GANDHINAGAR INSTITUTE OF PHARMACY

GANDHINAGAR UNIVERSITY

SEMSTSER 2

Academic year 2024-25

SCHEME OF TEACHING

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	Pharmaceutical Engineering (Theory)	3	1	4
BP205T	Environmental Sciences (Theory)*	3	-	3
BP206T	Biochemistry (Theory)	3	1	4
BP207TP	Basics of Ayurveda	2	-	2
BP201P	Human Anatomy and Physiology-II (Practical)	4	-	2
BP202P	Pharmaceutical Organic Chemistry-I (Practical)	4	-	2
BP203P	Pharmaceutical Engineering (Practical)	4	-	2
BP206P	Biochemistry (Practical)	4	-	2
	Total	**33**	**04**	**29**

*** Non-University Examination (NUE)**

GANDHINAGAR INSTITUTE OF PHARMACY

GANDHINAGAR UNIVERSITY

SEMSTSER 2

Academic year 2024-25

SCHEME OF EVALUATION

Course Code	Name of the Course	Marks Distribution			
		University (End Semester Exam)	Institute		Total
			Sessional Exams	Continuous Mode	
BP201T	Human Anatomy and physiology-II (Theory)	75	15	10	100
BP202T	Pharmaceutical Organic Chemistry-I (Theory)	75	15	10	100
BP203T	Pharmaceutical Engineering (Theory)	75	15	10	100
BP205T	Environmental Sciences (Theory)*	50	15	10	075
BP206T	Biochemistry (Theory)	75	15	10	100
BP207TP	Basics of Ayurveda	25	25	-	50
BP201P	Human Anatomy and Physiology-II (Practical)	35	10	05	050
BP202P	Pharmaceutical Organic Chemistry-I (Practical)	35	10	05	050
BP203P	Pharmaceutical Engineering (Practical)	35	10	05	050
BP206P	Biochemistry (Practical)	35	10	05	050
Total		**515**	**140**	**70**	**725**

*** Non-University Examination (NUE)**

GANDHINAGAR INSTITUTE OF PHARMACY

GANDHINAGAR UNIVERSITY

SEMSTSER 2

Academic year 2024-25

Subject Code: BP201T	**Subject Title: Human Anatomy and Physiology-II (Theory)**
Pre-requisite: --	

Course Objective: Upon completion of this course, the students would be able to

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

Teaching Scheme (Hours per week)			**Evaluation Scheme (Marks)**			
			Theory			**Total**
Lecture	**Tutorial**	**Credit**	**University Assessment**	**Continuous Assessment**	**Internal Assessment**	
3	1	4	75	10	15	100

Detailed Syllabus:

Sr. No.	**UNIT**	**Hours**	**Weightage (%)**
1.	**Nervous system** Organization of nervous system, neuron, neuroglia, classification and properties of nerve fibre, electrophysiology, action potential, nerve impulse, receptors, synapse, neurotransmitters. Central nervous system: Meninges, ventricles of brain and cerebrospinal fluid. Structure and functions of brain (cerebrum, brain stem, cerebellum), spinal cord (gross structure, functions of afferent and efferent nerve tracts, reflex activity)	**10 Hours**	**22.22%**
2.	**Digestive system** The anatomy of GI Tract with special reference to	**06 Hours**	**13.33%**

	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.		
3.	**Respiratory system** Anatomy of respiratory system with special reference to anatomy of lungs, mechanism of respiration, regulation of respiration. Lung Volumes and capacities transport of respiratory gases, artificial respiration, and resuscitation methods. **Urinary system** Anatomy of urinary tract with special reference to anatomy of kidney and nephrons, functions of kidney and urinary tract, physiology of urine formation, micturition reflex and role of kidneys in acid base balance, role of RAS in kidney and disorders of kidney.	**10 Hours**	**22.22%**
4.	**Endocrine system** Classification of hormones, mechanism of hormone action, structure and functions of pituitary gland, thyroid gland, parathyroid gland, adrenal gland, pancreas, pineal gland, thymus and their disorders.	**10 Hours**	**22.22%**
5.	**Reproductive system** Anatomy of male and female reproductive system, Functions of male and female reproductive system, sex hormones, physiology of menstruation, fertilization, spermatogenesis, oogenesis, pregnancy and parturition **Introduction to genetics** Chromosomes, genes and DNA, protein synthesis, genetic pattern of inheritance	**9 Hours**	**20%**

Subject Code: BP201P	Subject Title: Human Anatomy and Physiology-II (Practical)
Pre-requisite: --	

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

1. Summarize functional characteristics of various systems.
2. Describe the fundamental physiological mechanism involved in demonstrated practical.
3. Interlinking various systems in terms of feedback mechanisms and performing various tests related to blood cell counts which relate with the diagnosis of various disease conditions.
4. Identify and describe the functionality of various devices for family planning and Pregnancy diagnostic tests.
5. Analyze the problem, communicate suggested solutions and interpret the results.

Teaching Scheme (Hours per week)		Evaluation Scheme (Marks)			
		Theory			
Practical	Credit	University Assessment	Continuous Assessment	Internal Assessment	Total
4	2	35	5	10	50

List of practical:

Sr. No.	Title of the Practical
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 reproductivesystems 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 Study Material:

1. Essentials of Medical Physiology, K. Sembulingam and P. Sembulingam. Jaypeebrothers medical publishers, New Delhi.
2. Anatomy and Physiology in Health and Illness, 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, Tortora Grabowski. Palmetto, GA, U.S.A.
6. Textbook of Human Histology, Inderbir Singh, Jaypee brothers medical publishers,New Delhi.
7. Textbook of Practical Physiology, C.L. Ghai, Jaypee brothers medical publishers, New Delhi.
8. Practical workbook of Human Physiology, K. Srinageswari and Rajeev Sharma,Jaypee brother's medical publishers, New Delhi.
9. Practical Anatomy and Physiology, Goyal, R. K., Natvar M. P., Shah S. A., B.S. Shah Prakashan, Ahmedabad.
10. Textbook of Anatomy and Physiology, Goyal, R. K., Natvar M. P., Shah S. A., B.S. Shah Prakashan, Ahmedabad.
11. Textbook of Practical Physiology, Rannade VG, PVG Publisher, Pune.
12. Human Anatomy and Physiology, Paul D. Anderson, Jones and Bartlett publisher, London

Subject Code: BP202T	**Subject Title: Pharmaceutical Organic Chemistry-I (Theory)**
Pre-requisite: --	

Course Objective: Upon completion of this course, the students would be able to

1. Assign nomenclature to structure as per IUPAC system.
2. Identify the type of isomerism of the organic compound.
3. Write the reaction with their reactivity, stability, and orientation.
4. Enumerate the preparations, reactions and uses of important organic compounds.

Teaching Scheme (Hours per week)			**Evaluation Scheme (Marks)**			
			Theory			**Total**
Lecture	**Tutorial**	**Credit**	**University Assessment**	**Continuous Assessment**	**Internal Assessment**	
3	1	4	75	10	15	100

Detailed Syllabus:

Sr. No.	**UNIT**	**Hours**	**Weightage (%)**
1.	**Classification, nomenclature, and isomerism** Classification of Organic Compounds Common and IUPAC systems ofnomenclature of organic compounds (up to 10 Carbons open chain and carbocyclic compounds) Structural isomerism in organic compounds	**7 Hours**	**15.55%**
2.	**Alkanes*, Alkenes* and Conjugated dienes*** SP^3 hybridization in alkanes, Halogenation of alkanes, uses of paraffins. Stabilities of alkenes, SP^2 hybridization in alkenes E_1 and E_2 reactions – kinetics, order of reactivity of alkyl halides, rearrangement of carbocations, Saytzeffs orientation and evidence. E_1 verses E_2 reactions, Factors affecting E_1 and E_2 reactions. Ozonolysis, electrophilic addition reactions of alkenes, Markownikoff's orientation, free radical addition reactions of alkenes, Anti Markownikoff's orientation. Stability of conjugated dienes, Diel-Alder, electrophilic addition, free radical addition reactions of conjugated dienes, allylic rearrangement	**10 Hours**	**22.22%**
3.	**Alkyl halides***	**10**	**22.22%**

	SN^1 and SN^2 reactions - kinetics, order of reactivity of alkyl halides, stereochemistry, and rearrangement of carbocations. SN^1 versus SN^2 reactions, Factors affecting SN^1 and SN^2 reactions Structure and uses of ethyl chloride, Chloroform, trichloroethylene, tetrachloroethylene, dichloromethane, tetrachloromethane and iodoform. **Alcohols*:** Qualitative tests, Structure and uses of Ethyl alcohol, Methyl alcohol, Chlorobutanol, Cetosteryl alcohol, Benzyl alcohol, Glycerol, Propylene glycol	**Hours**	
4.	**Carbonyl compounds* (Aldehydes and ketones)** Nucleophilic addition, Electromeric effect, aldol condensation, Crossed Aldol condensation, Cannizzaro reaction, Crossed Cannizzaro reaction, Benzoin condensation, Perkin condensation, qualitative tests, Structure and uses of Formaldehyde, Paraldehyde, Acetone, Chloral hydrate, Hexamine, Benzaldehyde, Vanilin, Cinnamaldehyde.	**10 Hours**	**17.77%**
5.	**Carboxylic acids*** Acidity of carboxylic acids, effect of substituents on acidity, inductive effect and qualitative tests for carboxylic acids, amide and ester. Structure and Uses of Acetic acid, Lactic acid, Tartaric acid, Citric acid, Succinic acid, Oxalic acid, Salicylic acid, Benzoic acid, Benzyl benzoate, Dimethyl phthalate, Methyl salicylate and Acetyl salicylic acid. **Aliphatic amines***: Basicity, effect of substituent on Basicity. Qualitative test, Structure and uses of Ethanolamine, Ethylenediamine, Amphetamine.	**8 Hours**	**17.77%**

Note: General method of preparations and reactions of compounds superscripted with asterisk to be explained.

Subject Code: BP202P	Subject Title: Pharmaceutical Organic Chemistry-I (Practical)
Pre-requisite: --	

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

1. Identify the nature of organic compounds.
2. Prepare various derivatives of organic compounds.
3. Interpret the stereo models of organic compounds.
4. Analyze the problem, communicate suggested solution and interpret the results.

Teaching Scheme (Hours per week)		Evaluation Scheme (Marks)			
		Theory			
Practical	Credit	University Assessment	Continuous Assessment	Internal Assessment	Total
4	2	35	5	10	50

List of Practical:

Sr. No.	Title of the unit
1.	• 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 tests 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. • Minimum 5 unknown organic compounds to be analyzed systematically.
2.	Preparation of suitable solid derivatives from organic compounds
3.	Construction of molecular models

Recommended Study Material:

1. Organic Chemistry, Morrison and Boyd, Pearson Education, India
2. Organic Chemistry, I.L. Finar , Volume-I, Pearson Education, India
3. Textbook of Organic Chemistry, B.S. Bahl & Arun Bahl, S. Chand Publisher
4. Organic Chemistry, P. L. Soni, Sultan Chand & Sons Publisher
5. Practical Organic Chemistry, Mann and Saunders, Pearson Education, India
6. Vogel's textbook of Practical Organic Chemistry, Pearson Education, India
7. Advanced Practical Organic Chemistry. N. K. Vishnoi, S. Chand Publisher
8. Introduction to Organic Laboratory techniques, Pavia, Lampman and Kriz., Brooks/Cole
9. Reaction and reaction mechanism Ahluwalia/Chatwal.
10. Reaction and reaction mechanism, P. S. Kalsi, New Age International Publisher
11. Textbook of Organic, Medicinal and Pharmaceutical Chemistry, Willson & Gisvolds, Walter Kluwer India Pvt. Ltd.
12. Organic Chemistry, Bhupinder Mehta and Manju Mehta, PHI
13. Organic Chemistry, Jonathan Clayden, Nick Greeves & Stuart Warren, Oxford University Press.

Subject Code: BP203T	Subject Title: Pharmaceutical Engineering (Theory)
Pre-requisite: --	

Course Objective: Upon completion of the course student shall be able to

1. Summarize various unit operations used in pharmaceutical industries with applications.
2. Describe and suggest material handling techniques.
3. Suggest and justify appropriate equipment of the unit operations including their principle, construction, working and specific applications.
4. Describe preventive methods used for environmental pollution and corrosion control in pharmaceutical industries.
5. Draw and comprehend the significance of pharmaceutical plant lay out design.

Teaching Scheme (Hours per week)			Evaluation Scheme (Marks)			
			Theory			
Lecture	Tutorial	Credit	University Assessment	Continuous Assessment	Internal Assessment	Total
3	1	4	75	10	15	100

Detailed Syllabus:

Sr. No.	UNIT	Hours	Weightage (%)
1.	**Flow of fluids:** Types of manometers, Reynolds number and its significance, Bernoulli 's theorem and its applications, Energy losses, Orifice meter, Venturi meter, Pitottube and Roto meter. **Size Reduction:** Objectives, Mechanisms & Laws governing size reduction, factors affecting size reduction, principles, construction, working, uses, merits and demerits of Hammer mill, ball mill, fluid energy mill, Edge runner mill & end runner mill. **Size Separation:** Objectives, applications & mechanism of size separation, official standards of powders, sieves, size separation Principles, construction, working, uses, merits and	**10 Hours**	**22.22%**

	demerits of Sieve shaker, cyclone separator, Air separator, Bag filter & elutriation tank.		
2.	**Distillation:** Basic Principles and methodology of simple distillation, flash distillation, fractional distillation, distillation under reduced pressure, steam distillation & molecular distillation **Evaporation:** Objectives, application, and factors influencing evaporation, differences between evaporation and other heat processes. principles, construction, working, uses, merits and demerits of Steam jacketed kettle, horizontal tube evaporator, climbing film evaporator, forced circulation evaporator, multiple effect evaporator& Economy of multiple effect evaporator. **Heat Transfer** : Objectives, applications & Heat transfer mechanisms. Fourier's law, Heat transfer by conduction, convection & radiation. Heat interchangers & heat exchangers	**10 Hours**	**22.22%**
3.	**Drying:** Objectives, applications & mechanism of drying process, measurements& applications of Equilibrium Moisture content, rate of drying curve. principles, construction, working, uses, merits and demerits of Tray dryer, drum dryer spray dryer, fluidized bed dryer, vacuum dryer, freeze dryer. **Mixing**: Objectives, applications & factors affecting mixing, Difference between solid and liquid mixing, mechanism of solid mixing, liquids mixing and semisolids mixing. Principles, Construction, Working, uses, Merits and Demerits of Double cone blender, twin shell blender, ribbon blender, Sigma blade mixer, planetary mixers, Propellers, Turbines, Paddles & Silverson Emulsifier	**8 Hours**	**17.77%**
4.	**Filtration** Objectives, applications, Theories & Factors influencing filtration, filter aids,filter medias. Principle, Construction, Working, Uses, Merits and demerits ofplate & frame filter, filter leaf, rotary drum filter, Meta filter & Cartridge filter, membrane filters and Seidtz filter. **Centrifugation:** Objectives, principle & applications of Centrifugation,	**8 Hours**	**17.77%**

	principles, construction, working, uses, merits and demerits of Perforated basket centrifuge, non-perforated basket centrifuge, semi continuous centrifuge & super centrifuge		
5.	**Materials of pharmaceutical plant construction, Corrosion and its prevention** Factors affecting materials selected for pharmaceutical plant construction, Theories of corrosion, types of corrosion and their prevention. Ferrous and nonferrous metals, inorganic and organic nonmetals, basics of material handling systems.	**7 Hours**	**15.55%**

Subject Code: BP203P	Subject Title: Pharmaceutical Engineering (Practical)
Pre-requisite: --	

Course Objective: Upon completion of the course student shall be able to

1. Perform the experiments involving unit operations like filtration, distillation, evaporation, drying, mixing, crystallization.
2. Identify the equipment and carry out experiments related to size reduction and size separation.
3. Describe the basic concepts of heat transfer and HVAC (humidity ventilation and air conditioning).
4. Analyze the problem, communicate suggested solution and interpret the results.

Teaching Scheme (Hours per week)		Evaluation Scheme (Marks)			
		Theory			
Practical	Credit	University Assessment	Continuous Assessment	Internal Assessment	Total
4	2	35	5	10	50

List of Practical:

Sr. No.	Title of the unit
1.	Determination of radiation constant of brass, iron, unpainted and painted glass.
2.	Steam distillation – To calculate the efficiency of steam distillation.
3.	To determine the overall heat transfer coefficient by heat exchanger.
4.	Construction of drying curves (for calcium carbonate and starch).
5.	Determination of moisture content and loss on drying.
6.	Determination of humidity of air – i) From wet and dry bulb temperatures – use of Dew point method.
7.	Description of Construction working and application of Pharmaceutical Machinery such as rotary tablet machine, fluidized bed coater, fluid energy mill, de humidifier
8.	Size analysis by sieving – To evaluate size distribution of tablet granulations. – Construction of various size frequency curves including arithmetic and logarithmic probability plots.
9.	Size reduction: To verify the laws of size reduction using ball mill and determining Kicks, Rittinger ‘s, Bond‘s coefficients, power requirement and critical speed of Ball Mill.
10.	Demonstration of colloid mill, planetary mixer, fluidized bed dryer, freeze dryer and such other major equipment.

11.	Factors affecting Rate of Filtration and Evaporation (Surface area, Concentration and Thickness/ viscosity
12.	To study the effect of time on the Rate of Crystallization.
13.	To calculate the uniformity Index for given sample by using Double Cone Blender.

Recommended Study Material:

1. Introduction to Chemical Engineering, Walter L Badger & Julius Banchero, Latestedition.
2. Solid phase extraction, Principles, Techniques and Applications, Nigel J.K. Simpson, Latest edition.
3. Unit Operation of Chemical Engineering, Mcabe Smith, Latest edition.
4. Pharmaceutical Engineering- Principles and Practices, C.V.S Subrahmanyam et al., Latest edition.
5. Remington, The Science and Practice of Pharmacy, Martin, Latest edition.
6. Theory and Practice of Industrial Pharmacy, Leon Lachmann., Latest edition.
7. Physical pharmaceutics, C.V.S Subrahmanyam et al., Latest edition.
8. Cooper and Gunn's Tutorial pharmacy, S.J. Carter, Latest edition.
9. Practical Manual of Pharmaceutical Engineering, Munira Momin, Tejal Mehta, B. S. Shah Prakashan

Subject Code: BP205T	Subject Title: Environmental Sciences (Theory)
Pre-requisite: --	

Course Objective: Upon completion of the course student shall be able to

1. Summarize basic knowledge about the environment and its allied problems.
2. Narrate various Environmental Pollution like Air pollution, Water pollution and Soil pollution.
3. Describe basic concepts, structure and function of an ecosystem.

Teaching Scheme (Hours per week)			Evaluation Scheme (Marks)			
			Theory			
Lecture	Tutorial	Credit	University Assessment	Continuous Assessment	Internal Assessment	Total
3	-	3	50	10	15	75

Detailed Syllabus:

Sr. No.	UNIT	Hours	Weightage (%)
1.	**The Multidisciplinary nature of environmental studies** 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 conservationof natural resources	**10 Hours**	**33.33%**
2.	**Concept of an ecosystem.** Structure and function of an ecosystem. Introduction, types, characteristic features, structure and function of the ecosystems: Forest ecosystem; Grassland ecosystem; Desert ecosystem; Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)	**10 Hours**	**33.33%**
3.	**Environmental Pollution.** Air pollution; Water pollution; Soil pollution	**10 Hours**	**33.33%**

Recommended Study Material:

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

Subject Code: BP206T	Subject Title: Biochemistry (Theory)
Pre-requisite: --	

Course Objective: Upon completion of this course, the students would be 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.

Teaching Scheme (Hours per week)			Evaluation Scheme (Marks)			
			Theory			Total
Lecture	Tutorial	Credit	University Assessment	Continuous Assessment	Internal Assessment	
3	1	4	75	10	15	100

Detailed Syllabus:

Sr. No.	UNIT	Hours	Weightage (%)
1.	• **Biomolecules** Introduction, classification, chemical nature and biological role of carbohydrate, lipids, nucleic acids, amino acids and proteins. • **Bioenergetics** Concept of free energy, endergonic and exergonic reaction, Relationship between free energy, enthalpy and entropy; Redox potential. Energy rich compounds; classification; biological significances of ATP and cyclic AMP	**08 Hours**	**17.77%**
2.	**Carbohydrate metabolism** Glycolysis – Pathway, energetics and significance Citric acid cycle- Pathway, energetics and significance HMP shunt and its significance; Glucose-6-Phosphate dehydrogenase (G6PD) deficiency Glycogen metabolism Pathways and glycogen storage diseases (GSD)	**10 Hours**	**22.22%**

	Gluconeogenesis- Pathway and its significance Hormonal regulation of blood glucose level and Diabetes mellitus • **Biological oxidation** Electron transport chain (ETC) and its mechanism. Oxidative phosphorylation & its mechanism and substrate phosphorylation Inhibitors ETC and oxidative phosphorylation/Uncouplers level		
3.	• **Lipid metabolism** β-Oxidation of saturated fatty acid (Palmitic acid) Formation and utilization of ketone bodies; ketoacidosis De novo synthesis of fatty acids (Palmitic acid) Biological significance of cholesterol and conversion of cholesterol into bile acids, steroid hormone and vitamin D Disorders of lipid metabolism: Hypercholesterolemia, atherosclerosis, fatty liver and obesity. **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	**10 Hours**	**22.22 %**
4.	**Nucleic acid metabolism and genetic information transfer** Biosynthesis of purine and pyrimidine nucleotides Catabolism of purine nucleotides and Hyperuricemia and Gout disease Organization of mammalian genome Structure of DNA and RNA and their functions DNA replication (semi conservative model) Transcription or RNA synthesis Genetic code, Translation or Protein synthesis and inhibitors	**10 Hours**	**22.22 %**
5.	**Enzymes** Introduction, properties, nomenclature and IUB classification of enzymes Enzyme kinetics (Michaelis plot, Line Weaver Burke plot) Enzyme inhibitors with examples	**07 Hours**	**15.55%**

	Regulation of enzymes: enzyme induction and repression, allosteric enzymes regulation Therapeutic and diagnostic applications of enzymes and isoenzymes Coenzymes –Structure and biochemical functions		

Subject Code: BP206P	Subject Title: Biochemistry (Practical)
Pre-requisite: --	

Teaching Scheme (Hours per week)		Evaluation Scheme (Marks)			
		Theory			
Practical	Credit	University Assessment	Continuous Assessment	Internal Assessment	Total
4	2	35	5	10	50

List of practical:

Sr. No.	Title of the Experiments
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.

Subject Code: BP207TP	Subject Title: Basics of Ayurveda
Pre-requisite: --	

Teaching Scheme (Hours per week)			Evaluation Scheme (Marks)			
			Theory			
Theory	Practical	Credit	University Assessment	Continuous Assessment	Internal Assessment	Total
2	0	2	25	-	25	50

Scope: This course deals with the fundamentals of ancient ayurvedic system and scope of Ayurveda in treatment of diseases

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

- Understand the importance of Ayurvedic medicine system
- Diseases and their treatment
- Importance of lifestyle

Course content:

UNIT I **8 Hours**

i) Introduction to Ayurvedic system of medicine and its importance.

ii) Theory of Panchmahabhut, Saptadhatu and Tridosh.

UNIT II **6 Hours**

Diseases according to Ayurveda and their treatments.

UNIT III **6 Hours**

i) Ancient scientists of Ayurveda.

ii) Importance of diet and lifestyle in Ayurveda.