

Biochemistry

| Unit No. with total hours | Objectives | Contents with distributed hours | | | | | | |
|--|--|--|--------------|------------------------------|---|-------------------------|--|------------|
| | | Must know (18 hrs)60% | | Desirable to know (9 hrs)30% | | Nice to know (3 hrs)10% | | |
| I (02 hours) | At the end of unit students are able to Knowledge: Understand importance of biochemistry in. Skill : Draw the structure of cells. Attitude: Incorporate its knowledge in nursing care. | Introduction: • Importance of Biochemistry in Nursing (1 hour) • Study of cell and its various components (1 hr) | | | | | | |
| Introduction: | | | | | | | | |
| Course Outcome | | Program outcome | | | | | | |
| Students should be able to | | Clinician/Nurse educator | Professional | Communi- cator | Leader and member of the health care team and system | Lifelong learner | Critical thinker | Researcher |
| | | PO-1 | PO-2 | PO-3 | PO-4 | PO-5 | PO-6 | PO-7 |
| CO-1: Define Biochemistry and explain the importance of biochemistry in Nursing. | | 3 | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-2: Draw a labeled diagram of cell and describe its various components. | | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-3: Explain the structure and function of cell with well labeled diagram. | | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-4: Differentiate between prokaryotes and eukaryotes Cells. | | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| II (03 Hrs) | At the end of unit students are able to Knowledge: Understand the distribution, functions and requirement of fluids and electrolytes in our body. Skill : Identify the signs and symptoms of dehydration. Attitude : Incorporate this knowledge in nursing practice. | Water & Electrolytes • Sources, Properties, Distribution of water and its functions in human body (ECF & ICF), Water & Fluid balance (1 hr) • Electrolyte Distribution and its functions in body, Dehydration causes and consequences (1hr) | | | • Electrolyte imbalance – causes, hypo and hypernatremia & kalemia (1 hr) | | Normal and abnormal values for diagnosis of diseases | |
| Water & Electrolytes | | | | | | | | |
| Course Outcome | | Program outcome | | | | | | |

| | | Clinician/Nurse educator | Professional | Communicator | Leader and member of the health care team and system | Lifelong learner | Critical thinker | Researcher | |
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| | | PO-1 | PO-2 | PO-3 | PO-4 | PO-5 | PO-6 | PO-7 | |
| Students should be able to | | 3 | 2 | 2 | 2 | 2 | 2 | 1 | |
| CO-1: Describe Sources, Properties, Distribution of water and its functions in human body | | | | | | | | | |
| CO-2: Explain extracellular fluids and intracellular fluids. | | 2 | 2 | 2 | 2 | 2 | 2 | 1 | |
| CO-3: Explain , Water & Fluid balance | | 3 | 2 | 2 | 2 | 2 | 2 | 1 | |
| CO-4: Describe Electrolyte Distribution and its functions in body | | 3 | 2 | 2 | 2 | 2 | 2 | 1 | |
| CO-5: Explain diffusion with regards to definition, factors that affect diffusion, functions, types and its applications. | | 2 | 2 | 2 | 2 | 2 | 2 | 1 | |
| CO-6: Define Dehydration and explain causes and consequences of Dehydration | | 3 | 2 | 2 | 2 | 2 | 2 | 1 | |
| CO-7: Describe electrolyte imbalance | | 3 | 3 | 2 | 2 | 2 | 2 | 1 | |
| CO-8: Explain hyponatremia and hypernatremia | | 2 | 2 | 2 | 2 | 2 | 2 | 1 | |
| CO-9: Describe hypokalemia and hyperkalemia | | 2 | 2 | 2 | 2 | 2 | 2 | | |
| CO-10: Explain normal and abnormal values of electrolytes to diagnose the disease | | 2 | 2 | 2 | 2 | 2 | 2 | 1 | |
| III (05 Hrs) | At the end of unit students are able to Knowledge: Understands actions of enzymes, factors influencing the digestion and absorption. Skill : Able to handle the enzymes specimens. Attitude : Incorporate this knowledge in nursing practice. | Enzymes <ul style="list-style-type: none"> • Definition and Mechanism of action. Factors affecting enzyme activities (1 hour) • Digestion and Absorption of carbohydrates, proteins and lipids. (1 hour) • Factors influencing the digestion and absorption. (1hour) | | <ul style="list-style-type: none"> • Mal absorption syndrome (1 hr) • Precautions for handling specimens for enzymes estimation (1 hr) | | | Normal and abnormal values for diagnosis of diseases | | |

| Enzymes | | | | | | | | |
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| Course Outcome | Program outcome | | | | | | | |
| | Clinician/Nurse educator | Professional | Communicator | Leader and member of the health care team and system | Lifelong learner | Critical thinker | Researcher | |
| | PO-1 | PO-2 | PO-3 | PO-4 | PO-5 | PO-6 | PO-7 | |
| Students should be able to CO-1: Describe enzymes with reference to definition and classification, chemical nature and factors affecting enzyme activity | 2 | 2 | 2 | 2 | 2 | 2 | 1 | |
| CO-2: Differentiate between enzymes and coenzymes. | 2 | 2 | 2 | 2 | 2 | 2 | 1 | |
| CO- 3: Describe enzymes with reference to definition and classification, chemical nature and factors affecting enzyme activity. | 2 | 2 | 2 | 2 | 2 | 2 | 1 | |
| CO-4: Explain digestion and Absorption of carbohydrates, | 2 | 2 | 2 | 2 | 2 | 2 | 1 | |
| CO-5: Explain digestion and Absorption protein | 2 | 2 | 2 | 2 | 2 | 2 | 1 | |
| CO-6:Explain digestion and Absorption of lipids | 2 | 2 | 2 | 2 | 2 | 2 | 1 | |
| CO- 7: Explain factors influencing the digestion and absorption | 2 | 2 | 2 | 2 | 2 | 2 | 1 | |
| CO-8:Describe Malabsorption syndrome with reference to definition, causes, sign symptoms and management | 2 | 2 | 2 | 2 | 2 | 2 | 1 | |
| CO-9: Describe precautions for handling specimens for enzymes estimation | 2 | 2 | 2 | 2 | 2 | 2 | 1 | |
| CO-10: Describe Normal and abnormal values enzymes for diagnosis of diseases | 3 | 2 | 2 | 2 | 2 | 2 | 1 | |
| IV (05 hours) | At the end of unit students are able to Knowledge : Understand and describe ETC, oxidation, gluconeogenesis, glycogenesis, glycolysis, and glycogenoglysis. | | | Carbohydrates <ul style="list-style-type: none"> Elementary consideration of Mono, disaccharides and polysaccharides. (1 hour) Elementary outline of Electron transport chain (ETC) and Biological Oxidation - glycolysis, (1 hr) Storage of glucose, Regulation of blood | | <ul style="list-style-type: none"> Fate of glucose in the body including- gluconeogenesis, glycogenesis, glycogenoglysis. (1 hr) | | <ul style="list-style-type: none"> Outline and Importance of TCA Cycle (Kreb's cycle) (1 hr) Normal and abnormal values for diagnosis of diseases |

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| | | glucose levels. Glucose Tolerance test (GTT), Hyperglycemia, Hypoglycemia (1 hr) | | | | | |
| Carbohydrates | | | | | | | |
| Course Outcome | | Program outcome | | | | | |
| Students should be able to | Clinician/Nurse educator | Professional | Communicator | Leader and member of the health care team and system | Lifelong learner | Critical thinker | Researcher |
| | PO-1 | PO-2 | PO-3 | PO-4 | PO-5 | PO-6 | PO-7 |
| CO-1: Explain carbohydrate with reference to definition, functions, composition, uses and its classification in detail. | | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-2: Describe monosaccharide, disaccharides, polysaccharides and oligosaccharides in detail. | | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-3: Explain elementary outline of Electron transport chain (ETC) | | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-4: Explain the digestion and absorption of carbohydrate. | | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-5: Explain the fate of carbohydrate after absorption. | | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-6: Describe glycolysis with reference to definition, steps involved in glycolysis and its energetic. | | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-7: Explain Storage of glucose, Regulation of blood glucose levels. Glucose Tolerance test (GTT) | | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-8: Describe Glyconeogenesis and its significance. | | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-9: Describe Cori's cycle with schematic representation. | | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-10: Differentiate Hyperglycemia, Hypoglycemia | | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-11: Explain Tricarboxylic acid (TCA) cycle and its energetic. | | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-12: Describe glycogenolysis with schematic representation. | | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-13: Explain Normal and abnormal values for diagnosis of diseases | | 2 | 2 | 2 | 2 | 2 | 1 |

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| V (06 hours) | At the end of unit students are able to Knowledge: Understand and describe essentials, properties, functions and importance of amino acids. | Proteins – Amino Acids and Hormones <ul style="list-style-type: none"> Protein Chemistry, Essential amino acids, properties and functions, Important polypeptides (1 hr) Plasma Proteins and their functions,(1 hr) Nucleic acids- DNA, RNA (1 hr) | <ul style="list-style-type: none"> Nitrogen balance. Uric Acid formation, gout.(1 hr) Nitrogenous constituents of Urine, blood & their origin, Urea cycle (1hr) Hormones (1 hr) | <ul style="list-style-type: none"> Biosynthesis of proteins in the cells and Role of nucleic acids in protein synthesis (1 hr) Normal and abnormal values for diagnosis of diseases |
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Proteins – Amino Acids and Hormones

| Course Outcome | Program outcome | | | | | | |
|---|---------------------------------|--------------|--------------|--|---------------------|---------------------|------------|
| | Clinician/ Nurse educator | Professional | Communicator | Leader and member of the health care team and system | Lifelong learner | Critical thinker | Researcher |
| | PO-1 | PO-2 | PO-3 | PO-4 | PO-5 | PO-6 | PO-7 |
| Students should be able to CO-1: Explain protein with reference to definition, structure, classification and its functions. | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-2: Explain denaturation and its biological importance. | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-3: Describe amino acid with regards to definition, structure, classification and its properties. | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-4: Explain important polypeptides | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-5: Explain the plasma Proteins and their functions | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-6: Describe biosynthesis of proteins in the cells and role of nucleic acids in protein synthesis. | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-7: Define Nucleic acids and differentiate DNA, RNA | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-8: Explain Nitrogen balance and Nitrogenous constituents of Urine, blood & their origin | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-9: Describe urea cycle with schematic representation. | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-10: Explain the metabolism of amino acids. | 2 | 2 | 2 | 2 | 2 | 2 | 1 |

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| CO-11: Explain gout with reference to definition, causes, sign and symptoms and its treatment | | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-12: Explain role of nucleic acids in protein synthesis | | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-13: Explain Normal and abnormal values for diagnosis of diseases | | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| VI (06 hours) | At the end of unit students are able to Knowledge: Understand and describe importance and functions of lipids. | Lipids <ul style="list-style-type: none"> • Biological Importance of lipids and their functions (1 hr) • Cholesterol and Lipoproteins - Sources occurrence and distribution, Blood levels and Metabolism (1 hr) • Biosynthesis of fats and storage of fats (B-oxidation) (1 hour) • Goal of lipid metabolism in Atherosclerosis and Heart diseases (1 hr) | | | <ul style="list-style-type: none"> • Role of liver in fat metabolism Fatty liver, its causes and Prevention.(1 hr) | | <ul style="list-style-type: none"> • Ketone body formation and its utilization, Causes and detection of ketosis.(1 hr) Normal and abnormal values for diagnosis of diseases | |
| Lipids | | | | | | | | |
| Course Outcome | | Program outcome | | | | | | |
| Students should be able to CO-1: Explain lipids with reference to definition, classification, structure, composition, importance and its function. | | Clinician/Nurse educator | Professional | Communicator | Leader and member of the health care team and system | Lifelong learner | Critical thinker | Researcher |
| | | PO-1 | PO-2 | PO-3 | PO-4 | PO-5 | PO-6 | PO-7 |
| | | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-2: Describe Cholesterol and Lipoproteins | | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-3: Describe Biosynthesis of fats and storage of fats (B-oxidation) | | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| CO- 4: Determine the digestion and absorption of lipids and its abnormalities. | | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-5: Describe the transport of lipids. | | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-6: Explain fatty acids with reference to definition, classification, structure, composition, uses and its function. | | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-7: Describe the essential fatty acids with regards to definition, functions and its deficiency. | | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| CO- 8: Explain lipid metabolism in Atherosclerosis and Heart diseases | | 2 | 2 | 2 | 2 | 2 | 2 | 1 |

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| CO-9: Describe role of liver in fat metabolism | 2 | 2 | 2 | 2 | 2 | 2 | 1 | |
| CO-10: Explain Fatty liver with reference to definition, its causes and Prevention | 2 | 2 | 2 | 2 | 2 | 2 | 1 | |
| VII (03 Hrs) | At the end of unit students are able to Knowledge: Understand and describe metabolism of carbohydrate, protein and fats. | | Inter-relationship in Metabolism • Carbohydrates, Lipids, proteins, minerals metabolism.(1 hr) | | Nutrition - calorie value of food, BMR, SDA, Balance diet. (2 hrs) | | | |
| Inter-relationship in Metabolism | | | | | | | | |
| Course Outcome | | Program outcome | | | | | | |
| | | Clinician/Nurse educator | Professional | Communicator | Leader and member of the health care team and system | Lifelong learner | Critical thinker | Researcher |
| | | PO-1 | PO-2 | PO-3 | PO-4 | PO-5 | PO-6 | PO-7 |
| Students should be able to | | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-1: Define Interrelationship in metabolism | | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-2: Explain Carbohydrates, metabolism | | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-3: Describe , Lipids, metabolism | | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-4: Explain Protein , metabolism | | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| CO 5: Explain mineral metabolism | | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-6: Define Nutrition - calorie value of food, | | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-7: Explain BMR with reference to definition and factors influencing BMR, SDA, Balance diet | | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-8: Explain SDA with reference to definition and factors influencing SDA | | 2 | 2 | 2 | 2 | 2 | 2 | 1 |
| CO-9: Describe Balance diet | | 3 | 3 | 2 | 3 | 2 | 2 | 1 |

