

## NUTRITION & BIOCHEMISTRY

### Nutrition

**Placement: First Year**

**Theory – 265 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 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 Objective	Contents	Teaching Learning Activities	Evaluation
<b>I</b>	<b>T=4</b>	<ul style="list-style-type: none"> <li>• Describe the relationship between nutrition &amp; Health.</li> </ul>	<b>Introduction</b> <ul style="list-style-type: none"> <li>• Nutrition:                             <ul style="list-style-type: none"> <li>□ History</li> <li>□ Concepts</li> </ul> </li> <li>• Role of nutrition in maintaining health</li> <li>• Nutritional problems in India</li> <li>• National nutritional policy</li> <li>• Factors affecting food &amp; nutrition: socio-economic, cultural, tradition, production, system of distribution, life style &amp; food habits etc</li> <li>• Role of food &amp; its medicinal value</li> <li>• Classification of foods</li> <li>• Food standards</li> <li>• Elements of nutrition: macro and micro</li> <li>• Calorie, BMR</li> </ul>	<ul style="list-style-type: none"> <li>• Lecture discussion</li> <li>• Explaining using charts</li> <li>• Panel Discussion</li> </ul>	<ul style="list-style-type: none"> <li>• Short answers</li> <li>• Objective type</li> </ul>

<b>II</b>	<b>T=4</b>	<ul style="list-style-type: none"> <li>Describe the classification, functions, sources and recommended daily allowances (RDA) of carbohydrates</li> </ul>	<b>Carbohydrates</b> <ul style="list-style-type: none"> <li>Classification</li> <li>Caloric value</li> <li>Recommended daily allowances</li> <li>Dietary sources.</li> <li>Functions</li> <li>Digestion, absorption and storage, metabolism of carbohydrates</li> <li>Malnutrition: Deficiencies and Over consumption</li> </ul>	<ul style="list-style-type: none"> <li>Lecture discussion</li> <li>Explaining using charts</li> </ul>	<ul style="list-style-type: none"> <li>Short answers</li> <li>Objective type</li> </ul>
<b>III</b>	<b>T=4</b>	<ul style="list-style-type: none"> <li>Describe the classification, functions, sources and recommended daily allowances (RDA) of Fats.</li> </ul>	<b>FATS</b> <ul style="list-style-type: none"> <li>Classification</li> <li>Caloric value</li> <li>Recommended daily allowances</li> <li>Dietary sources.</li> <li>Functions</li> <li>Digestion, absorption and storage, metabolism</li> <li>* Malnutrition: Deficiencies and Over consumption</li> </ul>	<ul style="list-style-type: none"> <li>Lecture discussion</li> <li>Explaining using charts</li> </ul>	<ul style="list-style-type: none"> <li>Short answers</li> <li>Objective type</li> </ul>
<b>IV</b>	<b>T=3</b>	<ul style="list-style-type: none"> <li>Describe the classification, functions, sources and recommended daily allowances (RDA) of Proteins.</li> </ul>	<b>Proteins</b> <ul style="list-style-type: none"> <li>Classification</li> <li>Caloric value</li> <li>Recommended daily allowances</li> <li>Dietary sources.</li> <li>Functions</li> <li>Digestion, absorption and storage, metabolism of carbohydrates</li> <li>* Malnutrition: Deficiencies and Over consumption</li> </ul>	<ul style="list-style-type: none"> <li>Lecture discussion</li> <li>Explaining using charts</li> </ul>	<ul style="list-style-type: none"> <li>Short answers</li> <li>Objective type</li> </ul>
<b>V</b>	<b>T=3</b>	<ul style="list-style-type: none"> <li>Describe the classification, functions, sources and recommended daily allowances (RDA) of Energy.</li> </ul>	<b>Energy</b> <ul style="list-style-type: none"> <li>Unit of Energy - Kcal</li> <li>Energy requirements of different categories of people.</li> <li>Measurements of energy</li> <li>Body Mass Index (BMI) and basic metabolism</li> <li>Basal Metabolic Rate (BMR) – determination and factors affecting</li> </ul>	<ul style="list-style-type: none"> <li>Lecture Discussion</li> <li>Explaining using charts</li> <li>Exercise Demonstration</li> </ul>	<ul style="list-style-type: none"> <li>Short answers</li> <li>Objective type</li> </ul>

<b>VI</b>	<b>T=4</b>	<ul style="list-style-type: none"> <li>Describe the classification, functions, sources and recommended daily allowances (RDA) of Vitamins.</li> </ul>	<b>Vitamins</b> <ul style="list-style-type: none"> <li>Classification</li> <li>Recommended daily allowances</li> <li>Dietary sources.</li> <li>Functions</li> <li>Absorption, synthesis, metabolism storage &amp; excretion</li> <li>Deficiencies</li> <li>Hypervitaminosis</li> </ul>	<ul style="list-style-type: none"> <li>Lecture discussion</li> <li>Explaining using charts</li> </ul>	<ul style="list-style-type: none"> <li>Short answers</li> <li>Objective type</li> </ul>
<b>VII</b>	<b>T=4</b>	<ul style="list-style-type: none"> <li>Describe the classification, functions, sources and recommended daily allowances (RDA) of Minerals.</li> </ul>	<b>Minerals</b> <ul style="list-style-type: none"> <li>Classification</li> <li>Recommended daily allowances</li> <li>Dietary sources.</li> <li>Functions</li> <li>Absorption, synthesis, metabolism storage &amp; excretion</li> <li>Deficiencies</li> <li>Over consumption and toxicity</li> </ul>	<ul style="list-style-type: none"> <li>Lecture discussion</li> <li>Explaining using charts</li> </ul>	<ul style="list-style-type: none"> <li>Short answers</li> <li>Objective type</li> </ul>
<b>VIII</b>	<b>T=3</b>	<ul style="list-style-type: none"> <li>Describe the sources, functions and requirements of water &amp; electrolytes</li> </ul>	<b>Water &amp; electrolytes</b> <ul style="list-style-type: none"> <li>Water: Daily requirements, regulation of water metabolism, distribution of body water,</li> <li>Electrolytes: Types, sources, composition of body fluids.</li> <li>Maintenance of fluid &amp; electrolyte balance</li> <li>Over hydration, dehydration and water intoxication</li> <li>Electrolyte imbalances</li> </ul>	<ul style="list-style-type: none"> <li>Lecture discussion</li> <li>Explaining using charts</li> </ul>	<ul style="list-style-type: none"> <li>Short answers</li> <li>Objective type</li> </ul>

IX	15 Hrs T=5 P=10	<ul style="list-style-type: none"> <li>Describe the Cookery rules and preservation of nutrients</li> <li>Prepare &amp; serve simple beverages &amp; different types of foods</li> </ul>	<b>Cookery rules and preservation of nutrients</b> <ul style="list-style-type: none"> <li>Principles, methods of cooking and serving</li> <li><input type="checkbox"/> <b>Preservation of nutrients</b> <ul style="list-style-type: none"> <li>Safe food handling toxicity</li> <li>Storage of food</li> <li>Food preservation, food additives and its principles</li> <li>Prevention of food adulteration Act (PFA)</li> <li>Food standards</li> <li>Prevention of simple beverages</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Lecture Discussion</li> <li>Demonstration</li> <li>Practice session</li> </ul>	<ul style="list-style-type: none"> <li>Short answers</li> <li>Objective type</li> <li>Assessment practice sessions</li> </ul>
X	12 Hrs T=07 P=05	<ul style="list-style-type: none"> <li>Describe and plan balanced diet for different categories of people</li> </ul>	<b>Balance diet</b> <ul style="list-style-type: none"> <li>Elements</li> <li>Food groups</li> <li>Recommended Daily Allowance</li> <li>Nutritive value of foods</li> <li>Calculation of balanced diet for different categories of people</li> <li>Factors influencing food selection, marketing and budgeting for various cultural and socioeconomic group</li> <li>Planning menu</li> <li>Introduction to therapeutic diets: Naturopathy-Diet</li> <li>Demonstration: Fluid diet, Egg flip, Soup, barley water, whey water Soft diet: custard, Caramel custard, kanji, jelly Semisolid diet: Khichadi, mashed potatoes, kheer</li> </ul>	<ul style="list-style-type: none"> <li>Lecture Discussion</li> <li>Explaining using charts</li> <li>Practice session</li> <li>Meal Planning</li> </ul>	<ul style="list-style-type: none"> <li>Short answers</li> <li>Objective type</li> <li>Exercise on menu planning</li> </ul>

XI	T=4	<ul style="list-style-type: none"> <li>• Describe various national programs related to nutrition</li> <li>• Describe the role of nurse in assessment of nutritional status &amp; nutrition education</li> </ul>	<p><b>Role of nurse in nutritional Programmes</b></p> <ul style="list-style-type: none"> <li>• National programmes related to nutrition</li> <li>• Vitamin A deficiency programme</li> <li>• National iodine deficiency disorders (IDD) programme</li> <li>• Mid-Day meal programme</li> <li>• Integrated child development scheme (ICDS)</li> <li>• National and International agencies working towards food/nutrition</li> <li>• NIPCCD, CARE, FAO, NIN, CFTRI (Central food technology &amp; research institute) etc.</li> <li>• Assessment of nutritional status</li> <li>• Nutrition education and role of nurse</li> </ul>	<ul style="list-style-type: none"> <li>• Lecture Discussion</li> <li>• Explaining with</li> <li>• Slide/film shows</li> <li>• Demonstration of Assessment of nutritional status</li> </ul>	<ul style="list-style-type: none"> <li>• Short answers</li> <li>• Objective type</li> </ul>
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## BIBLIOGRAPHY

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2. Dr. M. Swaminathan, Handbook of Food and Nutrition, The Bangalore printing and publishing Co. Ltd. (Banglore press) 2004.
3. C. Gopalan, B. V. Ramasastri 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, 5<sup>th</sup> 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., 4<sup>th</sup>.

## 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)	Objective	Contents	Teaching Learning Activities	Assessment methods
I	3	<ul style="list-style-type: none"><li>• Describe the structure Composition and functions of cell</li><li>• Differentiate between Prokaryote and Eukaryote cell</li><li>• Identify techniques of Microscopy</li></ul>	<b>Introduction</b> <ul style="list-style-type: none"><li>• Definition and significance in nursing.</li><li>• Review of structure, Composition and functions of cell.</li><li>• Prokaryote and Eukaryote cell organization</li><li>• Microscopy</li></ul>	<ul style="list-style-type: none"><li>• Lecture discussion using charts, slides</li><li>• Demonstrate use of microscope</li></ul>	<ul style="list-style-type: none"><li>• Short answers</li><li>• Objective type</li></ul>
II	6	<ul style="list-style-type: none"><li>• Describe the Structure and functions of Cell membrane</li></ul>	Structure and functions of Cell membrane <ul style="list-style-type: none"><li>• Fluid mosaic model tight junction, Cytoskeleton</li><li>• Transport mechanism: diffusion, osmosis, filtration, active channel, and sodium pump.</li><li>• Acid base balance maintenance &amp; diagnostic tests.<ul style="list-style-type: none"><li>o PH buffers</li></ul></li></ul>	<ul style="list-style-type: none"><li>• Lecture Discussion</li></ul>	<ul style="list-style-type: none"><li>• Short answers</li><li>• Objective type</li></ul>

III	6	<ul style="list-style-type: none"> <li>• Explain the metabolism of carbohydrates</li> </ul>	<p><b>Composition and metabolism of carbohydrates</b></p> <ul style="list-style-type: none"> <li>• Types, structures, composition and uses. <ul style="list-style-type: none"> <li>o Monosaccharides, Disaccharides, Polysaccharides, Oligosaccharides</li> </ul> </li> <li>• Metabolism <ul style="list-style-type: none"> <li>o Pathways of glucose : <ul style="list-style-type: none"> <li>- Glycolysis</li> <li>- Gluconeogenesis : Cori's cycle, Tricarboxylic acid (TCA) cycle</li> <li>- Glycogenolysis</li> <li>- Pentose phosphate pathways (Hexose mono phosphate)</li> </ul> </li> <li>o Regulation of blood glucose level</li> </ul> </li> </ul> <p>Investigations and their interpretations.</p>	<ul style="list-style-type: none"> <li>• Lecture discussion</li> <li>• Demonstration of blood glucose monitoring</li> </ul>	<ul style="list-style-type: none"> <li>• Short answers</li> <li>• Objective type</li> </ul>
IV	4	<ul style="list-style-type: none"> <li>• Explain the metabolism of Lipids</li> </ul>	<p><b>Composition and metabolism of Lipids</b></p> <ul style="list-style-type: none"> <li>• Types, structure, composition and uses of fatty acids <ul style="list-style-type: none"> <li>o Nomenclature, Roles and Prostaglandins</li> </ul> </li> <li>• Metabolism of fatty acid <ul style="list-style-type: none"> <li>o Breakdown</li> <li>o Synthesis</li> </ul> </li> <li>• Metabolism of triacylglycerols</li> <li>• Cholesterol metabolism <ul style="list-style-type: none"> <li>o Biosynthesis and its</li> </ul> </li> <li>• Regulation <ul style="list-style-type: none"> <li>- Bile salts and bilirubin</li> <li>- Vitamin D</li> <li>- Steroid hormones</li> </ul> </li> <li>• Lipoproteins and their functions : <ul style="list-style-type: none"> <li>o VLDLs- IDLs, LDLs and HDLs</li> <li>o Transport of lipids</li> <li>o Atherosclerosis</li> </ul> </li> </ul> <p>Investigations and their interpretations.</p>	<ul style="list-style-type: none"> <li>• Lecture Discussion using charts</li> <li>• Demonstration of laboratory tests</li> </ul>	<ul style="list-style-type: none"> <li>• Short answers</li> <li>• Objective type</li> </ul>

V	6	<ul style="list-style-type: none"> <li>• Explain the metabolism of Lipids</li> </ul>	<p><b>Composition and metabolism of Amino acids and Proteins</b></p> <ul style="list-style-type: none"> <li>• Types, structure, composition and uses of Amino acids and Proteins</li> <li>• Metabolism of Amino acids and Proteins <ul style="list-style-type: none"> <li>o Protein synthesis, targeting and glycosylation</li> <li>o Chromatography</li> <li>o Electrophoresis</li> <li>o Sequencing</li> </ul> </li> <li>• Metabolism of Nitrogen <ul style="list-style-type: none"> <li>o Fixation and Assimilation</li> <li>o Urea Cycle</li> <li>o Hemes and chlorophylls</li> </ul> </li> <li>• Enzymes and co-enzymes <ul style="list-style-type: none"> <li>o Classification</li> <li>o Properties</li> <li>o Kinetics and inhibition</li> <li>o Control</li> </ul> </li> </ul> <p>Investigations and their interpretations.</p>	<ul style="list-style-type: none"> <li>• Lecture discussion</li> <li>• Demonstration of blood glucose monitoring</li> </ul>	<ul style="list-style-type: none"> <li>• Short answers</li> <li>• Objective type</li> </ul>
VI	2	<ul style="list-style-type: none"> <li>• Describe types, composition and utilization of Vitamins &amp; minerals</li> </ul>	<p><b>Composition of Vitamins and minerals</b></p> <ul style="list-style-type: none"> <li>• Vitamins and minerals: <ul style="list-style-type: none"> <li>o Structure</li> <li>o Classification</li> <li>o Properties</li> <li>o Absorption</li> <li>o Storage &amp; transportation</li> <li>o Normal concentration</li> </ul> </li> </ul> <p>Investigations and their interpretations</p>	<ul style="list-style-type: none"> <li>• Lecture Discussion using charts</li> <li>• Demonstration of laboratory tests</li> </ul>	<ul style="list-style-type: none"> <li>• Short answers</li> <li>• Objective type</li> </ul>

<b>VII</b>	<b>3</b>	<ul style="list-style-type: none"> <li>Describe Immunochemistry</li> </ul>	<b>Immunochemistry</b> <ul style="list-style-type: none"> <li>Immune response,</li> <li>Structure and classification of immunoglobins</li> <li>Mechanism of antibody production.</li> <li>Antigens: HLA typing.</li> <li>Free radical and Antioxidants.</li> <li>Specialised Protein : Collagen, Elastin, Keratin, Myosin, Lens Protein.</li> <li>Electrophoretic and Quantitative determination of immunoglobins - ELISA etc.</li> </ul> Investigation and their interpretations.	<ul style="list-style-type: none"> <li>Lecture discussion</li> <li>Demonstration laboratory tests</li> </ul>	<ul style="list-style-type: none"> <li>Short answers</li> <li>Objective type</li> </ul>
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### BIBLIOGRAPHY

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

### Evaluation Scheme

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

Details as follows:

**Internal Assessment:**

<b>Theory:</b>	<b>15 Marks</b>
<b>Practicum:</b>	<b>10 Marks</b>

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

Details as follows:

**Internal Assessment:**

<b>Theory:</b>	<b>25 Marks</b>
Mid-Term:	50 Marks
Prelim:	75 Marks
<b>Total:</b>	<b>125 Marks</b>

(125 Marks from mid-term & prelim (Theory) to be converted into 25 Marks)

### Theory Examination: 15 Marks

	<b>Nutrition</b>	<b>Biochemistry</b>	<b>Total Marks</b>	<b>Average out of</b>
<b>Mid-Term</b>	35	15	50	--
<b>Prelim</b>	45	30	75	--
		<b>Total</b>	<b>125</b>	<b>15</b>

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

### Laboratory (Practicum): 10 Marks

<b>Subject</b>	<b>Internal Exam Out of</b>	<b>Average out of</b>
Nutrition	25	05
Biochemistry	25	05
<b>Total</b>	<b>50</b>	<b>10</b>

Details as follows:

#### Evaluation Criteria for Nutrition (Practicum): 05 Marks

<b>Sr. No.</b>	<b>Items</b>	<b>Marks</b>
1	Selection of menu for specific group	05
2	Calculation of relative requirement	10
3	Presentation and recording	10
<b>Total</b>		<b>25</b>

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

#### Evaluation Criteria for Biochemistry (Journal): 05 Marks

<b>Sr. No.</b>	<b>Items</b>	<b>Marks</b>
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
<b>Total</b>		<b>25</b>

(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