

Rajiv Gandhi University of Health Sciences, Karnataka
4th T Block Jayanagar, Bengaluru

Curriculum delivery design of B. Pharm. course of Semester I & II System
w.e.f Academic year 2017-18

SEMESTER-II

BP 201T. HUMAN ANATOMY AND PHYSIOLOGY-II

1. Departmental objectives (what the learners will be able to perform after completing the subject):

A. Learning Objectives:

Upon completion of this course the student should be able to

- a. Explain the gross morphology, structure and functions of various organs of the human body.
- b. Describe the various homeostatic mechanisms and their imbalances.
- c. Identify the various tissues and organs of different systems of human body.
- d. 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.
- e. Appreciate coordinated working pattern of different organs of each system
- f. 6. Appreciate the interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body.

2. Content distribution as per the list of topics, time allotted for each topic, distribution for 'Must know', 'Desirable to know' and 'Nice to know' and the probable weightage.

The following table can also be a reference frame for continuous and formative assessment of learning. If the curriculum management is scheduled as per the tabulation, there can be clarity for both learners and teachers to take stock of the mastery achieved in each objective. This will also help for professional excellence that goes beyond the examination process.

UNIT-I	Hours: 10	Weightage: 21 Marks
Learning content distribution	Topics	
	Nervous System	
Must know	<ol style="list-style-type: none"> a. Organization of central nervous system, structure and function of cerebrum, cerebellum, brainstem. b. Classification and properties of nerve fibre, Electro physiology, c. Action potential-nerve impulse, receptors, synapse, neurotransmitters d. Spinal cord-gross structure, functions of afferent and efferent nerve tracts and reflex activity. 	

Desirable to know	Structure & functions of neuron and neurologia. Meninges, ventricles of brain, cerebro spinal fluid
Nice to know	Types of neurotransmitters in CNS, definitions of meningitis, encephalitis, parkinsonism

UNIT-II	Hours: 6	Weightage: 14 Marks
Learning content distribution	Topics	
	Digestive system, Energetics	
Must know	Anatomy and physiology Salivary glands, stomach(acid production in stomach, regulation of acid production through parasympathetic nervous system), pancreas, liver, small intestine and large intestine. Movements of small and large intestine, digestion and absorption of nutrients in GIT. Formation and role of ATP	
Desirable to know	Disorders of GIT-gastritis, peptic ulcer, hypochlorhydria, hepatitis, constipation, diarrhoea, GERD, liver cirrhosis, anorexia, pancreatitis. Creatinine phosphate and Basal metabolic rate(BMR).	
Nice to know	Fatty liver, insulin resistance	

UNIT-III	Hours: 10	Weightage: 22 Marks
Learning content distribution	Topics	
	Respiratory system	
Must know	Anatomy of respiratory system with special reference to anatomy of lungs. Mechanism of respiration, regulation of respiration	
Desirable to know	Lung Volumes and capacities transport of respiratory gases, artificial respiration, and resuscitation methods	
Nice to know	Bombay blood group, formation of body fluids from blood	

UNIT-IV	Hours: 7	Weightage: 19 Marks
Learning content distribution	Topics	
	Endocrine system	
Must know	Structure and functions of pituitary gland, thyroid gland, parathyroid gland, adrenal gland, pancreas, pineal gland, thymus	
Desirable to know	Classification of hormones, mechanism of hormone action, Disorders-acromegaly, cretinism, pheochromocytoma, diabetes incipidus, diabetes mellitus, Addisons disease, cushing syndrome, gigantism , dwarfism. Myxedema, grave's disease	
Nice to know	Hormone supplements	

UNIT-V	Hours: 9	Weightage: 19 Marks
Learning content distribution	Topics	
	Reproductive system Introduction of Genetics	
Must know	a. Anatomy and physiology of male and female reproductive system, physiology of menstruation, b. Spermatogenesis, oogenesis, pregnancy and parturition c. Chromosomes, genes and DNA, protein synthesis, genetic pattern of inheritance	
Desirable to know	sex hormones, fertilization	
Nice to know	Infertility, erectile dysfunction, PCOD	

Blueprint of question paper, for each QP. This shows the weightage given to each chapter in the summative assessment. This improves the content validity by distributing the assessment of learners in the competencies that are represented by learning objectives under each chapter.

**BLUE PRINT OF MODEL QUESTION PAPER
BP 201T. Human Anatomy and Physiology-II**

TIME: 3 HOURS

MAX. MARKS: 75

Unit No	Hours	Must know			Desirable to know			Weightage of marks
		LE (10X3)	SE (5X8)	SA (2X5)	LE (10X0)	SE (5X1)	SA (2X5)	
Unit-I	10	1	1	1	-	-	2	21
Unit-II	10		2	1	-	-	1	14
Unit-III	10	1	2	1	-	-	-	22
Unit-IV	08	1	1	1	-	-	1	19
Unit-V	07		2	1	-	1	1	19
Total	45	30	40	10	-	-	-	
		80			15			95

BP202T. PHARMACEUTICAL ORGANIC CHEMISTRY –I

1. Departmental objectives (what the learners will be able to perform after completing the subject):

A. Learning Objectives:

Upon completion of this course the student should be able to

- a. write the structure, name and the type of isomerism of the organic compound
 - b. write the reaction, name the reaction and orientation of reactions
 - c. account for reactivity/stability of compounds,
 - d. identify/confirm the identification of organic compound
2. Content distribution as per the list of topics, time allotted for each topic, distribution for 'Must know', 'Desirable to know' and 'Nice to know' and the probable weightage.

The following table can also be a reference frame for continuous and formative assessment of learning. If the curriculum management is scheduled as per the tabulation, there can be clarity for both learners and teachers to take stock of the mastery achieved in each objective. This will also help for professional excellence that goes beyond the examination process.

UNIT-I	Hours: 7	Weightage: 9 Marks
Learning content distribution	Topics	
	Classification, nomenclature and isomerism	
Must know	<ul style="list-style-type: none">➤ Classification of Organic compounds.➤ Common and IUPAC systems of Nomenclature of Alkanes, alkenes, dienes, alkynes, alcohols, aldehydes, ketones, ethers, alkyl halides, amines, carboxylic acids, esters, acid chlorides, amides, and cycloalkanes.➤ Definition, Classification of Isomerism with examples. Structural Isomerism	
Desirable to know	-	
Nice to know	Chemical Bonds, Stereoisomerism with example	

UNIT-II		Hours: 10	Weightage: 24 Marks
Learning content distribution	Topics		
	Alkanes, Alkenes and Conjugated dienes		
Must know	<ul style="list-style-type: none"> ➤ General methods of preparation and reactions of Alkanes, Alkenes & Conjugated dienes. ➤ SP² and SP³ hybridization in Alkene and alkanes respectively. ➤ Halogenation of alkanes, ➤ E1 and E2 reactions – kinetics, order of reactivity of alkyl halides ➤ E1 versus E2 reactions, Factors affecting E1 and E2 reactions. ➤ Electrophilic addition reactions of alkenes, Markownikoff's orientation, free radical addition reactions of alkenes, Anti Markownikoff's orientation. ➤ Stability of conjugated dienes, electrophilic addition, free radical addition reactions of conjugated dienes. 		
Desirable to know	<ul style="list-style-type: none"> ➤ Uses of paraffins, ➤ Ozonolysis, ➤ Stabilities of alkenes ➤ Saytzeffs orientation. ➤ Evidences for E1 versus E2 reactions, ➤ Rearrangement of carbocations ➤ Allylic rearrangement ➤ Diel-Alder reaction 		
Nice to know	<ul style="list-style-type: none"> ➤ Polarity and Dipole moment ➤ SP hybridization, ➤ Effect of Resonance on stability of alkenes and dienes ➤ Elimination reaction ➤ Cycloaddition reaction 		

UNIT-III		Hours: 10	Weightage: 22 Marks
Learning content distribution	Topics		
	Alkyl halides Alcohols		
Must know	<ul style="list-style-type: none"> ➤ SN₁ and SN₂ reactions - kinetics, order of reactivity of alkyl halides, stereochemistry and stability, rearrangement of carbocations. ➤ SN₁ versus SN₂ reactions, Factors affecting SN₁ and SN₂ reactions ➤ Structure and uses of ethylchloride, Chloroform, trichloroethylene, tetrachloroethylene, dichloromethane, tetrachloromethane and iodoform ➤ General methods of preparation and reactions of Alcohols ➤ Structure and uses of Ethyl alcohol, chlorobutanol, Cetosteryl alcohol, Benzyl alcohol, Glycerol, Propylene glycol 		
Desirable to know	<ul style="list-style-type: none"> ➤ General methods of preparation and reactions of Alkyl halide. ➤ Qualitative tests of Ethyl alcohol, chlorobutanol, Cetosteryl alcohol, Benzyl alcohol, Glycerol, Propylene glycol 		

Nice to know	Substitution reaction, Optical Isomerism Types of alcohols, Hydrogen bonding and its applications

UNIT-IV	Hours: 10	Weightage: 24 Marks
Learning content distribution	Topics	
	Carbonyl compounds (Aldehydes and ketones)	
Must know	<ul style="list-style-type: none"> ➤ Nucleophilic addition, aldol condensation, Crossed Aldol condensation, Cannizzaro reaction, Crossed Cannizzaro reaction, Benzoin condensation, Perkin condensation ➤ General methods of preparation and reactions of Aldehydes and Ketones 	
Desirable to know	<ul style="list-style-type: none"> ➤ Electromeric effect ➤ Qualitative tests, Structure and uses of Formaldehyde, Paraldehyde, Acetone, Chloral hydrate, Hexamine, Benzaldehyde, Vanilin, Cinnamaldehyde 	
Nice to know	Addition Reaction	

UNIT-V	Hours: 8	Weightage: 16 Marks
Learning content distribution	Topics	
	Carboxylic acids Aliphatic amines	
Must know	<ul style="list-style-type: none"> ➤ General methods of preparation and reactions of Carboxylic acid ➤ Inductive effect ➤ Acidity of carboxylic acids, effect of substituents on acidity, ➤ Qualitative tests for carboxylic acids, amide and ester ➤ General methods of preparation and reactions of Aliphatic amines ➤ Basicity, effect of substituent on Basicity 	
Desirable to know	<ul style="list-style-type: none"> ➤ 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 ➤ Qualitative test, Structure and uses of Ethanolamine, Ethylenediamine, Amphetamine 	
Nice to know	Theories of Acids and Bases	

BLUE PRINT OF MODEL QUESTION PAPER
BP202T. Pharmaceutical Organic Chemistry –I

TIME: 3 HOURS

MAX. MARKS: 75

Unit No	Hours	Must know			Desirable to know			Weightage of marks
		LE (10X3)	SE (5X8)	SA (2X5)	LE (10X0)	SE (5X1)	SA (2X5)	
Unit-I	7	--	1	2	--	--	--	09
Unit-II	10	1	2	--	--	--	2	24
Unit-III	10	1	1	--	--	1	1	22
Unit-IV	10	1	2	--	--	--	2	24
Unit-V	8	--	2	1	--	--	2	16
Total	45	30	40	6	--	5	12	95
		76			19			95

BP203 T. BIOCHEMISTRY

1. Departmental objectives (what the learners will be able to perform after completing the subject):

B. Learning Objectives:

Upon completion of this course the student should be able to

- a. Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.
 - b. Understand the metabolism of nutrient molecules in physiological and pathological conditions.
 - c. Understand the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins.
2. Content distribution as per the list of topics, time allotted for each topic, distribution for 'Must know', 'Desirable to know' and 'Nice to know' and the probable weightage.

The following table can also be a reference frame for continuous and formative assessment of learning. If the curriculum management is scheduled as per the tabulation, there can be clarity for both learners and teachers to take stock of the mastery achieved in each objective. This will also help for professional excellence that goes beyond the examination process.

UNIT-I	Hours: 10	Weightage: 24 Marks
Learning content distribution	Topics	
	Carbohydrate metabolism Biological oxidation	
Must know	<ul style="list-style-type: none"> ➤ 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 ➤ Electron transport chain (ETC) and its mechanism. ➤ Oxidative phosphorylation & its mechanism and substrate level phosphorylation 	
Desirable to know	<ul style="list-style-type: none"> ▪ Hormonal regulation of blood glucose level ▪ Inhibitors ETC and oxidative phosphorylation/Uncouplers 	
Nice to know	<ul style="list-style-type: none"> • Types of Diabetes mellitus 	

UNIT-II		Hours: 10	Weightage: 24 Marks
Learning content distribution	Topics		
	Lipid metabolism Amino acid metabolism		
Must know	<ul style="list-style-type: none"> ➤ -Oxidation of saturated fatty acid (Palmitic acid) ➤ Formation and utilization of ketone bodies; ketoacidosis ➤ De novo synthesis of fatty acids (Palmitic acid) ➤ Disorders of lipid metabolism: ➤ Hypercholesterolemia, atherosclerosis, fatty liver and obesity. ➤ General reactions of amino acid metabolism: Transamination, deamination & decarboxylation, urea cycle and its disorders ➤ Catabolism of phenylalanine and tyrosine and their metabolic disorders (Phenylketonuria, Albinism, alkeptonuria, tyrosinemia) 		
Desirable to know	<ul style="list-style-type: none"> ▪ Biological significance of cholesterol and conversion of cholesterol into Bile acids, steroidal hormones and Vitamin D ▪ Synthesis and significance of biological substances; 5-HT, melatonin, dopamine, noradrenaline, adrenaline ▪ Catabolism of heme; hyperbilirubinemia and jaundice 		
Nice to know	<ul style="list-style-type: none"> • Types of jaundices and causes 		

UNIT-III		Hours: 10	Weightage: 22 Marks
Learning content distribution	Topics		
	Nucleic acid metabolism and genetic information transfer		
Must know	<ul style="list-style-type: none"> ➤ Biosynthesis of purine and pyrimidine nucleotides ➤ Catabolism of purine nucleotides and Hyperuricemia and Gout disease ➤ Organization of mammalian genome ➤ Structure of DNA & RNA and their functions ➤ DNA replication (semi conservative model) ➤ Transcription or RNA synthesis ➤ Genetic code, Translation or Protein Synthesis and inhibitors ➤ Protein Synthesis and inhibitors ➤ Catabolism of phenylalanine and tyrosine and their metabolic disorders (Phenylketonuria, Albinism, alkeptonuria, tyrosinemia) 		
Desirable to know	--		
Nice to know	<ul style="list-style-type: none"> • Types of replication and mutation 		

UNIT-IV		Hours: 8	Weightage: 9 Marks
Learning content distribution	Topics		
	Biomolecules and Bioenergetics		
Must know	<ul style="list-style-type: none"> ➤ Introduction, classification, chemical nature and biological role of carbohydrate, lipids, nucleic acids, amino acids and proteins. ➤ Concept of free energy , endergonic and exergonic reaction, ➤ Energy rich compounds; classification; biological significances of ATP and cyclic AMP 		
Desirable to know	Redox potential. Relationship between free energy , enthalpy and entropy		
Nice to know	<ul style="list-style-type: none"> • Standard free energy 		

UNIT-V	Hours: 7	Weightage: 16 Marks
Learning content distribution	Topics	
	Enzymes	
Must know	<ul style="list-style-type: none"> ➤ Introduction, properties, nomenclature and IUB classification of enzymes ➤ Enzyme kinetics (Michaelis plot, Line Weaver Burke plot) ➤ Regulation of enzymes: allosteric enzymes regulation ➤ Therapeutic and diagnostic applications of enzymes and isoenzymes ➤ Coenzymes –Structure and biochemical functions 	
Desirable to know	<ul style="list-style-type: none"> ▪ Enzyme inhibitors with examples Enzyme induction and repression 	
Nice to know	<ul style="list-style-type: none"> • Factors affecting enzyme activity 	

**BLUE PRINT OF MODEL QUESTION PAPER
BP203 T. Biochemistry**

TIME: 3 HOURS

MAX. MARKS: 75

Unit No	Hours	Must know			Desirable to know			Weightage of marks
		LE (10X3)	SE (5X6)	SA (2X8)	LE (10X0)	SE (5X1)	SA (2X2)	
Unit-I	10	1	1	2	-	1	-	24
Unit-II	10	1	1	2	-	1	-	24
Unit-III	10	1	2	1	-	-	-	22
Unit-IV	8	-	1	1	-	-	1	09
Unit-V	7	-	1	2	-	1	1	16
Total	45	30	30	16	-	15	4	
		76			19			95

BP 204T. PATHOPHYSIOLOGY

1. Departmental objectives (what the learners will be able to perform after completing the subject):

A. Learning Objectives:

Upon completion of this course the student should be able to

1. Describe etiology and pathogenesis of the selected disease states
 2. Name the signs and symptoms of diseases, and
 3. Mention the complications of the diseases
3. Content distribution as per the list of topics, time allotted for each topic, distribution for 'Must know', 'Desirable to know' and 'Nice to know' and the probable weightage.

The following table can also be a reference frame for continuous and formative assessment of learning. If the curriculum management is scheduled as per the tabulation, there can be clarity for both learners and teachers to take stock of the mastery achieved in each objective. This will also help for professional excellence that goes beyond the examination process.

UNIT-I	Hours: 10	Weightage: 17 Marks
Learning content distribution	Topics	
	Basic principles of Cell injury and Adaptation Basic mechanism involved in the process of inflammation and repair	
Must know	<ul style="list-style-type: none"> ➤ Causes of cellular injury, Pathogenesis (Cell membrane damage, Mitochondrial damage, Ribosome damage, Nuclear damage) ➤ 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 	
Desirable to know	<ul style="list-style-type: none"> ▪ Morphology of cell injury – Adaptive changes (Atrophy, Hypertrophy, hyperplasia, Metaplasia, Dysplasia), Cell swelling, Intra cellular accumulation, Calcification, Enzyme leakage ▪ Cell Death Acidosis & Alkalosis, Electrolyte imbalance 	
Nice to know	<ul style="list-style-type: none"> • Introduction, Definitions, Homeostasis, Components and Types of feedback systems 	

UNIT-II		Hours: 10	Weightage: 15 Marks
Learning content distribution	Topics		
	Cardiovascular System Respiratory system Renal system		
Must know	<ul style="list-style-type: none"> ➤ Hypertension, congestive heart failure. ➤ Ischemic heart disease (angina, myocardial infarction, atherosclerosis and arteriosclerosis). ➤ Asthma, Chronic obstructive airways diseases 		
Desirable to know	Acute and chronic renal failure		
Nice to know	-		

UNIT-III		Hours: 10	Weightage: 17 Marks
Learning content distribution	Topics		
	Haematological Diseases Endocrine system Nervous system Gastrointestinal system		
Must know	<ul style="list-style-type: none"> ➤ Iron deficiency, megaloblastic anaemia (Vit B12 and folic acid), sickle cell anaemia, thalasemia, hereditary acquired anaemia, haemophilia ➤ Diabetes, thyroid diseases, disorders of sex hormones ➤ Epilepsy, Parkinson's disease, stroke, psychiatric disorders: depression, schizophrenia and Alzheimer's disease ➤ Peptic Ulcer 		
Desirable to know	-----		
Nice to know	-----		

UNIT-IV		Hours: 8	Weightage: 7 Marks
Learning content distribution	Topics		
	Disease of bones and joints Principles of cancer Nervous system Gastrointestinal system		
Must know	<ul style="list-style-type: none"> ➤ Inflammatory bowel diseases, jaundice, hepatitis (A,B,C,D,E,F) alcoholic liver disease ➤ Classification, etiology and pathogenesis of cancer 		
Desirable to know	Rheumatoid arthritis, osteoporosis and gout		
Nice to know	-----		

UNIT-V	Hours: 7	Weightage: 7 Marks
Learning content distribution	Topics	
	Infectious diseases Sexually transmitted diseases	
Must know	<ul style="list-style-type: none"> ➤ Inflammatory bowel diseases, jaundice, hepatitis (A,B,C,D,E,F) alcoholic liver disease ➤ Classification, etiology and pathogenesis of cancer 	
Desirable to know	Meningitis, Typhoid, Leprosy, Tuberculosis Urinary tract infections	
Nice to know	Syphilis, Gonorrhoea	

BLUE PRINT OF MODEL QUESTION PAPER
BP 204T.Pathophysiology

TIME: 3 HOURS

MAX. MARKS: 75

Unit No	Hours	Must know			Desirable to know			Weightage of marks
		LE (10X3)	SE (5X7)	SA (2X10)	LE (10X0)	SE (5X0)	SA (2X5)	
Unit-I	10	1	1	3	-	-	-	21
Unit-II	10	1	1	1	-	-	2	21
Unit-III	10	1	2	1	-	-	-	22
Unit-IV	8	-	2	2	-	-	1	16
Unit-V	7	-	1	3	-	-	2	15
Total	45	30	35	20	-	-	10	
		85			10			95