# Bachelor of Science in Nursing (B.Sc. Nursing) (Semester-II)

| Course Code | UM02CBND01 | Title of the Course | Applied Biochemistry |
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| Total Credits of the Course | 02 | Contact Credit Hours | 40 |

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| **Course Specific Objectives** | The course is designed to assist the students to acquire knowledge of the normal biochemical composition and functioning of human body, its alterations in disease conditions and to apply this knowledge in the practice of nursing. |
| **Course Objectives** | 1. Describe the metabolism of carbohydrates and its alterations.<br>2. Explain the metabolism of lipids and its alterations.<br>3. Explain the metabolism of proteins and amino acids and its alterations.<br>4. Explain clinical enzymology in various disease conditions.<br>5. Explain acid base balance, imbalance and its clinical significance.<br>6. Describe the metabolism of hemoglobin and its clinical significance.<br>7. Explain different function tests and interpret the findings.<br>8. Illustrate the immunochemistry. |

| Unit | Time (Hrs) | Content | Weightage |
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| **I** | 8 (T) | **Carbohydrates**<br>• Digestion, absorption and metabolism of carbohydrates and related disorders<br>• Regulation of blood glucose<br>• Diabetes Mellitus – type 1 and type 2, symptoms, complications & management in brief<br>• Investigations of Diabetes Mellitus OGTT – Indications, Procedure, Interpretation and types of GTT curve Mini GTT, extended GTT, GCT, IV<br>• GTT<br>• HbA1c (Only definition)<br>• Hypoglycemia – Definition & causes | **20%** |
| **II** | 8 (T) | **Lipids**<br>• Fatty acids – Definition, classification<br>• Definition & Clinical significance of MUFA & PUFA, Essential fatty acids,<br>• Trans fatty acids<br>• Digestion, absorption & metabolism of lipids & related disorders<br>• Compounds formed from cholesterol Ketone bodies (name, types & significance only)<br>• Lipoproteins – types & functions (metabolism not required)<br>• Lipid profile<br>• Atherosclerosis (in brief) | **20%** |
| **III** | 9 (T) | **Proteins**<br>• Classification of amino acids based on nutrition, metabolic rate with examples<br>• Digestion, absorption & metabolism of protein & related disorders<br>• Biologically important compounds synthesized from various amino acids (only names)<br>• In born errors of amino acid metabolism<br>– only aromatic amino acids (in brief)<br>• Plasma protein – types, function & normal values | **22.5%** |

| Unit | Time (Hrs) | Content | Weightage |
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| | | • Causes of proteinuria, hypoproteinemia, hyper-gamma globinemia<br>• Principle of electrophoresis, normal & abnormal electrophoretic patterns (in brief) | |
| **IV** | 4 (T) | **Clinical Enzymology**<br>• Isoenzymes – Definition & properties<br>• Enzymes of diagnostic importance in<br>• Liver Diseases – ALT, AST, ALP, GGT<br>• Myocardial infarction – CK, cardiac troponins, AST, LDH<br>• Muscle diseases – CK, Aldolase<br>• Bone diseases – ALP<br>• o Prostate cancer – PSA, ACP | **10%** |
| **V** | 3 (T) | **Acid base maintenance**<br>• pH – definition, normal value<br>• Regulation of blood pH – blood buffer, respiratory & renal<br>• ABG – normal values<br>• Acid base disorders – types, definition & causes | **7.5%** |
| **VI** | 2 (T) | **Heme catabolism**<br>• Heme degradation pathway<br>• Jaundice – type, causes, urine & blood investigations (van den berg test) | **5%** |
| **VII** | 3 (T) | **Organ function tests (biochemical parameters & normal values only)**<br>☐ Renal<br>☐ Liver<br>• ☐ Thyroid | **7.5%** |
| **VIII** | 3 (T) | **Immunochemistry**<br>☐ Structure & functions of immunoglobulin<br>• ☐ Investigations & interpretation– ELISA | **7.5%** |

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| **Teaching/ Learning Activities** | • Lecture cum Discussion<br>• Explain using charts, models and slides<br>• Demonstration of laboratory tests |
| **Assessment Methods** | • Essay<br>• Short answer<br>• Very short answer |

| SN | Details of Evaluation | Weightage |
|---|---|---|
| 1 | University Examination | 75 Marks |

| Course Outcomes: Having completed this course, the learner will be able to | |
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| **1** | Describe the metabolism of carbohydrates and its alterations |
| **2** | Explain the metabolism of lipids and its alterations |
| **3** | Explain the metabolism of amino acids and proteins Identify alterations in disease conditions |
| **4** | Explain clinical enzymology in various disease conditions |
| **5** | Explain acid base balance, imbalance and its clinical significance |
| **6** | Describe the metabolism of hemoglobin and its clinical significance |
| **7** | Explain different function tests and interpret the findings |
| **8** | Illustrate the immunochemistry |

| **Suggested References:** | |
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| **SN** | **References** |
| **1** | Textbook of Medical Biochemistry Dinesh Puri, Elsevier 3rd ed, 2011 |
| **2** | Concise Medical Biochemistry Sucheta P Dandekar., Elsevier 3rd ed, 2010 |
| **3** | Essentials of Biochemistry Pankaja Naik, Jaypee 1st ed, 2012 |
| **4** | Biochemistry for B.Sc. Nursing students Harbans Lal, CBS Pub. 2nd ed, 2010 |
| **5** | Biochemistry for Nurses S M Raju, Jaypee 1st ed, 2004. |
| **6** | Biochemistry for Nurses Jacob Anthikad, Jaypee 2nd ed, 2004. |
| **7** | Medical Biochemistry for Nurses Dr. Shweta Singla, Kumar Publishing House. 1st ed, 2010 |

# Bachelor of Science in Nursing (B.Sc. Nursing) (Semester-II)

| Course Code | UM02CBND01 | Title of the Course | Applied Nutrition and Dietetics |
|---|---|---|---|
| Total Credits of the Course | 03 | Contact Credit Hours | 60 (Theory: 60 Hr, Lab :15 Hr) |

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| **Course Specific Objectives** | The course is designed to assist the students to acquire basic knowledge and understanding of the principles of Nutrition and Dietetics and apply this knowledge in the practice of Nursing. |
| **Course Objectives** | 1. Identify the importance of nutrition in health and wellness.<br>2. Apply nutrient and dietary modifications in caring patients.<br>3. Explain the principles and practices of Nutrition and Dietetics.<br>4. Identify nutritional needs of different age groups and plan a balanced diet for them.<br>5. Identify the dietary principles for different diseases.<br>6. Plan therapeutic diet for patients suffering from various disease conditions.<br>7. Prepare meals using different methods and cookery rules. |

| Unit | Time (Hrs) | Content | Weightage |
|---|---|---|---|
| **I** | 2 (T) | **Introduction to Nutrition**<br>**Concepts**<br>• Definition of Nutrition & Health<br>• Malnutrition – Under Nutrition & Over Nutrition<br>• Role of Nutrition in maintaining health<br>• Factors affecting food and nutrition<br>**Nutrients**<br>• Classification<br>• Macro & Micronutrients<br>• Organic & Inorganic<br>• Energy Yielding & Non-Energy Yielding<br>**Food**<br>• Classification – Food groups<br>• • Origin | **3.32%** |
| **II** | 3 (T) | **Carbohydrates**<br>• Composition – Starches, sugar and cellulose<br>• Recommended Daily Allowance (RDA)<br>• Dietary sources<br>• Functions<br>**Energy**<br>• Unit of energy – Kcal<br>• Basal Metabolic Rate (BMR)<br>• Factors affecting BMR | **4.98 %** |
| **III** | 3 (T) | **Proteins**<br>• Composition<br>• Eight essential amino acids<br>• Functions<br>• Dietary sources<br>• Protein requirements – RDA | **4.98 %** |
| **IV** | 2 (T) | **Fats**<br>• Classification – Saturated & unsaturated<br>• Calorie value<br>• Functions<br>• Dietary sources of fats and fatty acids<br>• Fat requirements – RDA<br>• | **3.32 %** |
| **V** | 3 (T) | **Vitamins**<br>• Classification – fat soluble & water soluble<br>• Fat soluble – Vitamins A, D, E, and K<br>• Water soluble – Thiamine (vitamin B1), Riboflavin | **4.98%** |

| Unit | Time (Hrs) | Content | Weightage |
|---|---|---|---|
| | | (vitamin B2),<br>Nicotinic acid, Pyridoxine (vitamin B6), Pantothenic acid, Folic acid, Vitamin B12, Ascorbic acid (vitamin C)<br>• Functions, Dietary Sources &<br>• Requirements – RDA of every vitamin | |
| **VI** | 3 (T) | **Minerals**<br>• Classification – Major minerals (Calcium, phosphorus, sodium,<br>potassium and magnesium) and Trace elements<br>• Functions<br>• Dietary Sources<br>• Requirements – RDA | **4.98%** |
| **VII** | 7 (T)<br>8 (L) | **Balanced diet**<br>• Definition, principles, steps<br>• Food guides – Basic Four Food Groups<br>• RDA – Definition, limitations, uses<br>• Food Exchange System<br>• Calculation of nutritive value of foods<br>• Dietary fibre<br>**Nutrition across life cycle**<br>• Meal planning/Menu planning – Definition, principles, steps<br>• Infant and Young Child Feeding (IYCF) guidelines – breast feeding, infant foods<br>• Diet plan for different age groups – Children, adolescents and elderly<br>• Diet in pregnancy – nutritional requirements and balanced diet plan<br>• Anemia in pregnancy – diagnosis, diet for anemic pregnant women, iron & folic acid supplementation and counseling<br>• Nutrition in lactation – nutritional requirements, diet for lactating mothers, complementary feeding/ weaning | **24.9 %** |
| **VIII** | 6 (T) | **Nutritional deficiency disorders**<br>• Protein energy malnutrition – magnitude of the problem, causes, classification, signs & symptoms, Severe acute malnutrition (SAM), management & prevention and nurses‘ role<br>• Childhood obesity – signs & symptoms, assessment, management & prevention and nurses‘ role<br>• Vitamin deficiency disorders – vitamin A, B, C & D deficiency disorders –causes, signs & symptoms, management & prevention and nurses‘ role<br>• Mineral deficiency diseases – iron, iodine and calcium deficiencies –causes, signs & symptoms, management & prevention<br>• and nurses‘ role | **9.96%** |
| **IX** | 4 (T)<br>7 (L) | **Therapeutic diets**<br>• Definition, Objectives, Principles<br>• Modifications – Consistency, Nutrients,<br>• Feeding techniques.<br>• Diet in Diseases – Obesity, Diabetes Mellitus, CVD, Underweight, Renal diseases, Hepatic disorders Constipation,<br>• Diarrhea, Pre and Post-operative period | **28.22%** |
| **X** | 3 (T) | **Cookery rules and preservation of nutrients**<br>• Cooking **–** Methods, Advantages and | **4.98%** |

| Unit | Time (Hrs) | Content | Weightage |
|---|---|---|---|
| | | Disadvantages<br>• Preservation of nutrients<br>• Measures to prevent loss of nutrients during preparation<br>• Safe food handling and Storage of foods<br>• Food preservation<br>• Food additives and food adulteration<br>• Prevention of Food Adulteration Act (PFA)<br>• Food standards | |
| **XI** | 4 (T) | **Nutrition assessment and nutrition education**<br>• Objectives of nutritional assessment<br>• Methods of assessment – clinical examination, anthropometry, laboratory & biochemical assessment, assessment of dietary intake including Food frequency questionnaire (FFQ) method<br>• Nutrition education – purposes, principles and methods | **6.64%** |
| **XII** | 3 (T) | **National Nutritional Programs and role of nurse**<br>• Nutritional problems in India<br>• National nutritional policy<br>• National nutritional programs – Vitamin A Supplementation, Anemia Mukt Bharat Program, Integrated Child Development Services (ICDS), Mid-day Meal Scheme (MDMS), National Iodine Deficiency Disorders Control Program (NIDDCP), Weekly Iron Folic Acid Supplementation (WIFS) and others as introduced<br>• Role of nurse in every program | **4.98%** |
| **XIII** | 2 (T) | **Food safety**<br>• Definition, Food safety considerations & measures<br>• Food safety regulatory measures in India – Relevant Acts<br>• Five keys to safer food<br>• Food storage, food handling and cooking<br>• General principles of food storage of food items (ex. milk, meat)<br>• Role of food handlers in food borne diseases<br>• Essential steps in safe cooking practices | **3.32%** |

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| **Teaching/ Learning Activities** | • Lecture cum Discussion<br>• Demonstration<br>• Writing nutritional assessment report<br>• Guided reading on related acts<br>• Meal planning<br>• Lab session on preparation of therapeutic diets |
| **Assessment Methods** | • Essay<br>• Short answer<br>• Very short answer<br>• Evaluation of Nutritional assessment report<br>• Quiz |

| SN | Details of Evaluation | Weightage |
|---|---|---|
| 1 | University Examination | 75 Marks |

| Course Outcomes: Having completed this course, the learner will be able to | |
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| **1** | Define nutrition and its relationship to Health |
| **2** | Describe the classification, functions, sources and recommended daily allowances (RDA) of carbohydrates<br>Explain BMR and factors affecting BMR |
| **3** | Describe the classification, Functions, sources and RDA of proteins. |
| **4** | Describe the classification, Functions, sources and RDA of fats |
| **5** | Describe the classification, functions, sources and RDA of vitamins |
| **6** | Describe the classification, functions, sources and RDA of minerals |
| **7** | Describe and plan balanced diet for different age groups, pregnancy, and lactation |
| **8** | Classify and describe the common nutritional deficiency disorders and identify nurses‘ role in assessment, management and prevention |
| **9** | Principles of diets in various diseases |
| **10** | Describe the rules and preservation of nutrients |
| **11** | Explain the methods of nutritional assessment and nutrition education |
| **12** | Describe nutritional problems in India and nutritional programs |
| **13** | Discuss the importance of food hygiene and food safety<br>Explain the Acts related to food safety |

| Suggested References: | |
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| **SN** | **References** |
| **1** | Clinical Dietetics & Nutrition Antia F.P., Abraham Philip, Oxford Uni. 4th ed, 2002. |
| **2** | Basics of Clinical Nutrition YK Joshi , Jaypee 2nd ed, 2008 |
| **3** | Nutrition & Dietetics with Indian Case Studies Shubhangini A Joshi , Tata Mgraw Hill.Edu 3rd ed, 2010 |
| **4** | Williams` Basic Nutrition & Diet theraphy Staci Nix Elsevier 13th ed, 2009 |
| **5** | Essentials of Nutrition and Dietetics for Nursing John Sheila, Jenifer Jasmine D., B.I.Pub.Pvt.Ltd 2010 |