceutical Organic

5	acid, benzoic acid, benzylbenzoate, dimethyl phthalate, methyl salicylate and acetyl salicylic acid. **b) Aliphatic amines*** - Basicity, effect ofsubstituent on basicity, qualitative test, structure and uses of ethanolamine, ethylenediamine	7	Chemistry,Dr.Rama Rao Nadendla, Victory publishers, Chapters 18, 19, 21.
	TOTAL	**45**	

Reference Books (Latest Editions to be adopted):

1. A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press of University of London, 4th edition.
2. A.I. Vogel, Text Book of Quantitative Organic 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

Syllabus of First Year B. Pharm. (CBCS)

BP208P. PHARMACEUTICAL ORGANIC CHEMISTRY – I (Practical)
4 Hours / Week
(PRACTICAL 60 HOURS)

Teaching Scheme	**Examination Scheme:**
Lectures:	In SEM Exam:15 Marks
Practical: 04Hr/Week	End SEM Exam:35 Marks
Tutorials:	Continuous Assessment:
Credits: 2	Total Marks: 50 Marks

Course Outcomes:

CO's	**Course Outcomes**	**Bloom Taxonomy**	
Upon completion of this course students will be able to		**Level**	**Descriptor**
CO 1	Understand safety measures to be taken and handling of accidents happened in laboratory	1	Recall facts and basic concept
CO 2	Learn Basic techniques used in chemistry laboratory	2	Explain ideas or concept
CO 3	Perform systemic quantitative analysis of unknown organic compounds	3	Apply
CO 4	Confirm the structure by preparation of suitable derivative of the organic compound	3	Apply
CO 5	Building molecular models of structures containing various functional groups	3	Apply
CO 6	Differentiate compounds with same color, odor, texture etc.	3	Apply

Mapping of Course Outcomes to Program Outcomes:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
CO1	3	2	3	2	-	1	-	1	-	-	3
CO2	3	1	1	1	-	1	-	-	-	-	1
CO3	3	2	1	2	-	2	2	-	3	2	1
CO4	3	1	1	2	-	1	-	2	-	2	1
CO5	3	1	1	2	-	3	-	-	-	-	1
CO6	3	1	1	2	-	2	-	-	-	1	1

COURSE CONTENT

Sr. No.	**Name of Experiment**	**Duration**	**References**
I	Introduction to Safety measures while working in Chemistry Lab. & To study the general glassware used in lab	**04**	Vogel text book of practical organic chemistry, 5th edition
II	Determination of physical constant of given organic compound	**04**	Vogel text book of practical organic chemistry, 5th edition
III	To study preparation of various reagents required for Systematic qualitative analysis of unknown organic compounds	**04**	Vogel text book of practical organic chemistry, 5th edition

IV to VIII	Systematic qualitative analysis of unknown organic compounds like • Preliminary test: Color, odour, aliphatic/ aromatic compounds, saturation and unsaturation, etc. • Detection of elements like Nitrogen, Sulphur and Halogen by Lassaigne's test • Solubility test • Functional group test like Phenols, Amides/ Urea, Carbohydrates, Amines, Carboxylic acids, Aldehydes and Ketones, Alcohols, Esters, Aromatic and Halogenated Hydrocarbons, Nitro compounds and Anilides. • Melting point/Boiling point of organic compounds • Identification of the unknown compound from the literature using melting point/ boiling point. • Preparation of the derivatives and confirmation of the unknown compound by melting point/ boiling point.	**20**	1. Vogel text book of practical organic chemistry, 5th edition, Pg.No.1198 to 1234 2. Practical Pharmaceutical Chemistry-II and viva-voce by N. Sharma, 17th edition, chapter-1, Pg.No.1 to 2. 3. Advanced practical organic chemistry by O.P. Agarwal, 17th edition, chapter-3, pg.no.19 to 23
IX to XII	Preparation of suitable solid derivatives from organic compounds- • To prepare Picric Acid from Phenol • To prepare acetanilide from aniline • To prepare the benzoic acid from benzamide • To prepare Aspirin from Salicylic acid • To synthesize and characterize Iodoform from ethyl alcohol (Haloform Test)	**16**	1. Vogel text book of practical organic chemistry, 5th edition, Pg.No.1234 to 1286 2. Advanced practical organic chemistry by O.P. Agarwal, 17th edition, chapter-8, pg.no.90 to 213
XIII -XV	Construction of molecular models n-butane, tertiary butane, cyclohexane cyclohexylamine, benzene, aniline, phenol etc.	**12**	1. Organic chemistry by Morrison and Boyd, 6th edition. 2. Principles of Pharmaceutical Organic Chemistry by Rama Rao Nadendla, Unit-1.

Reference Books (Latest Editions to be adopted):

1. Morrison, R. T. & Boyd, R. D., Textbook of Organic Chemistry, VI (ed.) ELBS, London, 1996
2. Pine, S. H, Organic Chemistry, V, Tata McGraw Hill, New Delhi, 2007
3. Finar, I. L., Organic Chemistry Vol. I, V (ed.), ELBS, Pearson Education, New Delhi, 2003
4. Finar, I. L., Organic Chemistry Vol. II, V (ed.), ELBS, Pearson Education, New Delhi, 2003
5. Eliel, E. L., "Stereochemistry of Carbon Compounds", Wiley-lnterscience, 1994.
6. Indian Pharmacopoeia

Syllabus of First Year B. Pharm. (CBCS)

SUBJECT: BP203T. PHARMACEUTICAL BIOCHEMISTRY
(THEORY 45 HOURS)

Teaching Scheme	**Examination Scheme:**
Lectures: 03Hr/Week	In SEM Exam:25 Marks
Practical:	End SEM Exam:75 Marks
Tutorials: 01Hr/Week	Continuous Assessment: 10 Marks
Credits: 4	Total Marks: 100 Marks

Scope

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

Course Objectives:

Upon completion of course the students shall able to

1. Understand the catalytic role of enzymes and importance of enzyme in biochemical process.
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.

Course Outcomes:

CO's	**Course Outcomes**	**Bloom Taxonomy**	
Upon completion of this course students will be able to		**Level**	**Descriptor**
CO 1	understand the scope of Biochemistry in Pharmacy and Understand role of biochemical processes in cell metabolism.	1	Remember
CO 2	Clarify basic principles of chemistry, function, classification, biological importance, qualitative tests & applications of various bio-molecules e.g. proteins, carbohydrates, lipids, nucleic acids and vitamins.	2	Remember
CO 3	Explain basic types, their structures, biochemical functions & importance of biomolecules.	3	Remember and Understand
CO 4	Know the study of nucleic acids	3	Remember
CO 5	Establish the correlation of metabolism, process, steps involved in metabolism of biomolecules	3	Understand , Analyze and Apply
CO 6	Understand the basic concepts the enzyme structures, their functions, mechanism for activity and application	3	Remember and Understand

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	0	1	1	0	2	0	0	2	1	2
CO2	2	0	0	0	0	0	0	0	0	2	1
CO3	2	0	0	0	0	0	0	0	0	0	2
CO4	2	0	0	0	0	0	0	0	0	0	2
CO5	2	0	0	0	0	0	0	0	0	0	3
CO6	2	0	0	0	0	0	0	0	2	0	3

COURSE CONTENTS

Unit	Details	Hrs	References
1	**a) Biomolecules** Introduction, classification, chemical nature and biological role of carbohydrates, lipids, nucleic acids, amino acids and proteins. **b)** Carbohydrate metabolism i. Glycolysis – Pathway, energetics andsignificance. ii. Citric acid cycle- Pathway, energetics and significance. iii. HMP shunt and its significance; Glucose-6-Phosphate dehydrogenase (G6PD) deficiency. iv. Glycogen metabolism Pathways and glycogenstorage diseases (GSD). v. Gluconeogenesis- Pathway and its significance. vi. Hormonal regulation of blood glucose level and Diabetes mellitus **Water, Acids, Bases, pH, Buffer**	10	1. David Nelson and Cox M. M., Lehninger's Principles of Biochemistry, 4/Ed., Palgrave Macmillon. 2. Robert K. Murry, DarylK., Granner and Victor W.Rodwell, Harper's Biochemistry, 27/Ed, McGraw Hill. 3. Lubert Stryer, W.H., Freeman & Company, Biochemistry, New York 4. U. Satyanarayana & U. Chakrapani, Biochemistry,3/Ed., Books & Allied (P) Ltd. 5. Rao, A. V. S. S. Rama Rao, Textbook of Biochemistry, first edition, UBS Publishers' DistributorsPvt. Ltd
2	a) **Biological oxidation** i. Electron transport chain (ETC) and its mechanism. ii. Oxidative phosphorylation & its mechanismand substrate level. Phosphorylation Inhibitor iii. ETC and oxidative phosphorylation / uncouplers. b) Bioenergetics i. Concept of free energy, endergonic and exergonic reaction, relationship between free energy, enthalpy and entropy. ii. Energy rich compounds; classification; biological significances of ATP and cyclic AMP	10	1. David Nelson and Cox M. M., Lehninger's Principles of Biochemistry, 4/Ed., Palgrave Macmillon. 2. Robert K. Murry, Daryl K., Granner and Victor W. Rodwell, Harper's Biochemistry, 27/Ed, McGraw Hill. 3. Lubert Stryer, W.H., Freeman & Company, Biochemistry, New York 4. U. Satyanarayana & U. Chakrapani, Biochemistry, 3/Ed., Books & Allied (P) Ltd. 5. Rao, A. V. S. S. Rama Rao, Textbook of Biochemistry, first edition, UBS Publishers' Distributors Pvt. Ltd

3	**a) Lipid metabolism** i. β-Oxidation of saturated fatty acid (Palmitic acid). ii. Formation and utilization of ketone bodies; ketoacidosis. iv. De novo synthesis of fatty acids (Palmitic acid). Biological significance of cholesterol and conversion of cholesterol into bile acids, steroid hormone and vitamin D. v. Disorders of lipid metabolism: hypercholesterolemia, atherosclerosis, fatty liverand obesity. vi. Physical property-emulsification. vii. Chemical properties- saponification number, Rancidity, acid number, Iodine number and Reichert – Meissl number. **b) Amino acid metabolism** i. General reactions of amino acid metabolism: Transamination, deamination & decarboxylation, urea cycle and itsdisorders. ii. Catabolism of phenylalanine and tyrosine and their metabolic disorders (Phenyketonuria, alkaptonuria, tyrosinemia) iii. Synthesis and significance of biological substances; 5-HT, melatonin, dopamine, noradrenaline, adrenaline iv. Catabolism of heme; hyperbilirubinemia Physical properties: salting in and salting out and denaturation.	10	1. David Nelson and Cox M. M., Lehninger's Principles of Biochemistry, 4/Ed., Palgrave Macmillon. 2. Robert K. Murry, DarylK., Granner and Victor W.Rodwell, Harper's Biochemistry, 27/Ed, McGraw Hill. 3. Lubert Stryer, W.H., Freeman & Company, Biochemistry, New York 4. U. Satyanarayana & U. Chakrapani, Biochemistry, 3/Ed., Books & Allied (P) Ltd. 5. Rao, A. V. S. S. RamaRao, Textbook of Biochemistry, first edition, UBS Publishers' DistributorsPvt. Ltd
4	**Nucleic acid metabolism and genetic information transfer** i. Biosynthesis of purine and pyrimidine nucleotides. ii. Catabolism of purine nucleotides and hyperuricemia and gout disease. iii. Organization of mammalian genome. iv. Structure of DNA and RNA and their functions. v. DNA replication (semi conservative model) vi. Transcription or RNA synthesis. vii. Genetic code, Translation or Protein synthesis and inhibitors.	10	1. David Nelson and Cox M. M., Lehninger's Principles of Biochemistry, 4/Ed., Palgrave Macmillon. 2. Robert K. Murry, DarylK., Granner and Victor W.Rodwell, Harper's Biochemistry, 27/Ed, McGraw Hill. 3. Lubert Stryer, W.H., Freeman & Company, Biochemistry, New York 4. U. Satyanarayana & U. Chakrapani, Biochemistry, 3/Ed., Books & Allied (P) Ltd. 5. Rao, A. V. S. S. Rama Rao, Textbook of Biochemistry, first edition, UBS Publishers' DistributorsPvt. Ltd

5	**Enzymes** i. Introduction, properties, nomenclature and IUB classification of enzymes. ii. Enzyme kinetics (Michaelis plot, Line Weaver Burke plot). iii. Enzyme inhibitors with examples. iv. Regulation of enzymes: enzyme induction and repression, allosteric enzyme-regulation. v. Therapeutic and diagnostic applications of enzymes and isoenzymes. vi. Coenzymes–Structure and biochemical functions; Co-factors.	7	1. David Nelson and Cox M. M., Lehninger's Principles of Biochemistry, 4/Ed., Palgrave Macmillon. 2. Robert K. Murry, Daryl K., Granner and Victor W. Rodwell, Harper's Biochemistry, 27/Ed, McGraw Hill. 3. Lubert Stryer, W.H., Freeman & Company, Biochemistry, New York 4. U. Satyanarayana & U. Chakrapani, Biochemistry, 3/Ed., Books & Allied (P) Ltd. 5. Rao, A. V. S. S. Rama Rao, Textbook of Biochemistry, first edition, UBS Publishers' Distributors Pvt. Ltd.
	TOTAL	**45**	

Reference Books (Latest Editions to be adopted):

Syllabus of First Year B. Pharm. (CBCS)

PHARMACEUTICAL BIOCHEMISTRY (Practical)
4 BP209P. Hours / Week
SUBJECT: BP209P PHARMACEUTICAL BIOCHEMISTRY
(PRACTICAL 60 HOURS)

Teaching Scheme	**Examination Scheme:**
Lectures:	In SEM Exam:15 Marks
Practical: 04Hr/Week	End SEM Exam:35 Marks
Tutorials:	Continuous Assessment:
Credits: 2	Total Marks: 50 Marks

Course Outcomes:

CO's	Course Outcomes	Bloom Taxonomy	
		Level	**Descriptor**
CO 1	Fundamentals and practical aspects of principles carbohydrates byvarious qualitative as well as quantitative chemical test	1	Remember and understand
CO 2	To study reaction for Separate, identify and characterizecarbohydrate and proteins, amino acids	2	Create, evaluate and analyze
CO 3	Estimate amino acid and proteins in a given sample.	3	Evaluate and analyze
CO 4	Explain basic concepts and principles of qualitative and quantitative aspects of carbohydrate, proteins, amino acids, enzyme and determination various biomolecules	3	Evaluate and analyze
CO 5	Study of various practical aspects of temperature programming study	3	Evaluate, Apply and analyze
CO 6	Understand the basic concepts and applications of buffer and measurement of PH	3	Apply and analyze

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	2	2	2	1	-	1	-	-	2	1	3
CO2	2	2	2	1	-	-	-	-	-	-	2
CO3	2	2	2	1	-	-	-	-	-	-	0
CO4	2	-	1	-	-	-	-	-	-	-	3
CO5	2	2	1	3	-	-	-	-	-	-	2
CO6	2	2	1	3	-	-	-	-	-	-	2

COURSE CONTENT

Sr. No.	Name of Experiment	Hrs	References
I	Qualitative analysis of carbohydrates (Glucose, Fructose, Lactose, Maltose, Sucrose and Starch)	**24**	1.David T. Plummer, Introduction of Practical Biochemistry. 3/Ed, Tata McGraw-Hill Education Pvt.Ltd. 2. Rajagopal and Ramakrishna,Practical Biochemistry for Medical students, Orient Black Swan (1983) 3. Harold Varley, Varley's Practical Clinical Biochemistry,6/Ed., CBS Publishers, New Delhi. 4.David T. Plummer, Introduction to Practical Biochemistry, III (ed.), McGraw-Hill Publishing Co., New York, 1987. 5.Alan H. Gowenlock, Varley's Practical Clinical Biochemistry, VI (ed.), ButterworthHeinemannLtd., UK & CBS Publication, New Delhi, 2002.

			6. Practical handbook by kaleand kale, Nirali publication
II	Identification tests for amino acids(any one aromatic and one aliphatic)	**4**	1.David T. Plummer, Introduction of Practical Biochemistry. 3/Ed, Tata McGraw-Hill Education Pvt.Ltd. 2. Rajagopal and Ramakrishna,Practical Biochemistry for Medical students, Orient BlackSwan (1983) 3. Harold Varley, Varley's Practical Clinical Biochemistry,6/Ed., CBS Publishers, New Delhi. 4.David T. Plummer, Introduction to Practical Biochemistry, III (ed.), McGraw-Hill Publishing Co., New York, 1987. 5.Alan H. Gowenlock, Varley's Practical Clinical Biochemistry, VI (ed.), ButterworthHeinemann Ltd., UK & CBS Publication,New Delhi, 2002. 6. Practical handbook by kale and kale, Nirali publication
III	Identification tests for proteins (albumin and casein, gelatin)	**12**	**1.** Indian Pharmacopoeia **2.** Beckett A. H., Stenlake J. B.,Practical Pharmaceutical Chemistry, Vol. I & II, 2nd edition, Athlone Press, University of London, London, 1970 6.Vogel A.I., Textbook of Quantitative Inorganic Analysis, 2nd edition, Longman Green and Co., London, 1951
IV.	Qualitative analysis of urine for abnormal constituents (at least fourabnormal constituents)	**16**	1.David T. Plummer, Introduction of Practical Biochemistry. 3/Ed, Tata McGraw-Hill Education Pvt.Ltd. 2. Rajagopal and Ramakrishna,Practical Biochemistry for Medical students, Orient BlackSwan (1983) 3. Harold Varley, Varley's Practical Clinical Biochemistry, 6/Ed., CBS Publishers, New Delhi. 4.David T. Plummer, Introduction to Practical Biochemistry, III (ed.), McGraw-Hill Publishing Co., New York, 1987. 5.Alan H. Gowenlock, Varley's Practical Clinical Biochemistry, VI (ed.), ButterworthHeinemannLtd., UK & CBS Publication, New Delhi, 2002. **3.** Practical handbook by kaleand kale, Nirali publication
V	Preparation of buffer solution and measurement of pH (any two).	**8**	1.David T. Plummer, Introduction of Practical Biochemistry. 3/Ed, Tata McGraw-Hill Education Pvt.Ltd. Rajagopal and Ramakrishna,Practical Biochemistry for Medical students, OrientBlackSwan (1983) 3. Harold Varley, Varley's Practical Clinical Biochemistry, 6/Ed., CBS Publishers, New Delhi. 4.David T. Plummer, Introduction to Practical Biochemistry, III (ed.), McGraw-Hill Publishing Co., New York, 1987. 5.Alan H. Gowenlock, Varley's Practical Clinical Biochemistry, VI (ed.), ButterworthHeinemannLtd., UK & CBS Publication, New Delhi, 2002. 6.Practical handbook by kaleand kale, Nirali publication
VI	Determination of blood creatinine, sugar,cholesterol	**12**	1.David T. Plummer, Introduction of Practical Biochemistry. 3/Ed, Tata McGraw-Hill Education Pvt.Ltd. 2. Rajagopal and Ramakrishna,Practical Biochemistry for Medical students, Orient BlackSwan (1983) 3. Harold Varley, Varley's Practical Clinical

			Biochemistry,6/Ed., CBS Publishers, New Delhi. 4.David T. Plummer, Introduction to Practical Biochemistry, III (ed.), McGraw-Hill Publishing Co., New York, 1987. 5.Alan H. Gowenlock, Varley's Practical Clinical Biochemistry, VI (ed.), ButterworthHeinemannLtd., UK & CBS Publication, New Delhi, 2002. 2.Practical handbook by kaleand kale, Nirali publication
VII	Quantitative analysis of reducing sugars (DNSA method) and Proteins (Biuret method).	**8**	1.David T. Plummer, Introduction of Practical Biochemistry. 3/Ed, Tata McGraw-Hill Education Pvt.Ltd. 2. Rajagopal and Ramakrishna,Practical Biochemistry for Medical students, Orient Black Swan (1983) 3. Harold Varley, Varley's Practical Clinical Biochemistry, 6/Ed., CBS Publishers, New Delhi. 4.David T. Plummer, Introduction to Practical Biochemistry, III (ed.), McGraw-Hill Publishing Co., New York, 1987. 5.Alan H. Gowenlock, Varley's Practical Clinical Biochemistry, VI (ed.), Butterworth Heinemann Ltd, UK & CBS Publication, New Delhi, 2002. 6.Practical handbook by kaleand kale, Nirali publication
VII	Study the effect of temperature on salivary amylase activity and its activity and substrate activity determination	**8**	1.David T. Plummer, Introduction of Practical Biochemistry. 3/Ed, Tata McGraw-Hill Education Pvt.Ltd. 2. Rajagopal and Ramakrishna,Practical Biochemistry for Medical students, Orient Black Swan (1983) 3. Harold Varley, Varley's Practical Clinical Biochemistry,6/Ed., CBS Publishers, New Delhi. 4.David T. Plummer, Introduction to Practical Biochemistry, III (ed.), McGraw-Hill Publishing Co., New York, 1987. 5.Alan H. Gowenlock, Varley's Practical Clinical Biochemistry, VI (ed.), ButterworthHeinemannLtd., UK & CBS Publication New Delhi, 2002. 6.Practical handbook by kaleand kale, Nirali publication,
VIII	Pathology Lab training for estimation ofblood and urine various constituents by using modern instruments.	**2 days**	

Syllabus of First Year B. Pharm. (CBCS)

SUBJECT: BP204T PATHOPHYSIOLOGY
(THEORY 45 HOURS)

Teaching Scheme	**Examination Scheme:**
Lectures: 03Hr/Week	In SEM Exam:25 Marks
Practical:	End SEM Exam:75 Marks
Tutorials: 01Hr/Week	Continuous Assessment: 10 Marks
Credits: 4	Total Marks: 100 Marks

Scope

This subject deals with the cause, mechanism of action, signs & symptoms, complications of various disease conditions. Also deals with the drug safety, rational use of drug and effective of drug.

Course Objectives:

Upon completion of the course a student shall be able to understand

- Describe the etiology and pathogenesis of the selected disease states
- Name the signs and symptoms of the diseases
- Mention the complications of the diseases.
- **Course Outcomes:**

CO's	**Course Outcomes**	**Bloom Taxonomy**	
		Level	**Descriptor**
CO 1	The students should be able to understand the basic principles of Cell injury and adaption. Able to understand the Cell morphology, causes, pathology ,celldeath, electrolyte imbalance in human body	1	Recall factsand basic concept ofcell injury
CO 2	The students able to understand basic concept about inflammationTypes, Mechanism of action, signs and symptoms Role of blood components in inflammation	1,3	Recall facts and basic concept of inflammation and Apply
CO 3	The students able to understand the Cardiovascular System Able to understand the pathophysiology of disease related heart,lung, renal Able to understand the cause, signs and symptoms, complication ofthe disease related to heart	1,3 5,	Recall factsand basic concept of inflammation, apply Evaluating
CO 4	The students able to understand the disease related to blood components The students able to understand the disease related to endocrinesystem, nervous system, GI The students able to understand cause, signs and symptoms, complication of the disease	1,3,5	Recall factsand basic concept of inflammation, apply and Evaluating
CO 5	The students able to understand the basic concepts, causes,pathophysiology, complications of disease related bones	1,3,5	Recall factsand basic concept of inflammation, apply and Evaluating
CO 6	The students able to understand the concepts of Infectious diseaseTo understand about the preventive measures to be taken for Infectious disease	3	Apply

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	3	-	3	-	1	1	2	2	1	-	2
CO2	3	2	3	-	1	1	2	2	1	-	2
CO3	3	2	3	2	1	2	2	2	2	1	2
CO4	3	2	3	2	1	2	2	2	2	1	2
CO5	3	2	3	2	1	2	2	2	2	1	2
CO6	3	2	3	2	1	2	2	2	2	1	2

COURSE CONTENTS

Unit	Details	Hrs	References
1	**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), Morphologyof cell injury – Adaptive changes (Atrophy, Hypertrophy, hyperplasia, Metaplasia, Dysplasia), Cell swelling, Intra cellular accumulation, Calcification, Enzyme leakage andCell Death Acidosis &Alkalosis, Electrolyte imbalance **Basic mechanism involved in the process ofinflammation and repair** Introduction, Clinical signs of inflammation, Different types of Inflammation, Mechanism ofInflammation – Alteration in vascular permeability and blood flow, migration of WBC's, Mediators of inflammation, Basic principles of wound healing in the skin, Basic principles of wound healing in the skin	10	1. Harsh Mohan; Text book of Pathology; 6 th edition; India; Jaypee Publications; 2010 2. Laurence B, Bruce C, Bjorn K. ; Goodman Gilman's The Pharmacological Basisof Therapeutics; 12 th edition; New York; McGraw-Hill; 2011 3. Guyton A, John .E Hall; Textbook of Medical Physiology; 12th edition; WB Saunders Company; 2010.
2	**Cardiovascular System:** Hypertension, Congestive heart failure, Ischemicheart diseases (angina, myocardial infarction, atherosclerosis and arteriosclerosis) **Respiratory system:** Asthma, Chronic obstructive airways diseases **Renal system:** Acute and chronic renal failure	10	1. Harsh Mohan; Text book of Pathology; 6th edn; India; Jaypee Publications; 2010. 2. Laurence B, Bruce C, Bjorn K. ; Goodman Gilman's The Pharmacological Basisof Therapeutics; 12 th edition; New York; McGraw-Hill; 2011. 3. William and Wilkins, Baltimore;1991 [1990 printing]. 4. Nicki R. Colledge, Brian R. Walker, Stuart H. Ralston; Davidson'sPrinciples and Practiceof Medicine; 21st edition; London; ELBS/ Churchill Livingstone; 2010.
3	**Hematological Diseases:** Iron deficiency, megaloblastic anemia (Vit. B12 and folic acid), sickle cell anemia, thalassemia, hereditary acquired anemia, hemophilia **Endocrine system:**	12	1. Harsh Mohan; Text book of Pathology; 6th edition; India; Jaypee Publications; 2010. 2. Laurence B, Bruce C, Bjorn K. ; Goodman Gilman's The Pharmacological Basis of Therapeutics; 12 thedition; New York; McGraw-Hill; 2011

	Diabetes, thyroid diseases, disorders of sexhormones **Nervous system:** Epilepsy, Parkinson's disease, stroke, psychiatricdisorders: depression, schizophrenia and Alzheimer's disease. **Gastrointestinal system:** Peptic Ulcer, Inflammatory Bowel Diseases, Jaundice,Hepatitis (A,B,C,D,E,F), Alcoholic liver disease		3. Best, Charles Herbert1899-1978; Taylor,Norman Burke 1885-1972; West, John B (John Burnard); Best and Taylor'sPhysiological basis of medical practice; 12th ed; united states; 4. William and Wilkins, Baltimore;1991 [1990 printing]. 5. Nicki R. Colledge, Brian R. Walker, Stuart H. Ralston; Davidson's Principles and Practice of Medicine; 21st edition; London; ELBS/ Churchill Livingstone; 2010 6. Guyton A, John .E Hall; Textbook of Medical Physiology; 12 th edition; WB Saunders Company; 2010.
4	**Diseases of bones and joints** Rheumatoid Arthritis, Osteoporosis, Gout **Cancer:** Classification, etiology and pathogenesis of cancer	6	1. Harsh Mohan; Textbook of Pathology;6 th edition; India;Jaypee Publications; 2010. 2. Laurence B, BruceC,Bjorn K.;Goodman Gilman'sThe Pharmacological Basis of Therapeutics; 12 thedition; New York; McGraw-Hill; 2011 3. Best,CharlesHerbert 1899-1978;Taylor,Norman Burke 1885-1972;West, John B (JohnBurnard); Best andTaylor's Physiological basisof medical practice;12th ed; united states; 4. William andWilkins, Baltimore;1991 [1990 printing]. 5. Nicki R. Colledge, Brian R. Walker,Stuart H. Ralston; Davidson'sPrinciples and Practice of Medicine; 21stedition; London;ELBS/ Churchill Livingstone; 2010 6. Guyton A, John .EHall; Textbook ofMedical Physiology; 12 thedition; WBSaunders Company; 2010.
5	**Infectious diseases** Tuberculosis, Leprosy, Malaria, Dengue, Meningitis, Typhoid, Urinary tract infections **Sexually transmitted diseases** AIDS, Syphilis, Gonorrhea	7	1. V. Kumar, R. S. Cotranand S. L. Robbins; Basic Pathology; 6 th edition; Philadelphia; WB SaundersCompany; 1997. 2. Roger Walker, Clive Edwards; Clinical Pharmacy andTherapeutics; 3rd edition; London; Churchill Livingstonepublication; 2003. 3. Harsh Mohan; Text book of Pathology; 6 th edition; India; Jaypee Publications; 2010 4. Laurence B, Bruce C, Bjorn K. ; Goodman Gilman's, The Pharmacological Basis of Therapeutics; 12 th edition; New York; McGraw-Hill; 2011. 5. Guyton A, John .E Hall; Textbook of Medical Physiology; 12th edition; WB 6. Saunders Company;2010.
	TOTAL	**45**	

Recommended Journals

1. The Journal of Pathology. ISSN: 1096-9896 (Online)
2. International Journal of Physiology, Pathophysiology and Pharmacology. ISSN: 1944-8171 (Online)
3. The American Journal of Pathology. ISSN: 0002-9440

Syllabus of First Year B. Pharm. (CBCS)

SUBJECT: BP205T. COMPUTER APPLICATIONS IN PHARMACY
(THEORY 30 HOURS)

Teaching Scheme	**Examination Scheme:**
Lectures: 03Hr/Week	In SEM Exam:15 Marks
Practical:	End SEM Exam:50Marks
Tutorials:	Continuous Assessment: 10 Marks
Credits: 3	Total Marks: 75 Marks

Scope

This subject deals with the introduction Database Management system, computer application in clinical studies and use of database

Course Objectives:

Upon completion of the course a student shall be able to understand -

- The various types of application of computers in pharmacy
- The various types of database
- The application of database in pharmacy

Course Outcomes:

CO's	**Course Outcomes**	**Bloom Taxonomy**	
		Level	**Descriptor**
CO 1	know the various types of application of computers in pharmacy.	1	Recall facts and basic concept
CO 2	. know the various types of databases	2	Explain concept
CO 3	know the various applications of databases in pharmacy	2	Describing the study
CO 4	To study the application of computers in Pharmacy	3	Apply
CO 5	To know Concept of Bioinformatics	2	Explain
CO 6	Computers as data analysis in Preclinical development	3	Apply

Mapping of Course Outcomes to Program Outcomes:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
CO1	-	-	1	-	-	-	-	-	-	-	3
CO2	1	1	-	-	-	-	-	-	-	-	1
CO3	2	-	1	2	-	-	-	-	-	-	3
CO4	3	-	1	2	-	-	-	-	-	-	3
CO5	3	-	1	2	-	2	-	-	-	-	3
CO6	3	-	1	2	-	2	-	-	-	-	3

Syllabus of First Year B. Pharm. (CBCS)

COURSE CONTENTS

Unit	Details	Hrs	References
1	a) **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 b) **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	06	1. Computer Application in Pharmacy – William E.Fassett – Lea and Febiger,600 South Washington Square, USA,(215) 922-1330
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	06	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
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	06	Computer Application in Pharmaceutical Research and Development –Sean Ekins – Wiley-Interscience, A John Willey and Sons, INC., Publication, USA
4	**Bioinformatics:** Introduction, Objective of Bioinformatics, Bioinformatics Databases, Concept of Bioinformatics, Impact of Bioinformatics in Vaccine Discovery	06	Bioinformatics (Concept, Skills and Applications) – S.C.Rastogi-CBS Publishersand Distributors, 4596/1- A, 11 Darya Gani, New Delhi –110 002(INDIA)
5	**Computers as data analysis in Preclinical development:** Chromatographic dada analysis(CDS), Laboratory Information Management System (LIMS) and Text Information ManagementSystem(TIMS)	06	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
	TOTAL	**30**	

Syllabus of First Year B. Pharm. (CBCS)

BP210P COMPUTER APPLICATION IN PHARMACY (Practical)
4 Hours / Week
(PRACTICAL 60 HOURS)

Teaching Scheme	**Examination Scheme:**
Lectures:	In SEM Exam:5 Marks
Practical: 04Hr/Week	End SEM Exam:15 Marks
Tutorials:	Continuous Assessment: 5
Credits: 1	Total Marks: 25 Marks

Course Outcomes:

CO's	**Course Outcomes**	**Bloom Taxonomy**	
		Level	**Descriptor**
CO 1	Design a questionnaire using a word processing package to gather information about a particular disease. Create a HTML web page to show personal information	1	Recall facts and basic concept
CO 2	Retrieve the information of a drug and its adverse effects using online tools Creating mailing labels Using Label Wizard, generating label in MS WORD	2	Explain ideas or concept
CO 3	Create a database in MS Access to store the patient information with the required fields Using access Design a form in MS Access to view, add, delete and modify the patient record in the database	3	Apply
CO 4	Generating report and printing the report from patient database Creating invoice table using – MS Access	3	Apply
CO 5	Drug information storage and retrieval using MS Access Creating and working with queries in MS Access	3	Apply
CO 6	Exporting Tables, Queries, Forms and Reports to web pages Exporting Tables, Queries, Forms and Reports to XML pages	2	Explain the concept

Mapping of Course Outcomes to Program Outcomes:

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**
CO1	-	3	1	2	-	2	-	1	2	-	3
CO2	2	-	1	-	-	2	-	-	-	-	2
CO3	3	-	1	2	-	-	-	-	-	-	3
CO4	2	-	1	2	-	2	-	-	-	-	3
CO5	-	-	1	2	-	-	-	-	-	-	1
CO6	-	-	1	2	-	-	-	-	-	-	1

COURSE CONTENT

Sr. No.	Name of Experiment	Hrs.	References
I	**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	**10**	Microsoft office Access - 2003, Application Development UsingVBA, SQL Server, DAP and Infopath – Cary N.Prague – Wiley Dreamtech India (P) Ltd.,4435/7, Ansari Road, Daryagani,New Delhi – 110002
II	**3** Retrieve the information of a drug and its adverse effects using online tools **4** Creating mailing labels Using Label Wizard, generating label in MS WORD	**10**	**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.** Microsoft office Access - 2003, Application Development UsingVBA, SQL Server, DAP and Infopath – Cary N.Prague – Wiley Dreamtech India (P) Ltd.,4435/7, Ansari Road, Daryagani,New Delhi – 110002
III	**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	**10**	Microsoft office Access - 2003, Application Development UsingVBA, SQL Server, DAP and Infopath – Cary N.Prague – Wiley Dreamtech India (P) Ltd.,4435/7, Ansari Road, Daryagani, New Delhi – 110002
IV.	**7.** Generating report and printing the report from patient database **8.** Creating invoice table using – MS Access	**10**	Microsoft office Access - 2003, Application Development UsingVBA, SQL Server, DAP and Infopath – Cary N.Prague – Wiley Dreamtech India (P) Ltd., 4435/7, Ansari Road, Daryagani, New Delhi – 110002
V	**9.** Drug information storage and retrieval using MS Access **10.** Creating and working with queriesin MS Access	**10**	Microsoft office Access - 2003, Application Development UsingVBA, SQL Server, DAP and Infopath – Cary N.Prague – Wiley Dreamtech India (P) Ltd.,4435/7, Ansari Road, Daryagani, New Delhi – 110002
VI	**11.** Exporting Tables, Queries, Forms and Reports to web pages Exporting Tables, Queries, Formsand Reports to XML pages	**10**	Computer Application in Pharmaceutical Research and Development –Sean Ekins – Wiley-Interscience, A John Willey and Sons, INC.,Publication, USA
	Total	**60**	

Syllabus of First Year B. Pharm. (CBCS)

SUBJECT: BP 206 T. ENVIRONMENTAL SCIENCES
(THEORY 30 HOURS)

Teaching Scheme	**Examination Scheme:**
Lectures: 03Hr/Week	In SEM Exam:15 Marks
Practical:	End SEM Exam:50 Marks
Tutorials:	Continuous Assessment: 10 Marks
Credits: 3	Total Marks: 75Marks

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

Course Objectives:

Upon completion of the course a student shall be able to understand -

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..

Course Outcomes:

CO's	**Course Outcomes**	**Bloom Taxonomy**	
		Level	**Descriptor**
CO 1	To understand the multidisciplinary nature of environmental studies	1	Recall facts and basic concept
CO 2	To study about Natural Resources Renewable and non-renewable resources: Natural resources and associated problems a) 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	1,2	Recall facts and basic concept, Explain ideas or concept
CO 3	To explain the Ecosystems. Concept of an ecosystem. Structure and function of an ecosystem	3	Apply
CO 4	To understand the Introduction, types, characteristic features, structure and function of the ecosystems: Forest ecosystem; Grassland ecosystem; Desert ecosystem; Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)	3	Apply
CO 5	To study about pollution i. e Environmental Pollution: Air pollution; Water pollution; Soil pollution	3	Apply

Mapping of Course Outcomes to Program Outcomes:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	1	-	-	-	-	-	-	-	-	3	3
CO2	-	2	3	-	-	-	-	-		3	3
CO3	-	-	-	-	-	-	-	-	-	3	3
CO4	-	-	-	-	-	-	-	-	-	3	3
CO5	-	-	3	-	-	-	-	-	-	3	3

COURSE CONTENTS

Unit	Details	Hrs	References
1	The Multidisciplinary nature of environmentalstudies Natural Resources Renewable and non-renewable resources: Natural resources and associated problems a) 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	1. Y.K. Sing, EnvironmentalScience, New Age International Pvt, Publishers,Bangalore 2. Agarwal, K.C. 2001 Environmental Biology, NidiPubl. Ltd. Bikaner. 3. Bharucha Erach, The Biodiversity of India, Map in Publishing Pvt. Ltd., Ahmedabad – 380 013, India
2	Ecosystems ▪ Concept of an ecosystem. ▪ Structure and function of an ecosystem. ▪ Introduction, types, characteristic features, structure and function of the ecosystems: Forest ecosystem; Grasslandecosystem; Desert ecosystem; Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)	10	4.Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p 5. Clark R.S., Marine Pollution, Clanderson PressOxford
3	Environmental Pollution: Air pollution; Waterpollution; Soil pollution	10	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 forScience and Environment

Syllabus of First Year B. Pharm. (CBCS)

BP207MLC- **FUNCTIONAL ENGLISH II (2hrs/week)**

Teaching Scheme	**Examination Scheme:**
Lectures: 02Hr/Week	**Term End Exam: 35 Marks**
Practical: 02Hr/Week	Continuous Assessment:15
Credits: 0	Total Marks: 50 Marks

Course Objectives:

- to enable the learner to communicate effectively and appropriately in real-life situations
- to develop and integrate the use of listening, speaking, reading and writing skills in reality
- to enrich receptive and productive skills of the learners

Course Outcomes (CO's):

The Learners will be able to:

CO's	**Course Outcomes**	**Bloom's Taxonomy**	
		Level	**Descriptor**
CO 1	✓ apply the linguistic parameters learnt in everyday speaking and listening effectively	3	Apply
CO 2	✓ critically listen and interpret ideas or perspectives	3	Apply
CO 3	✓ make effective presentation and participate in discussions	3	Apply

Course Content:

Unit	**Content**	**No. of hrs.**
1.	What does she look like? Appearance and dress; clothing and clothing styles; people	02
2.	Have you ever been there? Past experiences; unusual activities	03
3.	It's a really nice city. Cities; hometowns; countries	02
4.	It's important to get rest. Health problems; medication and remedies; products in a pharmacy	03
5.	What would you like? Food and restaurants	02
6.	It's the coldest city! World geography and facts; countries	03
7.	What are you doing later? Invitations and excuses; free-time activities; telephone messages	02
8.	How have you changed? Life changes; plans and hopes for the future	03
	Total no. of training hours:	**20**

Prescribed Text Book:

S. No.	**Author(s)**	**Title of the Book**	**Publisher**	**Year of Publication**
1.	Jack C Richards with Jonathan Hull and Susan Proctor –1	Interchange (Book 2)	Cambridge University Press, Fifth Edition	2019

Reference Books:

S. No.	Author(s)	Title of the Book	Publisher	Year of Publication
1.	Jack C. Richards	Interchange (Book 2)	Cambridge University Press	2015
2.	Raymond Murphy	Essential English Grammar	Cambridge University Press, Second Edition	2016
3.	Jack C. Richards	Interchange (Book 2)	Cambridge University Press	2016
4.	Barun K Mitra	Effective Technical Communication	Oxford University Press	2017
5.	University of Cambridge	BEC Preliminary 1 (Exam Papers with answers)	Cambridge University Press	2010
6.	Lin Lougheed	Barron's all-books-in-one IELTS Superpack	Barrons Educational Services, Fifth Edition	2020

Web URL's:

1. www.onestopenglish.com
2. www.britishcouncil.org
3. www.learnenglishtoday.com
4. www.talkenglish.com
5. www.bogglesworldesl.com
6. www.learnenglish.britishcouncil.org/skills/listening/b1-listening
7. www.englishcentral.com/browse/videos?setLanguage=en
8. www.dialectsarchive.com/