

BIOCHEMISTRY AND BIOPHYSICS
SECTION B -BIOPHYSICS

Unit No. & Hrs.	Objectives	Contents		
		Must know 60%	Desirable to know 30%	Nice to know 10%
I (01 hours)	At the end of unit students are able to Knowledge: Understand and describe the concepts of unit and measurements. Skill: Able to use measurements in nursing practice. Attitude: Recognizes the importance of units.	<ul style="list-style-type: none"> Introduction: Concepts of unit and measurements Fundamental and derived units Unit length, weight, mass, time. (1 hour) 		

Unit:1 Introduction

Course outcome		Program outcome						
		Clinician/Nurse educator	Professional	Communicator	Leader and member of the health care team and system	Lifelong learner	Critical thinker	Researcher
		PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1: List out the basic unit of length, weight and mass. Describe the different system of the units		2	2	3	2	2	1	2
CO2: Recall the meaning and importance of biophysics in nursing.		2	2	2	2	2	2	2
II (01 hours)	At the end of unit students are able to Knowledge: Understands and describes vector, speed, velocity and accelerations.	<ul style="list-style-type: none"> Vector and scalar motion, speed, velocity and acceleration Newton's law of 						

	<p>Skill: Able to apply law of motion while providing care to the patients.</p> <p>Attitude: Incorporate knowledge into practice.</p>	motion (1 hour)			
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Unit: II Motion

Course outcome	Program outcome						
	Clinician/Nurse educator	Professional	Communicator	Leader and member of the health care team and system	Lifelong learner	Critical thinker	Researcher
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1: Recall the meaning of velocity. Cite the example of type of velocity.	1	2	2	2	2	2	2
CO2: Define the motion. Identify the type of motion. Describe the circular motion.	2	2	2	2	2	1	3
CO3: Define the speed. Explain the application of principles of the motion in nursing.	2	3	3	3	2	3	2
CO4: Define the Acceleration. Identify the Newton's law of motion. Explain the Newton's first law of motion.	2	2	3	2	3	2	3
CO5: Restate the scalar quantity. Explain the Newton's second law of motion with example.	2	2	2	2	2	3	2
<p>III (02 hours)</p> <p>At the end of unit students are able to</p> <p>Knowledge: Understand and describe various aspects of gravity.</p>	<ul style="list-style-type: none"> Application of principles of gravity in nursing. (1 hour) 			<ul style="list-style-type: none"> Gravity: Specific gravity, centre of gravity, principles of gravity. Effect of gravitational forces on human body. (1 hour) 			

Unit: III Gravity

Course outcome		Program outcome						
		Clinician/Nurse educator	Professional	Communicator	Leader and member of the health care team and system	Lifelong learner	Critical thinker	Researcher
		PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1: Recall the meaning of center of gravity. Narrate the principle of gravity	2	3	2	2	2	2	2	
CO2: Interpret the term Specific gravity, density and mass. Describe the presence of gravitation forces affect the human body	2	2	2	2	2	2	2	
CO3: Define Gravity. Explain the application of Archimedes' principles.	2	3	2	2	2	2	2	
CO4: Restate the Gravity. Explain the application of principles of gravity in nursing.	2	2	3	2	3	2	3	
IV (04 hours)	<p>At the end of unit students are able to</p> <p>Knowledge: Understand describe concept of force, work, and energy.</p> <p>Skill: Apply principles of mechanics while providing tractions to the patients.</p> <p>Attitude: Recognizes the importance of body mechanics in nursing practice.</p>		<ul style="list-style-type: none"> Type and transformation of energy, forces of the body, Static forces (1 hour) Principles of machines, friction and body mechanics. Simple mechanics – lever and body mechanics, pulley and traction, incline plane, screw. 		<ul style="list-style-type: none"> Force, work, Energy: Their units of measurement. (1 hour) 		<p>Application of these principles in nursing. (2 hours)</p>	

Unit: IV Force

Course outcome	Program outcome						
	Clinician/Nurse educator	Professional	Communicator	Leader and member of the health care team and system	Lifelong learner	Critical thinker	Researcher
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1: Restate the meaning of force. Classify the type of force. Describe the centripetal force.	3	2	1	2	2	2	2
CO2: Define energy. Describe types of energy and write two example of conservation of energy.	3	3	3	3	3	2	2
CO3: Define is friction. Identify advantages and disadvantages of friction. Describe the methods of increasing friction.	3	3	2	2	2	3	2
CO4: Define Traction and Explain about Russell Traction.	3	3	3	2	3	3	2

CO5: Define simple machine. Describe principles of machines and mechanical advantage.	3	3	1	2	2	2	2
CO6: Recall pulley. Identify classification of pulley with examples.	3	3	3	3	2	2	2
V (03 hours)	At the end of unit students are able to Knowledge: Understand and describe nature and effects of heat, relative humidity, and regulation of body temperature. Skill: Regulate temperature and humidity while providing care to patients. Attitude: Identify deviations in body temperature.	<ul style="list-style-type: none"> Heat : Nature, measurement, transfer of heat , Effects of heat on matter Relative humidity, specific heat Temperature scales Principles of thermometer Regulation of body temperature (1 hour) 	<ul style="list-style-type: none"> Use of heat for sterilization Light: Laws of reflection (1 hour)	Application of these principles in nursing(1 hour)			

Unit: V Heat

Course outcome	Program outcome						
	Clinician/Nurse educator	Professional	Communicator	Leader and member of the health care team and system	Lifelong learner	Critical thinker	Researcher
	PO1	PO2	PO3	PO4	PO5	PO6	PO7

CO1 List methods of heat transfer. Describe physical effect of heat on matter.	2	2	3	2	2	2	2
CO2: Restate quantity of heat. Explain the application of heat Principles in nursing	2	3	3	3	2	2	2
CO3: Define is clinical thermometer. Identify the advantage of clinical thermometer. Describe explain clinical thermometer.	3	3	3	3	2	3	3
CO4: Define Specific Heat and Explain about the Regulation of body temperature.	3	2	3	2	2	2	2
CO5: Define Heat. Use of heat for sterilization.	3	3	3	3	3	2	3

CO6: Recall Relative humidity. Describe Temperature scales.	3	2	2	2	2	2	2
CO7: Define light. Name the Light: Laws of reflection	3	3	3	2	2	2	2
VI (03 hours)	At the end of unit students are able to Knowledge: Understand and describe laws of reflection, elements of the eye, and use of light in therapy. Skill: Uses light in therapies. Attitude: Recognizes the importance of light in patient care.	<ul style="list-style-type: none"> Focusing elements of the eye, defective vision and its correction, use of lenses Relationship between energy, frequency and wavelength of light. (1 hour) 	<ul style="list-style-type: none"> Use of light in therapy. Application of these principles in nursing. (1 Hour) 	<ul style="list-style-type: none"> Biological effects of light (1 hour) 			
Unit: VI Light							
Course outcome	Program outcome						
	Clinician/Nurse educator	Professional	Communicator	Leader and member of the health care team and system	Lifelong learner	Critical thinker	Researcher

	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1: Rewrite the light. Narrate the corpuscular Theory of light.	2	2	1	2	1	1	2
CO2: Identify types of visible light. Describe the action of the eye.	3	3	3	3	3	2	2
CO3: Create the image formation through convex and concave lenses.	3	3	2	2	2	3	2
CO4: Define the Refraction of light. Explain the Refraction of Light.	3	3	3	2	3	3	2
CO5: Enumerate defective vision. Explain the Presbyopia	3	2	3	2	2	2	2
CO6: Recall Thermograph. Use of light in therapy	2	2	2	2	2	2	2

CO7: Define Photometry and describe the units used in Photometry	3	2	1	2	2	2	2
CO8: Define Photosensitivity. Use of light in therapy.	3	3	3	3	3	2	2
CO9: Define Ultraviolet radiation. List the use of Ultraviolet radiation. Apply these principles of light in nursing.	3	3	2	2	2	3	2
CO10: Illustrate the structure of eye. Enumerate Biological effects of light	3	3	3	3	3	2	2
VII (03 hours)	At the end of unit students are able to Knowledge: Understand and describe various principles of osmotic pressure. Skill: Able to apply the principles of osmotic pressure providing	<ul style="list-style-type: none"> • Pressures: Atmospheric pressure, hydrostatic pressure, osmotic pressure • Measurements of pressures in the body. (1 hour), 	<ul style="list-style-type: none"> • Arterial and venous blood pressures, Ocular pressure shock (Intracranial pressure-applications of these principles in nursing. (1 hour) 	<ul style="list-style-type: none"> • Suction apparatus, oxygen therapy (1 hour) 			

	nursing care. Attitude: Recognizes the importance of osmotic pressure.			
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Unit: V II Pressure

Course outcome	Program outcome						
	Clinician/Nurse educator	Professional	Communicator	Leader and member of the health care team and system	Lifelong learner	Critical thinker	Researcher
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 Define Atmospheric Pressure. Apply Atmospheric Pressure into clinical practice and its implications.	3	2	2	2	2	2	2
CO2: Restate hydrostatic pressure. Explain the application of Pascal's law.	2	2	2	2	2	2	2
CO3: Enlist measurement of Pressure. Describe central venous Pressure.	3	2	1	2	2	2	2

CO4: Define Intraocular pressure. Identify method of measuring the intracranial pressure.	3	3	3	3	3	3	2
CO5: Recall osmotic pressure. Recognizes the importance of osmotic pressure.	2	2	2	2	2	2	2
CO6: Define Oxygen therapy. Describe Oxygen therapy	3	3	3	3	3	3	3
CO7: Define hydrostatic pressure. Apply these principles of Pressure in nursing.	2	2	2	2	2	3	2
VIII (02 hours)	At the end of unit students are able to Knowledge: Understand	<ul style="list-style-type: none"> • Sound : Frequency, Velocity and Intensity • Vocalization and hearing • Use of ultrasound. Noise pollution and 		Application of these principles in nursing (1 hour)		Mechanism of hearing	

	<p>and describe various aspects of sound.</p> <p>Skill: Able to apply the principles of sound in providing nursing care.</p> <p>Attitude: Appreciates socio cultural and economic background of individual and families.</p>	its prevention(1 hour)		
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Unit: V III Sound

Course outcome	Program outcome						
	Clinician/Nurse educator	Professional	Communicator	Leader and member of the health care team and system	Lifelong learner	Critical thinker	Researcher
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1 Define sound. Describe Vocalization and hearing	3	3	3	2	3	3	3
CO2: Define noise pollution. Identify effects of noise pollution. Explain noise control measures in detail.	3	3	3	3	3	3	3

CO3: Enlist Use of ultrasound. Describe prevention of noise pollution.	3	3	3	2	2	3	2
CO4: Define Hearing. Explain Mechanism of hearing.	3	3	3	3	3	3	2
CO5: Recall Wave motion. Apply the principles of sound in providing nursing care.	2	2	2	2	2	2	2
CO6: Define deafness. Classify its types. Explain tests of hearing.	3	3	3	3	3	2	2
IX (05 hours)	At the end of unit students are able to Knowledge: Understand and describe Electricity and Electromagnetism. Skill: Assist in the procedures such as ECG, EEG, EMG, and ECT. Attitude: Recognizes the importance of principles of electricity.	<ul style="list-style-type: none"> • Electricity and Electromagnetism: Nature of Electricity, Voltage, Current, Resistance and their Units. (1 hour) • Electricity and human body • ECG, EEG, EMG, ECT • Pace makers and defibrillators. (1 hr) 	<ul style="list-style-type: none"> • Flow of electricity in solids, electrolytes, gases and vacuum. (1 hour) 	<ul style="list-style-type: none"> • Magnetism and electricity. (1 hour) 	M.R.I. Scanning CAT Scan (1 hr)		
Unit: IX Electricity							
Course outcome	Program outcome						

	Clinician/Nurse educator	Professional	Communicator	Leader and member of the health care team and system	Lifelong learner	Critical thinker	Researcher
	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1: Define electrostatic electricity. Identify the type of electricity. Explain Coulomb's law.	2	2	1	2	2	1	2
CO2: Discriminate thermal and chemical source of electric current.	2	2	2	2	2	2	2
CO3: Recall defibrillators. Describe defibrillators.	3	3	3	2	2	3	2
CO4: Define Pace makers. Explain Pace makers.	3	3	3	2	3	3	2
CO5: Enlist the use of EEG. Describe EEG.	3	2	3	2	2	2	2
CO6: Enumerate the effect of an electric current. Describe ECT.	3	2	3	2	2	2	2
CO7: Define electricity. Recognizes the importance of principles of electricity.	2	2	2	2	2	2	2

CO8: Rewrite Magnetism. Describe the application of the magnet and magnetism.		3	2	2	2	2	2	2
CO9: Define MRI. Use of CAT Scan. Describe the mechanism of MRI.		3	2	2	2	2	2	2
X (02 hours)	At the end of unit students are able to Knowledge: Understand and describe the principles of radioactivity. Skill: Apply principles of radioactivity in nursing care.		<ul style="list-style-type: none"> • Atomic Energy: Structure of Atom, Isotopes and Isobars. • Radiation protection units and limits, instruments used for detection of ionizing radiation. X-rays. (1 hour) 	<ul style="list-style-type: none"> • Radioactivity : Use of radioactive isotopes (1 hour) 	Use of Ultrasound			
Unit: X Atomic Energy:								
Course outcome	Program outcome							
	Clinician/Nurse educator	Professional	Communicator	Leader and member of the health care team and system	Lifelong learner	Critical thinker	Researcher	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1: Define Atomic Energy. Illustrate Structure of Atom.	2	2	1	2	1	1	2	

CO2: Rewrite Isobars. Explain instruments used for detection of ionizing radiation.	2	2	1	2	2	2	2
CO3: Recall Isotopes. Use of radioactive isotopes.	2	2	2	2	2	1	2
CO4: Define Ultrasound. Use of Ultrasound	3	3	3	2	3	3	2
CO5: Recall radioactivity. Describe the principles of radioactivity.	2	2	1	2	2	2	2
CO6: Recall radioactivity .Apply principles of radioactivity in nursing care.	2	2	2	2	1	2	2
XI (04 hours)	At the end of unit students are able to Knowledge: Understand s and describe the principles of electronics.		Principles of Electronics: Common electronic equipments used in patient care. (4 hours)				
Unit: XI Principles of Electronics:							
CO1: Differentiate between P type and N type semiconductor.	1	2	1	2	2	2	2
CO2: Recall semiconductor. Describe semiconductor.	1	1	2	2	2	2	2
CO3: Classify Types of vacuum tubes. Describe vacuum diode tube.	3	2	2	1	2	2	2

CO4: Restate Capacitor. Explain the diagrammatic presentation of capacitors .Uses of capacitors.	2	2	2	2	2	2	2	
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