D.T.E. Code - 3487

IDEAL INSTITUTE OF PHARMACY

EMPOWERING INDIA THROUGH KNOWLEDGE

Affiliated by the Mumbai University & Approved by AICTE New Delhi, DTE Maharastra.

1.3.1 Institution integrates crosscutting issues relevant to Professional Ethics, Gender, Human Values, Environment and Sustainability into the Curriculum

Principal
Ideal Institute of Pharmacy
Wada, Palghar

A Unit Of Ideal Foundation
At Village - Posheri, Taluka- Wada, District- Palghar, Maharashtra
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Sr.No.	Subject Name	Subject code	Semester	Year	Category
1.	Human Anatomy and Physiology-I	BP101T	I	I	Gender Equity
2.	Pharmaceutics-I	BP103T	I	I	Human Value and Professional Ethics
3.	Communication skills	BP105T	I	I	Gender Equity
4.	Human Anatomy and Physiology II	BP201T	II	I	Gender Equity
5.	Biochemistry	BP203T	II	I	Human Value and Professional Ethics
6.	Pathophysiology	BP204T	II	I	Gender Equity
7.	Environmental sciences	BP206T	II	I	Environmental and Sustainability Environmental
8.	Pharmaceutical Microbiology	BP303Y	III	II	Environmental
9.	Pharmaceutical Jurisprudence	BP505T	V	III	Professional Ethics
10.	Pharmaceutical Biotechnology	BP605T	VI	III	Human Value and Professional Ethics
11.	Social Preventive and Pharmacy	BP802T	VIII	IV	Human Value and Professional Ethics

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BP101T HUMAN ANATOMY AND PHYSIOLOGY-I (Theory)3 L + 1T / Week

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

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

1. Explain the gross morphology, structure and functions of various organs of the human body.
2. Describe the various homeostatic mechanisms and their imbalances.
3. Identify the various tissues and organs of different systems of human body.
4. Perform the various experiments related to special senses and nervous system.
5. Appreciate coordinated working pattern of different organs of each system
6.

Sr. No.	Content	Hours
1	**UNIT I**	10
1.1	**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	2
1.2	**Cellular level of organization** Structure and functions of cell, transport across cell membrane, cell division, cell junctions. General principles of cell communication, intracellular signaling pathway activation by extracellular signal molecule, Forms of intracellular signaling: a) Contact-dependent b) Paracrine c) Synaptic d) Endocrine	4
1.3	**Tissue level of organization** Classification of tissues, structure, location and functions of epithelial, muscular and nervous and connective tissues	4
2	**UNIT II**	10
2.1	**Integumentary system** Structure and functions of skin	1

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2.2	**Skeletal system** Divisions of skeletal system, types of bone, salient features and functions of bones of axial and appendicular skeletal system. Organization of skeletal muscle, physiology of muscle contraction, neuromuscular junction	**6**
2.3	**Joints** Structural and functional classification, types of joints movements and its articulation	**3**
3	**UNIT III**	**10**
3.1	**Body fluids and blood** Body fluids, composition and functions of blood, hemopoeisis, formation of hemoglobin, anemia, mechanisms of coagulation, blood grouping, Rh factors, transfusion, its significance and disorders of blood, Reticulo endothelial system.	**6**
3.2	**Lymphatic system** Lymphatic organs and tissues, lymphatic vessels, lymph circulation and functions of lymphatic system	**4**
4	**UNIT IV**	**08**
4.1	**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.	**3**
4.2	**Special senses** Structure and functions of eye, ear, nose and tongue and their disorders.	**5**
5	**UNIT V**	**07**
	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 hear beat, its regulation by autonomic nervous system, cardiac output, cardiac cycle. Regulation of blood pressure, pulse, electrocardiogram and disorders of heart.	**4** **3**

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BP107P HUMAN ANATOMY AND PHYSIOLOGY (Practical) 4 Hours/week

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

Recommended Books (Latest Editions)

1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brothers medical publishers, New Delhi.

2. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York

3. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co,Riverview,MI USA

4. Text book of Medical Physiology- Arthur C,Guyton andJohn.E. Hall. Miamisburg, OH, U.S.A.

5. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A

6. Textbook of Human Histology by Inderbir Singh, Jaypee brother's medical publishers, New Delhi. 7. Textbook of Practical Physiology by C.L. Ghai, Jaypee brother's medical publishers, New Delhi.

8. Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi.

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BP103T PHARMACEUTICS- I (Theory)3 L + 1T / Week

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

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

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

Sr. No.	Content	Hours
1	**UNIT I**	10
1.1	**Historical background and development of profession of pharmacy**: Historyof profession of Pharmacy in India in relation to pharmacy education, industry and organization, Pharmacy as a career, Pharmacopoeias: Introduction to IP, BP, USP and Extra Pharmacopoeia.	3
1.2	**Dosage forms:** Introduction to dosage forms, classification and definitions	3
1.3	**Prescription:** Definition, Parts of prescription, handling of Prescription andErrors in prescription.	2
1.4	**Posology:** Definition, Factors affecting posology. Pediatric dose calculationsbased on age, body weight and body surface area.	2
2	**UNIT II**	10
2.1	**Pharmaceutical calculations**: Weights and measures–Imperial & Metricsystem, Calculations involving percentage solutions, alligation, proof spirit and isotonic solutions based on freezing point and molecular weight.	4
2.2	**Powders:** Definition, classification, advantages and disadvantages,Simple &compound powders – official preparations, dusting powders, effervescent, efflorescent and hygroscopic powders, eutectic mixtures. Geometric dilutions.	3
2.3	**Liquid dosage forms:** Advantages and disadvantages of liquid dosage forms.Excipients used in formulation of liquid dosage forms. Solubility enhancement techniques	3

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	UNIT III	**10**
3.1	**Monophasic liquids:** Definitions and preparations of Gargles, Mouthwashes,Throat Paint, Eardrops, Nasal drops, Enemas, Syrups, Elixirs, Liniments and Lotions.	**3**
3.2	**Biphasic liquids:** ○ **Suspensions:** Definition, advantages and disadvantages, classifications,Preparation of suspensions; Flocculated and Deflocculated suspension & stability problems and methods to overcome. ○ **Emulsions:** Definition, classification, emulsifying agent, test for the identificationof type ofEmulsion, Methods of preparation & stability problems and methods to overcome.	**7**
4	**UNIT IV**	**08**
4.1	**Suppositories**: Definition, types, advantages and disadvantages, types of bases,methods of preparations. Displacement value & its calculations, evaluation of suppositories.	**5**
4.2	**Pharmaceutical incompatibilities**: Definition, classification, physical, chemicaland therapeutic incompatibilities with examples.	**3**
5	**UNIT V**	**07**
	Semisolid dosage forms: Definitions, classification, mechanisms and factorsinfluencing dermal penetration of drugs. Preparation of ointments, pastes, creams and gels. Excipients used in semi solid dosage forms. Evaluation of semi solid dosages forms	
	Total	**45**

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BP109P PHARMACEUTICSI (Practical) 4 Hours / week

1 .Syrups

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

2. Elixirs

a) Piperazine citrate elixir
b) Paracetamol pediatric elixir

3. Linctus

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

4. Solutions

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

5. Suspensions

a) Calamine lotion
b) Magnesium Hydroxide mixture
c) Aluminimum Hydroxide gel

6. Emulsions

a) Turpentine Liniment
b) Liquid paraffin emulsion

7. Powders and Granules

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

8. Suppositories

a) Glycero gelatin suppository
b) Coca butter suppository
c) Zinc Oxide suppository

8. Semisolids

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

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9. Gargles and Mouthwashes

a) Iodine gargle
b) Chlorhexidine mouthwash

Recommended Books: (Latest Editions)

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

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BP110P PHARMACEUTICAL INORGANIC CHEMISTRY (Practical)

4 Hours / Week

I Limit tests for following ions

a) Limit test for Chlorides and Sulphates
b) Modified limit test for Chlorides and Sulphates Limit test for Iron
c) Limit test for Heavy metals Limit test for Lead
d) Limit test for Arsenic

II Identification test

a) Magnesium hydroxide Ferrous sulphate Sodium Bicarbonate Calcium gluconate Copper sulphate

III Test for purity

a) Swelling power of Bentonite
b) Neutralizing capacity of aluminum hydroxide gel
c) Determination of potassium iodate and iodine in potassium Iodide

VI Preparation of inorganic pharmaceuticals

a) Boric acid
b) Potash alum
c) Ferrous sulphate

Recommended Books (Latest Editions)

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 Inorganic analysis
3. P. Gundu Rao, Inorganic Pharmaceutical Chemistry, 3rd Edition
4. M.L Schroff, Inorganic Pharmaceutical Chemistry
5. Bentley and Driver's Textbook of Pharmaceutical Chemistry
6. Anand & Chatwal, Inorganic Pharmaceutical Chemistry
7. IndianPharmacopoeia

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BP105T COMMUNICATION SKILLS (Theory) 2hours/week

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

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

1. Understand the 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

Sr. No.	Content	Hours
1	**UNIT I**	7
1.1	**Communication Skills:** Introduction, Definition, The Importance of Communication,The Communication Process – Source, Message, Encoding, Channel, Decoding, Receiver, Feedback, Context	3
1.2	**Barriers to communication:** Physiological Barriers, Physical Barriers, CulturalBarriers, Language Barriers, Gender Barriers, Interpersonal Barriers, Psychological Barriers, Emotional barriers	2
1.3	**Perspectives in Communication:** Introduction, Visual Perception, Language, Otherfactors affecting our perspective - Past Experiences, Prejudices, Feelings, Environment	2
2	**UNIT II**	7
2.1	**Elements of Communication:** Introduction, Face to Face Communication - Tone ofVoice, Body Language (Non-verbal communication), Verbal Communication, Physical Communication	3
2.2	**Communication Styles:** Introduction, The Communication Styles Matrix with examplefor each -Direct Communication Style, Spirited Communication Style, Systematic Communication Style, Considerate Communication Style	4

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3	**UNIT III**	**7**
3.1	**Basic Listening Skills:** Introduction, Self-Awareness, Active Listening, Becoming anActive Listener, Listening in Difficult Situations	**2**
3.2	**Effective Written Communication:** Introduction, When and When Not to Use WrittenCommunication - Complexity of the Topic, Amount of Discussion' Required, Shades of Meaning, Formal Communication	**3**
3.3	**Writing Effectively:** Subject Lines, Put the Main Point First, Know Your Audience,Organization of the Message	2
4	**UNIT IV**	**5**
4.1	**Interview Skills:** Purpose of an interview, Do's and Dont's of an interview	2
4.2	**Giving Presentations:** Dealing with Fears, Planning your Presentation, Structuring YourPresentation, Delivering Your Presentation, Techniques of Delivery	3
5	**UNIT V**	**4**
	Group Discussion: Introduction, Communication skills in group discussion, Do's andDont's of group discussion	
	Total	**30**

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BP111P COMMUNICATION SKILLS (Practical) 2 Hours / week

Thefollowing learning modules are to be conducted using wordsworth® English language lab software

1. **Basic communication covering the following topics**
   a. Meeting People
   b. Asking Questions
   c. Making Friends
   d. What did you do?
   e. Do's and Dont's
2. **Pronunciations covering the following topics**
   a. Pronunciation (Consonant Sounds)
   b. Pronunciation and Nouns
   c. Pronunciation (Vowel Sounds)
3. **Advanced Learning**
   a. Listening Comprehension / Direct and Indirect Speech
   b. Figures of Speech
   c. Effective Communication
   d. Writing Skills
   e. Effective Writing
   f. Interview Handling Skills
   g. E-Mail etiquette
   h. Presentation Skills

Recommended Books: (Latest Edition)

1. Basic communication skills for Technology, Andreja. J. Ruther Ford, 2nd Edition, Pearson Education, 2011
2. Communication skills, Sanjay Kumar, Pushpalata, 1stEdition, Oxford Press, 2011
3. Organizational Behaviour, Stephen .P. Robbins, 1stEdition, Pearson, 2012
4. Brilliant- Communication skills, Gill Hasson, 1stEdition, Pearson Life, 2011
5. The Ace of Soft Skills: Attitude, Communication and Etiquette for success, Gopala Swamy Ramesh, 5thEdition, Pearson, 2013
6. Developing your influencing skills, Deborah Dalley, Lois Burton, Margaret, Green hall, 1st Edition Universe of Learning LTD, 2010

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7. Communication skills for professionals, Konar nira, 2nd Edition, New arrivals – PHI, 2011
8. Personality development and soft skills, Barun K Mitra, 1st Edition, Oxford Press, 2011
9. Soft skill for everyone, Butter Field, 1st Edition, Cengage Learning Indipvt.ltd, 2011
10. Soft skills and professional communication, Francis Peters SJ, 1st Edition, Mc Graw Hill Education, 2011
11. Effective communication, John Adair, 4th Edition, Pan Mac Millan,2009
12. Bringing out the best in people, Aubrey Daniels, 2nd Edition, Mc Graw Hill, 1999

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BP201T HUMAN ANATOMY AND PHYSIOLOGY-II (Theory)3 L + 1T / Week

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

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

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

Sr. No.	Content	Hours
1	**UNIT I - Nervous system**	10
1.1	Organization of nervous system, neuron, neuroglia, classification and properties of nerve fibre, electrophysiology, action potential, nerve impulse, receptors, synapse, neurotransmitters.	4
1.2	Central nervous system: Meninges, ventricles of brain and cerebrospinal fluid. Structure and functions of brain (cerebrum, brain stem, and cerebellum), spinal cord (gross structure, functions of afferent and efferent nerve tracts,reflex activity).	6
2	**UNIT II**	6
2.1	**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.	4

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2.2	**Energetics** **Formation and role of ATP, Creatinine Phosphate and BMR.**	**2**
3	**UNIT III**	**10**
3.1	**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.**	**5**
3.2	**Urinary system** **Anatomy of urinary tract with special reference to anatomy of kidney and nephrons, functions of 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.**	**5**
4	**UNIT IV**	**10**
	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**	
5	**UNIT V**	**9**
5.1	**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**	**6**
5.2	**Introduction to genetics** **Chromosomes, genes and DNA, protein synthesis, genetic pattern of inheritance**	**4**

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BP207P HUMAN ANATOMY AND PHYSIOLOGY (Practical) 4 Hours/week

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

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

Recommended Books (Latest Editions)

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

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

Reference Books:

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

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BP203T BIOCHEMISTRY (Theory)3 L + 1T / Week

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

Objectives: Upon completion of course student shell able to:

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

Sr.No.	Content	Hours
1	**UNIT I**	8
1.1	**Biomolecules** Introduction, classification, chemical nature and biological role of carbohydrate, lipids, nucleic acids, amino acids and proteins	
1.2	**Bioenergetics** Concept of free energy, endergonic and exergonic reaction, Relationship between free energy, enthalpy and entropy; Redox potential.	
1.3	Energy rich compounds; classification; biological significances of ATP and cyclic AMP.	
2	**UNIT II**	10
2.1	**Carbohydrate metabolism** Glycolysis – Pathway, energetics and significance Citric acid cycle- Pathway, energetics and significance HMP shunt and its significance; Glucose-6-Phosphate dehydrogenase (G6PD) deficiency Glycogen metabolism Pathways and glycogen storage diseases (GSD) Gluconeogenesis- Pathway and its significance Hormonal regulation of blood glucose level and Diabetes mellitus	
2.2	**Biological oxidation** Electron transport chain (ETC) and its mechanism. Oxidative phosphorylation & its mechanism and substrate level	

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	phosphorylation Inhibitors ETC and oxidative phosphorylation/Uncouplers	
3	**UNIT III**	**10**
3.1	**Lipid metabolism** β-Oxidation of saturated fatty acid (Palmitic acid) Formation and utilization of ketone bodies; ketoacidosis De novo synthesis of fatty acids (Palmitic acid) Biological significance of cholesterol and conversion of cholesterol into bile acids, steroid hormone and vitamin D Disorders of lipid metabolism: Hypercholesterolemia, atherosclerosis, fatty liver and obesity.	
3.2	**Amino acid metabolism** General reactions of amino acid metabolism: Transamination, deamination & decarboxylation, urea cycle and its disorders Catabolism of phenylalanine and tyrosine and their metabolic disorders (Phenyketonuria, Albinism, alkeptonuria, tyrosinemia) Synthesis and significance of biological substances; 5-HT, melatonin, dopamine, noradrenaline, adrenaline Catabolism of heme; hyperbilirubinemia and jaundice	
4	**UNIT IV**	**10**
	Nucleic acid metabolism and genetic information transfer Biosynthesis of purine and pyrimidine nucleotides Catabolism of purine nucleotides and Hyperuricemia and Gout disease Organization of mammalian genome Structure of DNA and RNA and their functions DNA replication (semi conservative model) Transcription or RNA synthesis Genetic code, Translation or Protein synthesis and inhibitors	
5	**UNIT V**	**07**
	Enzymes Introduction, properties, nomenclature and IUB classification of enzymes Enzyme kinetics (Michaelis plot, Line Weaver Burke plot) Enzyme inhibitors with examples Regulation of enzymes: enzyme induction and repression, allosteric enzymes regulation Therapeutic and diagnostic applications of enzymes and isoenzymes Coenzymes –Structure and biochemical functions	

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	Total	**45**

BP209P BIOCHEMISTRY (Practical) 4 Hours / Week

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

Recommended Books (Latest Editions)

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

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BP204T PATHOPHYSIOLOGY (Theory) 4 hours/week

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

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

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

Sr. No.	Content	Hours
1	**UNIT I**	10
1.1	**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)**,**Morphology of cell injury – Adaptive changes (Atrophy, Hypertrophy, hyperplasia, Metaplasia, Dysplasia)**,**Cell swelling, Intra cellular accumulation, Calcification, Enzyme leakage and Cell Death Acidosis &Alkalosis,Electrolyte imbalance	5
1.2	**Basicmechanism involved in the process of inflammation and repair:** Introduction, Clinical signs of inflammation, Different types of Inflammation,Mechanism of Inflammation – Alteration in vascular permeability and blood flow, migration of WBC's,Mediators of inflammation,Basic principles of wound healing in the skin,Pathophysiology of Atherosclerosis	5
2	**UNIT II**	10
2.1	**Cardiovascular System:** Hypertension, congestive heart failure, ischemic heart disease (angina,myocardial infarction, atherosclerosis and arteriosclerosis)	4
2.2	**Respiratory system:**Asthma, Chronic obstructive airways diseases.	3
2.3	**Renal system:**Acute and chronic renal failure	3
3	**UNIT III**	10

3.1	**Haematological Diseases:** Iron deficiency, megaloblastic anemia (Vit B12 and folic acid), sickle cell anemia, thalasemia, hereditary acquired anemia, hemophilia	**3**
3.2	**Endocrine system:** Diabetes, thyroid diseases, disorders of sex hormones	**3**
3.3	**Nervous system:** Epilepsy, Parkinson's disease, stroke, psychiatric disorders:depression, schizophrenia and Alzheimer's disease.	**3**
3.4	**Gastrointestinal system:** Peptic Ulcer	**1**
4	**UNIT IV**	**08**
4.1	Inflammatory bowel diseases, jaundice, hepatitis (A,B,C,D,E,F) alcoholic liver disease.	**2**
4.2	**Disease of bones and joints:** Rheumatoid arthritis, osteoporosis and gout	**2**
4.3	**Principles of cancer:** classification, etiology and pathogenesis of cancer	**4**
5	**UNIT V**	**07**
5.1	**Infectious diseases:** Meningitis, Typhoid, Leprosy, TuberculosisUrinary tract infections	**4**
5.2	**Sexually transmitted diseases:** AIDS, Syphilis, Gonorrhea	**3**
	Total	**45**

Recommended Books (Latest Editions)

1. Vinay Kumar, Abul K. Abas, Jon C. Aster; Robbins &Cotran Pathologic Basis of Disease; South Asia edition; India; Elsevier; 2014.
2. Harsh Mohan; Text book of Pathology; 6th edition; India; Jaypee Publications; 2010.
3. Laurence B, Bruce C, Bjorn K. ; Goodman Gilman's The Pharmacological Basis of Therapeutics; 12th edition; New York; McGraw-Hill; 2011.
4. Best, Charles Herbert 1899-1978; Taylor, Norman Burke 1885-1972; West, John B. (John Burnard); Best and Taylor's Physiological basis of medical practice; 12th ed; united states;
5. William and Wilkins, Baltimore;1991 [1990 printing].
6. Nicki R. Colledge, Brian R. Walker, Stuart H. Ralston;Davidson's Principles and Practice of Medicine; 21st edition; London; ELBS/Churchill Livingstone; 2010.

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BP303T PHARMACEUTICAL MICROBIOLOGY (Theory) 3 L + 1T / Week

Scope:

Study of all categories of microorganisims especially for the production of alchol antibiotics, vaccines, vitamins enzymes etc..

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

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

Sr.No.	Content	Hours
1	**UNIT I**	**10**
1.1	Introduction, history of microbiology, its branches, scope and its importance	**1**
1.2	Introduction to Prokaryotes and Eukaryotes	**1**
1.3	Study of ultra-structure and morphological classification of bacteria, nutritional requirements, raw materials used for culture media and physical parameters for growth, growth curve, isolation and preservation methods for pure cultures, cultivation of anaerobes, quantitative measurement of bacterial growth (total & viable count).	**6**
1.4	Study of different types of phase constrast microscopy, dark field microscopy and electron microscopy	**2**
2	**UNIT II**	**10**
2.1	Identification of bacteria using staining techniques (simple, Gram's &Acid fast staining) and biochemical tests (IMViC).	**3**
2.2	Study of principle, procedure, merits, demerits and applications of Physical, chemical and mechanical method of sterilization, Evaluation of the efficiency of sterilization method, Equipments employed in large scale sterilization, Sterility indicators	**7**
3	**UNIT III**	**10**
3.1	Study of morphology, classification, reproduction/replication and cultivation	**3**

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	of Fungi and Virus.	
3.2	Classification and mode of action of disinfectants. Factors influencing disinfection, antiseptics and their evaluation, for bacteriostatic and bactericidal actions	**4**
3.3	Sterility testing of products (solids, liquids, ophthalmic and other sterile products) according to IP, BP and USP	**3**
4	**UNIT IV**	**08**
4.1	Designing of aseptic area, laminar flow equipments; study of different sources of contamination in an aseptic area and methods of prevention, clean area classification.	**3**
4.2	Principles and methods of different microbiological assay. Methods for standardization of antibiotics, vitamins and amino acids.	**3**
4.3	Assessment of a new antibiotic and testing of antimicrobial activity of a new substance.	**2**
5	**UNIT V**	**07**
5.1	Types of spoilage, factors affecting the microbial spoilage of pharmaceutical products, sources and types of microbial contaminants, assessment of microbial contamination and spoilage.	**2**
5.2	Preservation of pharmaceutical products using antimicrobial agents, evaluation of microbial stability of formulations.	**2**
5.3	Growth of animal cells in culture, general procedure for cell culture, Primary, established and transformed cell cultures.	**2**
5.4	Application of cell cultures in pharmaceutical industry and research.	**1**
	Total	**45**

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BP307P PHARMACEUTICAL MICROBIOLOGY (Practical)4 Hours/week

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

Recommended Books (Latest edition)

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

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BP505T PHARMACEUTICAL JURISPRUDENCE (Theory) 3 L + 1T / Week

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

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

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

Sr. No.	Content	Hours
1	**UNIT I - Drugs and Cosmetics Act, 1940 and its rules 1945**	**10**
1.1	Objectives, Definitions, Legal definitions of schedules to the act and rules	**3**
1.2	Import of drugs – Classes of drugs and cosmetics prohibited from import, Import under license or permit. Offences and penalties**.**	**2**
1.3	Manufacture of drugs – Prohibition of manufacture and sale of certain drugs	**2**
1.4	Conditions for grant of license and conditions of license for manufacture of drugs, Manufacture of drugs for test, examination and analysis, manufacture of new drug, loan license and repacking license	**3**
2	**UNIT II - Drugs and Cosmetics Act, 1940 and its rules 1945.**	**10**
2.1	Detailed study of Schedule G, H, M, N, P,T,U, V, X, Y, Part XII B, Sch F & DMR (OA)	**4**
2.2	Sale of Drugs – Wholesale, Retail sale and Restricted license. Offences and penalties	**1**
2.3	Labeling & Packing of drugs- General labeling requirements and specimen labels for drugs and cosmetics, List of permitted colors. Offences and penalties.	**2**
2.4	Administration of the act and rules – Drugs Technical Advisory Board, Central drugs Laboratory, Drugs Consultative Committee, Government drug analysts, Licensing authorities, controlling authorities, Drugs Inspectors	**3**
3	**UNIT III**	**10**
3.1	**Pharmacy Act –1948**: Objectives, Definitions, Pharmacy Council of India, its constitution and functions, Education Regulations, State and Joint state pharmacy councils; constitution and functions, Registration of Pharmacists, Offences and Penalties	**3**

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3.2	**Medicinal and Toilet Preparation Act –1955**: Objectives, Definitions, Licensing,Manufacture In bond and Outside bond, Export of alcoholic preparations, Manufacture of Ayurvedic, Homeopathic, Patent & Proprietary Preparations. Offences and Penalties	**3**
3.3	**Narcotic Drugs and Psychotropic substances Act-1985 and Rules**: Objectives,Definitions, Authorities and Officers, Constitution and Functions of narcotic & Psychotropic Consultative Committee, National Fund for Controlling the Drug Abuse, Prohibition, Control and Regulation, opium poppy cultivation and production of poppy straw, manufacture, sale and export of opium, Offences and Penalties	**4**
4	**UNIT IV**	**08**
4.1	**Study of Salient Features of Drugs and magic remedies Act and its rules:** Objectives, Definitions, Prohibition of certain advertisements, Classes of Exempted advertisements, Offences and Penalties	**2**
4.2	**Prevention of Cruelty to animals Act-1960:** Objectives, Definitions, InstitutionalAnimal Ethics Committee, Breeding and Stocking of Animals, Performance of Experiments, Transfer and acquisition of animals for experiment, Records, Power to suspend or revoke registration, Offences and Penalties	**3**
4.3	**National Pharmaceutical Pricing Authority:** Drugs Price Control Order (DPCO)-2013. Objectives, Definitions, Sale prices of bulk drugs, Retail price of formulations, Retail price and ceiling price of scheduled formulations, National List of Essential Medicines (NLEM)	**3**
5	**UNIT V**	**07**
5.1	**Pharmaceutical Legislations –** A brief review, Introduction, Study of drugs enquirycommittee, Health survey and development committee, Hathi committee and Mudaliar committee	1
5.2	**Code of Pharmaceutical ethics** D efinition, Pharmacist in relation to his job, trade,medical profession and his profession, Pharmacist's oath	1
5.3	**Medical Termination of pregnancy act**	1
5.4	**Right to information Act**	1
5.5	**Introduction to Intellectual Property Rights (IPR)**	1
	Total	**45**

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Reference Books (Latest Editions to be adopted)

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

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BP605T PHARMACEUTICAL BIOTECHNOLOGY (Theory) 3 L + 1T / Week

Scope:

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

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

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

Sr.No	Content	Hours
1	**UNIT I**	10
1.1	Brief introduction to Biotechnology with reference to Pharmaceutical Sciences	1
1.2	Enzyme Biotechnology- Methods of enzyme immobilization and applications.	2
1.3	Biosensors- Working and applications of biosensors in Pharmaceutical Industries.	1
1.4	Brief introduction to Protein Engineering.	2
1.5	Use of microbes in industry. Production of Enzymes- General consideration - Amylase, Catalase, Peroxidase, Lipase, Protease, Penicillinase.	2
1.6	Basic principles of genetic engineering.	2
2	**UNIT II**	10
2.1	Study of cloning vectors, restriction endonucleases and DNA ligase.	2
2.2	Recombinant DNA technology. Application of genetic engineering in medicine.	2
2.3	Application of r DNA technology and genetic engineering in the products:	2
2.4	Interferon b) Vaccines- hepatitis- B c) Hormones- Insulin.	2
2.5	Brief introduction to PCR	2

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3	**UNIT III**	**10**
	Types of immunity- humoral immunity, cellular immunity a. Structure of Immunoglobulins b. Structure and Function of MHC c. Hypersensitivity reactions, Immune stimulation and Immune suppressions d. General method of the preparation of bacterial vaccines, toxoids, viral vaccine, antitoxins, serum-immune blood derivatives and other products relative to immunity e. Storage conditions and stability of official vaccines f. Hybridoma technology- Production, Purification and Applications g. Blood products and Plasma Substitutes	
4	**UNIT IV**	**08**
4.1	Immuno blotting techniques- ELISA, Western blotting, Southern blotting.	**2**
4.2	Genetic organization of Eukaryotes and Prokaryotes	**1**
4.3	Microbial genetics including transformation, transduction, conjugation, plasmids and transposons	**2**
4.4	Introduction to Microbial biotransformation and applications	**2**
4.5	Mutation.: Types of mutation/ mutants	**1**
5	**UNIT V**	**07**
5.1	Fermentation methods and general requirements, study of media, equipments, sterilization methods, aeration process, stirring.	**2**
5.2	Large scale production fermenter design and its various controls.	**1**
5.3	Study of the production of - penicillins, citric acid, Vitamin B12, Glutamic acid, Griseofulvin	**2**
5.4	Blood product collection, Processing and storage of whole volume blood, dries=d human plasma, plasma substituents	**2**
	Total	**45**

Reference Books (Latest Editions to be adopted)

1. B.R. Glick and J.J. Pasternak: Molecular Biotechnology: Principles and Applicationsof RecombinantDNA: ASM Press Washington D.C.
2. RA Goldshy et. al., : Kuby Immunology.
3. J.W. Goding: Monoclonal Antibodies.
4. J.M. Walker and E.B. Gingold: Molecular Biology and Biotechnology by Royal Society of Chemistry.

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5. Zaborsky: Immobilized Enzymes, CRC Press, Degraland, Ohio.
6. S.B. Primrose: Molecular Biotechnology (Second Edition) Blackwell Scientific Publication.

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BP802T SOCIAL AND PREVENTIVE PHARMACY 3L + 1T / week

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

Objectives: After the successful completion of this course, the student shall be able to:

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

Sr.No.	Content	Hours
1	**UNIT I**	10
1.1	**Concept of health and disease:** Definition, concepts and evaluation of public health.Understanding the concept of prevention and control of disease, social causes of diseases and social problems of the sick.	
1.2	**Social and health education:** Food in relation to nutrition and health, Balanced diet,Nutritional deficiencies, Vitamin deficiencies, Malnutrition and its prevention.	
1.3	**Sociology and health:** Socio cultural factors related to health and disease, Impact ofurbanization on health and disease, Poverty and health	
1.4	**Hygiene and health:** personal hygiene and health care; avoidable habits	
2	**UNIT –II**	10
2.1	**Preventive medicine:** General principles of prevention and control of diseases such ascholera, SARS, Ebola virus, influenza, acute respiratory infections, malaria, chicken guinea, dengue, lymphatic filariasis, pneumonia, hypertension, diabetes mellitus, cancer, drug addiction-drug substance abuse	
3	**UNIT –III**	10
	National health programs, its objectives, functioning and outcome of the following: HIV AND AIDS control programme, TB, Integrated disease surveillance program (IDSP), National leprosy control programme, National mental health program, National programme for prevention and control of deafness, Universal immunization programme, National programme for control of blindness, Pulse polio programme	

4	**UNIT –IV**	**8**
	National health intervention programme for mother and child, National family welfare programme, National tobacco control programme, National Malaria Prevention Program, National programme for the health care for the elderly, Social health programme; role of WHO in Indian national program	
5	**UNIT –V**	**7**
	Community services in rural, urban and school health: Functions of PHC, Improvement in rural sanitation, national urban health mission, Health promotion and education in school.	
		45

Recommended Books (Latest edition)*:*

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

Recommended Journals:

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

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Sr.No.	Institution activity under Professional Ethics, Gender, Human Values, Environment and Sustainability.
1.	Seminar on human Values
2.	Plantation
3.	Green Campus imitative
4.	Health initiatives
5.	Gender sensitization
6.	Society development programs
7.	Save the girls

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