

NUTRITION & BIOCHEMISTRY

Nutrition

Placement: First Year

Theory 60-hours
(Class 45 + lab 15)

Course Description: The Course is designed to assist the students to acquire knowledge of the normal biochemical composition and functioning of human body and understand the alterations in biochemistry in diseases for practice of nursing.

Specific objectives: At the end of the course the students will be able to

1. To Understand the concept of nutrition & health.
2. Understand different types of nutrients, their importance, sources, functions and problems due to deficiency.
3. To plan balanced diet for individuals and groups.
4. Plan menu efficiently.
5. Explain methods of effective cooking and food preservation.
6. Apply the principles of food preparation in the practical field effectively

Unit	Time (Hrs)	Learning objectives	Content	Teaching Learning Activities	Evaluation
I	T=4	<ul style="list-style-type: none">• Describe the relationship between nutrition & Health.	<p>Introduction</p> <ul style="list-style-type: none">• Nutrition:<ul style="list-style-type: none">□ History□ Concepts• Role of nutrition in maintaining health• Nutritional problems in India• National nutritional policy• Factors affecting food & nutrition : socio-economic, cultural, tradition, production, system of distribution, life style & food habits etc• Role of food & its medicinal value• Classification of foods• Food standards• Elements of nutrition: macro and micro• Calorie, BMR	<ul style="list-style-type: none">• Lecture• Discussion• Explaining using charts• Panel Discussion	<ul style="list-style-type: none">• Short answers• Objective type

Unit	Time (Hrs)	Learning objectives	Content	Teaching Learning Activities	Evaluation
II	T=2	<ul style="list-style-type: none"> Describe the classification, functions, sources and recommended daily allowances (RDA) of carbohydrates 	Carbohydrates <ul style="list-style-type: none"> Classification Caloric value Recommended daily allowances Dietary sources. Functions Digestion, absorption and storage, metabolism of carbohydrates Malnutrition: Deficiencies and Over consumption 	<ul style="list-style-type: none"> Lecture Discussion Explaining using charts 	<ul style="list-style-type: none"> Short answers Objective type
III	T=2	<ul style="list-style-type: none"> Describe the classification, functions, sources and recommended daily allowances (RDA) of Fats. 	FATS <ul style="list-style-type: none"> Classification Caloric value Recommended daily allowances Dietary sources. Functions Digestion, absorption and storage, metabolism * Malnutrition: Deficiencies and Over consumption 	<ul style="list-style-type: none"> Lecture Discussion Explaining using charts 	<ul style="list-style-type: none"> Short answers Objective type
IV	T=4	<ul style="list-style-type: none"> Describe the classification, functions, sources and recommended daily allowances (RDA) of Proteins. 	Proteins <ul style="list-style-type: none"> Classification Caloric value Recommended daily allowances Dietary sources. Functions Digestion, absorption and storage, metabolism of carbohydrates * Malnutrition: Deficiencies and Over consumption 	<ul style="list-style-type: none"> Lecture Discussion Explaining using charts 	<ul style="list-style-type: none"> Short answers Objective type
V	T=4	<ul style="list-style-type: none"> Describe the classification, functions, sources and 	Energy <ul style="list-style-type: none"> Unit of Energy -Kcal Energy requirements of different categories of 	<ul style="list-style-type: none"> Lecture Discussion Explaining using charts Exercise Demonstration 	<ul style="list-style-type: none"> Short answers Objective type

Unit	Time (Hrs)	Learning objectives	Content	Teaching Learning Activities	Evaluation
		recommended daily allowances (RDA) of Energy.	<p>people.</p> <ul style="list-style-type: none"> • Measurements of energy • Body Mass Index (BMI) and basic metabolism • Basal Metabolic Rate (BMR) - determination and factors affecting 		
VI	T=4	*Describe the classification, functions, sources and recommended daily allowances (RDA) of Vitamins.	<p>Vitamins</p> <ul style="list-style-type: none"> • Classification • Recommended daily allowances • Dietary sources. • Functions • Absorption, synthesis, metabolism storage & excretion • Deficiencies • Hypervitaminosis 	<ul style="list-style-type: none"> • Lecture • Discussion • Explaining using charts 	<ul style="list-style-type: none"> • Short answers • Objective type
VII	T=4	Describe the classification, functions, sources and recommended daily allowances (RDA) of Minerals.	<p>Minerals</p> <ul style="list-style-type: none"> • Classification • Recommended daily allowances • Dietary sources. • Functions • Absorption, synthesis, metabolism storage & excretion • Deficiencies • Over consumption and toxicity 	<ul style="list-style-type: none"> • Lecture • Discussion • Explaining using charts 	<ul style="list-style-type: none"> • Short answers • Objective type
VIII	T=3	Describe the sources, functions and requirements of water & electrolytes	<p>Water & electrolytes</p> <ul style="list-style-type: none"> • Water: Daily requirements, regulation of water metabolism, distribution of body water, • Electrolytes: Types, sources, composition of body fluids. • Maintenance of 	<ul style="list-style-type: none"> • Lecture • Discussion • Explaining Using charts 	<ul style="list-style-type: none"> • Short answers • Objective type

Unit	Time (Hrs)	Learning objectives	Content	Teaching Learning Activities	Evaluation
			fluid & electrolyte balance <ul style="list-style-type: none"> • Over hydration, dehydration and water intoxication • Electrolyte imbalances 		
IX	10 Hrs T=5 P=5	*Describe the Cookery rules and preservation of nutrients * Prepare & serve simple beverages & different types of foods	Cookery rules and preservation of nutrients <ul style="list-style-type: none"> • Principles, methods of cooking and serving □ Preservation of nutrients • Safe food handling – toxicity • Storage of food • Food preservation, food additives and its principles • Prevention of food adulteration Act(PFA) • Food standards 	<ul style="list-style-type: none"> • Lecture • Discussion • Demonstration • Practice session 	<ul style="list-style-type: none"> • Short answers • Objective type • Assessment practice sessions
X	10 Hrs T=0 P=10	<ul style="list-style-type: none"> • Describe and plan balanced diet for different categories of people 	Balance diet <ul style="list-style-type: none"> • Elements • Food groups • Recommended Daily Allowance • Nutritive value of foods • Calculation of balanced diet for different categories of people • Factors influencing food selection, marketing and budgeting for various cultural and socioeconomic group • Planning menu • Introduction to 	<ul style="list-style-type: none"> • Lecture • Discussion • Explaining using charts • Practice session • Meal Planning 	<ul style="list-style-type: none"> • Short answers • Objective type • Exercise on menu planning

Unit	Time (Hrs)	Learning objectives	Content	Teaching Learning Activities	Evaluation
			therapeutic diets: Naturopathy-Diet <ul style="list-style-type: none"> • Demonstration: Fluid diet, Egg flip, Soup, barley water, whey water Soft diet: custard, Caramel custard, kanji, jelly Semisolid diet: Khichadi, mashed potatoes, kheer 		
XI	T=4	<ul style="list-style-type: none"> • Describe various national programmes related to nutrition • Describe the role of nurse in assessment of nutritional status & nutrition education 	Role of nurse in nutritional Programmes <ul style="list-style-type: none"> • National programmes related to nutrition • Vitamin A deficiency programme • National iodine deficiency disorders (IDD) programme • Mid-Day meal programme • Integrated child development scheme (ICDS) • National and International agencies working towards food/nutrition • NIPCCD, CARE, FAO, NIN, CFTRI (Central food technology & research institute) etc. • Assessment of nutritional status • Nutrition education and role of nurse 	<ul style="list-style-type: none"> • Lecture Discussion • Explaining with • Slide/film shows • Demonstration of Assessment of nutritional status 	<ul style="list-style-type: none"> • Short answers • Objective type

Bibliography :

- 1) Shubhangi Joshi, *Nutrition and Dietetics* 2nd edition, Tata McGraw – Hill publishing company Limited, New Delhi, 2002.
- 2) Dr. M. Swaminathan, *Handbook of Food and Nutrition*, The Bangalore printing and publishing Co. Ltd. (Bangalore press) 2004.

- 3) C. Gopalan, B. V. Ramasastry and S.C. Balasubramanian *Nutritive value of Indian Foods*, National Institute of Nutrition, Indian Council of Medical Research, Hyderabad 1999.
- 4) Joshi V.D. Handbook of *Nutrition and Dietetics* vora medical publications, 1999.
- 5) Kusum Gupta (L. C.Guple, Abhishek Gupta) *Food and Nutrition Facts and Figures*, 5th edition Jaypee brothers Medical publications (P) Ltd., New Delhi, India 2003.
- 6) T. K. Indrani, *Nursing Manual of Nutrition and Therapeutic Diet*, 1st edition Jaypee Brothers medical publishers (P) Ltd., 2003.
- 7) Antia – Clinical Dietetics and Nutrition, ed., 4th.

Biochemistry

Placement: First Year

Theory – 30 hours

Course Description: The Course is designed to assist the students to acquire knowledge of the normal biochemical composition and functioning of human body and understand the alterations in biochemistry in diseases for practice of nursing.

Specific objectives: at the end of the course the students will be able to:

- 1) To understand normal biochemistry of human body
- 2) To understand biochemical changes occurring in illness
- 3) To assist with simple biochemical test, interpret the results and draw inference.

Unit	Time (Hrs)	Objectives	Content	Teaching Learning Activities	Assessment methods
I	3	<ul style="list-style-type: none"> • Describe the structure Composition and functions of cell • Differentiate between Prokaryote and Eukaryote cell • Identify techniques of Microscopy 	Introduction <ul style="list-style-type: none"> • Definition and significance in nursing. • Review of structure, Composition and functions of cell. • Prokaryote and Eukaryote cell organization • Microscopy 	<ul style="list-style-type: none"> • Lecture discussion using charts, slides • Demonstrate use of microscope 	<ul style="list-style-type: none"> • Short answer questions • Objective type.
II	6	<ul style="list-style-type: none"> • Describe the Structure and functions of Cell membrane 	Structure and functions of Cell membrane <ul style="list-style-type: none"> • Fluid mosaic model tight junction, Cytoskeleton • Transport mechanism: diffusion, osmosis, filtration, active channel, sodium pump. • Acid base balance-maintenance & diagnostic tests. <ul style="list-style-type: none"> ○ PH buffers 	<ul style="list-style-type: none"> • Lecture Discussion 	<ul style="list-style-type: none"> • Short answer questions • Objective type.
III	6	<ul style="list-style-type: none"> • Explain the metabolism of carbohydrates 	Composition and metabolism of carbohydrates <ul style="list-style-type: none"> • Types, structures, composition and uses. <ul style="list-style-type: none"> ○ Monosaccharides , Disaccharides, 	<ul style="list-style-type: none"> • Lecture discussion • Demonstration of blood glucose monitoring 	<ul style="list-style-type: none"> • Short answer questions • Objective type.

Unit	Time (Hrs)	Objectives	Content	Teaching Learning Activities	Assessment methods
			Polysaccharides, Oligosaccharides • Metabolism <ul style="list-style-type: none"> ○ Pathways of glucose : <ul style="list-style-type: none"> - Glycolysis - Gluconeogenesis : Cori's cycle, Tricarboxylic acid (TCA) cycle - Glycogenolysis - Pentose phosphate pathways (Hexose mono phosphate) ○ Regulation of blood glucose level Investigations and their interpretations.		
IV	4	<ul style="list-style-type: none"> • Explain the metabolism of Lipids 	Composition and metabolism of Lipids <ul style="list-style-type: none"> • Types, structure, composition and uses of fatty acids <ul style="list-style-type: none"> ○ Nomenclature, Roles and Prostaglandins • Metabolism of fatty acid <ul style="list-style-type: none"> ○ Breakdown ○ Synthesis • Metabolism of triacylglycerols • Cholesterol metabolism <ul style="list-style-type: none"> ○ Biosynthesis and its Regulation <ul style="list-style-type: none"> - Bile salts and bilirubin - Vitamin D - Steroid hormones • Lipoproteins and their functions : <ul style="list-style-type: none"> ○ VLDLs- IDLs, LDLs and HDLs ○ Transport of lipids ○ Atherosclerosis Investigations and their interpretations. 	<ul style="list-style-type: none"> • Lecture Discussion using charts • Demonstration of laboratory tests 	<ul style="list-style-type: none"> • Short answer questions • Objective type.
V	6	<ul style="list-style-type: none"> • Explain the metabolism of Lipids 	Composition and metabolism of Amino acids and Proteins <ul style="list-style-type: none"> • Types, structure, composition and uses of Amino acids and Proteins • Metabolism of Amino acids and Proteins <ul style="list-style-type: none"> ○ Protein synthesis, targeting and glycosylation ○ Chromatography ○ Electrophoresis ○ Sequencing 	<ul style="list-style-type: none"> • Lecture discussion • Demonstration of blood glucose monitoring 	<ul style="list-style-type: none"> • Short answer questions • Objective type.

Unit	Time (Hrs)	Objectives	Content	Teaching Learning Activities	Assessment methods
			<ul style="list-style-type: none"> • Metabolism of Nitrogen <ul style="list-style-type: none"> ○ Fixation and Assimilation ○ Urea Cycle ○ Hemes and chlorophylls • Enzymes and co-enzymes <ul style="list-style-type: none"> ○ Classification ○ Properties ○ Kinetics and inhibition ○ Control <p>Investigations and their interpretations.</p>		
VI	2	<ul style="list-style-type: none"> • Describe types, composition and utilization of Vitamins & minerals 	<p>Composition of Vitamins and minerals</p> <ul style="list-style-type: none"> • Vitamins and minerals: <ul style="list-style-type: none"> ○ Structure ○ Classification ○ Properties ○ Absorption ○ Storage & transportation ○ Normal concentration <p>Investigations and their interpretations</p>	<ul style="list-style-type: none"> • Lecture Discussion using charts • Demonstration of laboratory tests 	<ul style="list-style-type: none"> • Short answer questions • Objective type.
VII	3	<ul style="list-style-type: none"> • Describe Immunology 	<p>Immunochemistry</p> <ul style="list-style-type: none"> • Immune response, • Structure and classification of immunoglobins • Mechanism of antibody production. • Antigens: HLA typing. • Free radical and Antioxidants. • Specialised Protein : Collagen, Elastin, Keratin, Myosin, Lens Protein. • Electrophoretic and Quantitative determination of immunoglobins - ELISA etc. <p>Investigation and their interpretations.</p>	<ul style="list-style-type: none"> • Lecture discussion • Demonstration of laboratory tests 	<ul style="list-style-type: none"> • Short answer questions • Objective type.

Bibliography :

1. U. Satyanarayan, Essentials of biochemistry, Books & allied (P) Ltd., Kolkata publisher, 2004.
2. Deb A.C.: Concepts of biochemistry (Theory & Practical) 1st edition, books & allied (P) Ltd. Publisher, Kolkata, 1999.
3. Deb. A.C. Fundamentals of biochemistry of biochemistry: 1st edition New central book Ag (P) Ltd., 2004.
4. Jacob Anthikad, Biochemistry for nurses; 2nd edition, Jaypee; 2001..
5. Gupta. R.C., Multiple choice questions in Biochemistry, 2nd edition, Jaypee, 2004.

Evaluation Scheme:

Subject Nutrition and Biochemistry	Assessment			
	Hours	Internal	External	Total
Theory	3	25	75	100

Details as follows:

Internal Assessment:

Theory:	15 Marks
Laboratory (Practicum):	10 Marks
Total:	25 Marks

(Out of 25 Marks to be send to the University)

Theory Examination:			15 Marks	
	Nutrition	Biochemistry	Total Marks	Average out of
Mid-Term	35	15	50	--
Prelim	45	30	75	--
		Total	125	15

(125 Marks from mid-term & prelim (Theory) to be converted into 15 Marks)

Laboratory (Practicum):		10 Marks	
Subject	Internal Exam Out of	Average Out of	
Nutrition	25	05	
Biochemistry	25	05	
Total	50	10	

Details as follows:

Evaluation Criteria for Nutrition (Practicum): 05 Marks		
Sr. No.	Items	Marks
1	Selection of menu for specific group	05
2	Calculation of relative requirement	10
3	Presentation and recording	10
Total		25

(25 Marks from Nutrition Practicum to be converted into 05 Marks)

Evaluation Criteria for Biochemistry (Journal): 05 Marks

Sr. No	Items	Marks
1	Investigations related to altered CHO metabolism	05
2	Investigations related to altered protein metabolism	05
3	Investigations related to altered lipid metabolism	05
4	Investigations related to altered vitamins and minerals	05
5	Investigations related to altered immunochemistry	05
Total		25

(25 Marks from Biochemistry Practicum to be converted into 05 Marks)

External Assessment: 75 Marks
(University examination)

Section A: Nutrition:	45 marks
Section B: Biochemistry:	30 marks
Total:	75 Marks

