

Branch Name:	BPT
Program Code:	PT101
Course Title:	Fundamentals of Electro Physical Agents (FoEA)
Course Code:	3PT1010105
Pre-requisite Course:	Basic Science

Teaching and Examination Scheme:

Teaching Scheme			Evaluation Scheme (Marks)				
Lecture (L)	Practical (P)	Credit	Theory (Marks)		Practical (Marks)		Total (Marks)
			University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
120	60	10	80	20	80	20	200

Course Outcomes:

After completion of this course the student shall be able to

1. Explain fundamental principles of physics related to electricity production, its transmission.
2. Explain the production, physiological and therapeutic effects Biophysics, principles, therapeutic uses, indications, contraindications electrical stimulation agents
3. Demonstrate competencies in operational skills of equipment and patient preparation and techniques of application of electrical stimulation agents
4. Discuss the physiology and pathophysiology of pain.
5. Discuss theories of pain and its implications to physiotherapy clinical decision making.
6. Explain physiological effects, therapeutic uses, indications, contraindications and demonstrate practical/operational skills required Demonstrate competencies in equipment maintenance, care and safety- precautions

Course Contents: B.P.T. FoEA 105 (L)

UNIT 1:

FoEA 1.1. Physical Principles in Relation to Physiotherapy:

1. Structure and Properties of matter-solids, liquids and gases, adhesion, surface tension, viscosity, density and elasticity. Structure of atoms, molecules, elements and compounds, electron theory, static and current electricity.
2. Conduction, Insulators, Potential difference, Resistance and Intensity. Ohm's Law its application to AC and DC currents.
3. Rectifying Devices-Thermionic valves, semiconductors, Transistors, Amplifiers, Transducers, Oscillator Circuits. Capacitance, Condensers in DC and AC circuits.
4. Display devices and indicators-analogue & digital.

FoEA 1.2. Effects of Current Electricity

1. Chemical effects- ions and electrolytes, ionization, production of E.M.F by chemical actions. Magnetic effects, Molecular theory of Magnetism. Magnetic fields, electromagnetic induction.
2. Milli ammeter and voltmeter, transformers and choke coil, thermal effects-joules law and heat production.
3. Physical principles of light and its properties.
4. Physical principles of sound and its properties.

5. Electromagnetic spectrum-biophysical application.

FoEA 1.3. Electrical Supply

1. Brief outline of main supply of electric current. Dangers short circuits, electric shocks. Precautions safety devices, earthing, fuses etc. First and initial management of electric shock.

Unit 2:

FoEA 2.1. Low Frequency Currents

1. Introduction to direct, alternating and modified currents.
2. Iontophoresis: Biophysics, principles, therapeutic uses, indications, contra- indications, operational skills of equipment and patient preparation.
3. Faradic current: Biophysics, principles, therapeutic uses, indications, contra- indications, operational skills of equipment and patient preparation
4. Interrupted direct current: Biophysics, principles, therapeutic uses, indications, contra- indications, operational skills of equipment and patient preparation

Transcutaneous Electrical Nerve Stimulations (TENS) Types of low frequency, pulse widths, frequencies and intensities used as TENS applications, Theories of pain relief by TENS. Principles of clinical application, effects and uses, indications, contraindications, precautions. Operational skills of equipment patient preparation.

Unit 3:

FoEA 3.1. Electrical Reactions and Electro-Diagnostic Tests

1. Electrical stimuli and normal behavior of nerve and muscle tissue. Types of lesions and development of reaction of degeneration.
2. Faradic/Intermittent direct current test.

S.D. Curve and its application. Chronaxie, Rheobase and pulse ratio.

Unit 4:

FoEA 4.1. Infrared Rays-Wavelength, frequency, types and sources of IRR generation techniques of irradiation, physiological and therapeutic effects indications, contraindications, precautions, Operational skills of equipment and patient Preparation.

FoEA 4.2. Superficial Heat: Paraffin wax bath, moist heat, electrical heating pads.

1. Mechanism of production.
2. Mode of heat transfer.
3. Physiological & therapeutic effects.

Indications, contraindications, precautions, operational skills of equipment and patient preparation.

PRACTICAL B.P.T. Fundamentals of Electro Physical Agents Practical: FoEA (P)

The students are to be trained in Practical Laboratory work for all the topics discussed in theory.

List of practical (student shall be able to perform independently)

- 5.1. Identify components and safety devices involved in electric supply of the electrotherapy department.
- 5.2. Experience sensory and motor stimulation of nerves and muscles by various types of low frequency currents on self.
- 5.3. Locate and stimulate different motor points region wise including the upper & lower limb, trunk face. On the human model.
- 5.4. Demonstrate the application of special techniques of low frequency current including Faradic foot bath, faradism under pressure.

- 5.5.** Demonstrate the application of techniques of Iontophoresis.
- 5.6.** Demonstrate the plotting of the strength duration curve and find out Chronaxie and Rheobase.
- 5.7.** Demonstrate the techniques of application of various types of IR lamps to various body regions.
- 5.8.** Demonstrate the techniques of application of paraffin wax bath to various body regions.
- 5.9.** Demonstrate the techniques of application of TENS to various body regions.

Text Books:

1. Electro therapy Explained: Principles & Practice Low& Reed, Butterworth Heinemann.
2. Claytons Electro therapy, Forster & Palastange Baillier Tindal.

Reference Books:

1. Therapeutic Heat & Cold, Lehmann, Williams & Wilkins.

List of Open-Source Software/learning website:

- k-hub.in e library/A single platform for all e resources (K-hub, E Resource)
 - User Name- KB4605VNG
 - Password- BL@69BX!
- knowledgegainer.delnet.in (Delnet, E Resource)
 - User Name-gjspum
 - Password- spu10924

Mapping of CO with PO:

Course Outcomes	Program Outcomes (POs)										
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	H										
CO2		M					M				
CO3			H							M	
CO4				M		M					
CO5					M			M			
CO6		H							M		M

H:High, M:Medium, L:Low