



SOMAIYA
VIDYAVIHAR

K J Somaiya College of Science & Commerce
Autonomous (Affiliated to University of Mumbai)



F.Y. B. Sc. (Biochemistry) Semester I and II Syllabi 2023-2024 onwards

S.No	Class	Semester	Course type	Course Title	Credits
1	F.Y.B.Sc.	1	DSC I (Core)	Biomolecules I	2+1=3
			DSC II(Core)	Nutrition I	2+1=3
2		2	DSC I (Core)	Biomolecules II	2+1=3
			DSC II(Core)	Nutrition II	2+1=3



F.Y. B. Sc. (BIOCHEMISTRY) SEMESTER I
Core Course- I (DSC-1)
COURSE TITLE: Biomolecules-I
COURSE CODE: 23US1BCHCC1BIO [CREDITS - 02]

Discipline Specific Course – I Biomolecules-I			
Module	Topics	Credits	Lectures
I	Module I : Carbohydrates Water <ul style="list-style-type: none"> • Effect of water on Biomolecules • Structure and properties of water (hydrogen bonding) • Entropy and dissolution of solute • Effect of non polar compounds on the structure of water • Weak interactions of biomolecules in aqueous solutions • Concepts of mole, molar, molar equivalent and normal, • Dissociation and Ionic product of water Carbohydrates: <ul style="list-style-type: none"> • Monosaccharides –Definition and classification of carbohydrates (mono, oligo and poly), classification of monosaccharides in terms of – A) aldoses and ketoses. B) Number of carbon atoms. • Reactions of monosaccharides – <ol style="list-style-type: none"> 1) Oxidation to produce aldonic, aldaric and Uronic acid (only w.r.t glucose), 2) Osazone (only w.r.t glucose and fructose), 3) Reducing action of sugar in boiling alkaline medium (enediol formation) -only w.r.t glucose and fructose, Disaccharides - Occurrence and structure of maltose, lactose, sucrose. • Polysaccharides- Classification based on function (storage and structural), composition (homo and hetero) giving examples. Storage polysaccharides (Starch and Glycogen), action of amylases on starch. • Structural polysaccharides – Cellulose, Chitin (Structure and biochemical importance). 	2	15
	Module II : Lipids <ul style="list-style-type: none"> • Definition and Bloor’s Classification of lipids. • Fatty acids and TAG: Saturated fatty acids – definition, classification of C2 and C20 (only even C chain fatty acids) Unsaturated fatty acids – MUFA, PUFA (2,3,4 double bonds), Omega - 3, Omega - 6 and Omega - 9 fatty acids. 		



	<ul style="list-style-type: none"> • Triacylglycerol - Simple and mixed. • Chemical reactions - Saponification, Iodination, Ozonolysis, Auto-oxidation, Phospholipases, action of heat on glycerol and choline, Rancidity of fats. • Definition and significance - Acid Number, Saponification Number, Iodine Number and Reichert-Meissel Number. • Compound lipids – Structure and function of Glycerophospholipids (Cephalin, Lecithin and Phosphotidyl inositol) Phosphosphingolipids (Ceramide, Sphingomyeline), Glycolipids or Cerebrocides (Galacto and Glucocerebrocides). • Steroids and Lipoproteins 		
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F.Y. B. Sc. (BIOCHEMISTRY) SEMESTER I

Core Course- I (DSC-2)

COURSE TITLE: Nutrition I

COURSE CODE: 23US1BCHCC2NUT [CREDITS - 02]

Discipline Specific Course – II Nutrition I			
Module	Topics	Credits	Lect ures
I	<p>Module I: Macromolecules, Digestion and absorption</p> <ul style="list-style-type: none"> • Nutritional significance • Sources • Recommended Dietary allowances (RDA) • Disorders (Deficiency and overconsumption) and estimation of proximate principles: carbohydrates (digestible / non-digestible), protein, lipids. • Quality of protein: concept of NPU, BV, PER. • Digestion, absorption: • Structure and function of different components of digestive system. • Digestion and absorption of carbohydrates, lipids and Proteins, • Glycaemic index, blood glucose buffer system, hormonal control of blood glucose level (in brief) 	2	15
II	<p>Module II: Micromolecules</p> <ul style="list-style-type: none"> • Nutritional significance, sources and deficiency disorders of Minerals:- Calcium, Phosphorus, Iron, Sodium, Potassium, Iodine, Magnesium, Selenium, Manganese, Zinc, Copper, Cobalt and Fluorine. • Nutritional significance, sources and deficiency disorders of Vitamins: 		15



	<p>Water soluble vitamins: C, Thiamine(B₁), Riboflavin(B₂),Niacin(B₃), Pantothenic acid(B₅), Pyridoxine(B₆), Biotin(B₇), , Folic acid(B₉), Cyanocobalamin (B₁₂)</p> <p>Fat Soluble Vitamins: A, D, E, K</p>		
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F.Y. B. Sc. (BIOCHEMISTRY) SEMESTER II
Core Course- I (DSC-1)
COURSE TITLE: Biomolecules-II
COURSE CODE: 23US2BCHCC1BIO [CREDITS - 02]

Discipline Specific Course – I Biomolecules-II			
Module	Topics	Credits	Lectures
I	<p>Module I : Amino acids and Proteins</p> <p>Amino acids:</p> <ul style="list-style-type: none"> • Classification of amino acids based on the polarity of R-groups (structure of 20 amino acids). • Chemical reactions of amino acids with following reagents – Ninhydrin, Sanger's, Edman's, Dansyl chloride. • Cleavage of polypeptide - Trypsin, Chymotrypsin, Pepsin, Aminopeptidase, Carboxypeptidase <p>Proteins:</p> <ul style="list-style-type: none"> • ASBC-APS classification on the basis of shape and function. • Formation and characteristics of peptide bond. • Primary structure, Secondary structure-alpha helix and beta sheet, Tertiary and Quaternary structure • Forces stabilizing protein structure. • Protein denaturation. 	2	15
II	<p>Module II: Nucleic acid and water</p> <p>Nucleic Acids:</p> <ul style="list-style-type: none"> • Structure of purine and pyrimidine bases, ribose, deoxyribose, nucleosides and nucleotides. c AMP and formation of polynucleotide strand with its shorthand representation. • RNAs- (various type in pro and eukaryotes) rRNA, t- RNA (Clover –leaf model), m-RNA (general account) and action of alkali on RNA. • DNA-X-ray diffraction pattern (Physical evidence), • Chargaff's rules (Chemical evidence), Watson –Crick model of DNA and its characteristic features. • Physical properties of DNA - Ionisation, Viscosity, Buoyant 		15



	density, UV absorption and Hypochromism, Hyperchromism, Denaturation of DNA, Tm.		
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F.Y. B. Sc. (BIOCHEMISTRY) SEMESTER II
Core Course- I (DSC-2)

COURSE TITLE: Nutrition-II

COURSE CODE: 23US2BCHCC2NUT [CREDITS - 02]

Discipline Specific Course – II Nutrition-II

Module	Topics	Credits	Lect ures
I	<p>Module I: Food calorimetry</p> <ul style="list-style-type: none"> • Definition-Calorie and Joule. • Food calorimetry - calorific value by Bomb calorimeter, calorific values of proximate principles, RQ and Non protein RQ. • BMR- definition, factors affecting BMR, significance of BMR in clinical diagnosis. • SDA - General concept and significance, energy requirement of individuals for various activities -sedentary, moderate and heavy. • Numerical problems based on above concepts. 		15
II	<p>Module II: Balanced/Seasonal diet and other nutritional concepts.</p> <p>Balanced and Seasonal diet:</p> <ul style="list-style-type: none"> • Balanced diet for healthy adult, Balanced diet for different age groups (Children, old age, Pregnancy and Lactation) • Seasonal variation in diet (Summer, Winter and Monsoon season) <p>Other Nutritional Concepts:</p> <ul style="list-style-type: none"> • Anti-Nutritional Factors in Food: Their Occurrence, Health-Hazards and Effect of Cooking on reduction in Anti-nutrient levels. • Anti-oxidants : Nutritional significance, sources and Disorders of Non-enzymatic Anti-oxidants • Concept of Nutraceutical, Functional Food, Traditional Foods, Designer Foods and Pharma/ Therapeutic Foods • Nutrition for Sports – Basic concepts 	2	15



Practicals based on 23US1BCHDSC1 and 23US1BCHDSC2	
Topics	Credits
<ol style="list-style-type: none">1. Good laboratory practices: Lab safety and introduction to common laboratory glassware and instruments<ol style="list-style-type: none">a. Use of digital analytical weighing balanceb. Validation of glass and micropipettes2. Preparation of solutions of different concentrations<ol style="list-style-type: none">a. Concepts of w/v, v/v, percentage, ppm, ppb, moles/L, molarity, molality, normalityb. Preparation and verification of solutions of desired strengths3. Qualitative Analysis: Carbohydrates - Glucose, Fructose, Maltose, Lactose, Sucrose, Starch, Dextrin.4. Verification of Beer and Lamberts Law using CoCl_25. Maltose by DNSA method6. Vitamin C by Iodometric method	2

Practicals based on 23US2BCHDSC1 and 23US2BCHDSC2	
Topics	Credits
<ol style="list-style-type: none">1. Qualitative Analysis: Proteins - Albumin, Casein, Gelatine, Peptone.2. RNA by Orcinol method3. Proteins by Biuret method4. Iron by Wongs method5. Food Product development	1



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