

Branch Name:	BACHELOR OF PHYSIOTHERAPY
Program Code:	PT101
Course Title:	ELECTROTHERAPY
Course Code:	2PT1010205
Pre-requisite Course:	Biomedical physics

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)			Credit	Evaluation Scheme (Marks)					
Lecture	Tutorial	Practical		Theory(T)		Practical(P)		Total Marks	
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment		
4	-	4	12	80	20	80	20	100	100

COURSE OUTCOMES:

At the end of the course the candidate will be able to

1. Recall the Physics – Principles and laws of electricity, Electromagnetic spectrum, Ultrasound
2. Describe the electrical main supply, Electric shock – precautions
3. Describe and identify various types of electrodes used in therapeutics, resistance offered by the skin and significance of various media used to reduce the same
4. Describe the production, physiological effects, therapeutic uses, merits/ demerits, indications and contraindication of various Low, Medium and High frequency currents and modes. Describe the panel diagrams of the machine
5. Acquire the skill of application of Low, Medium and High frequency currents on models for the purpose of treatment
6. Describe the physiological effects and therapeutic uses of various therapeutic ions to be used for the application of Iontophoresis
7. Describe effects of electromagnetic field at the cellular level and risk factors on prolonged exposure
8. Describe the physiological effects and therapeutic uses of various topical pharmaco-therapeutic agents to be used for the application of phonophoresis
9. Acquire an ability to select the appropriate mode as per the tissue specific and area specific application.

Subject Contents:

Sr. No.	Topic	Hours
1	LOW FREQUENCY CURRENTS	
	Review of physics: Current, electricity, Ohm's law, Resistance, Rheostats, potentiometers, Electromagnetic induction, capacitors, valves, semiconductors and transistors	10
	Nerve Muscle Physiology: Resting potential, action potential, propagation of action potential, motor unit, synapse and synaptic transmission of impulses. Effect of negative and positive electrodes on nerve & accommodation	10
	Faradic Current: Definition, characteristic and modified faradic current, sinusoidal current, parameters of faradic stimulation, physiological and therapeutic effects of faradic-stimulation. Indication, contra-indications and precautions, techniques of stimulation- group muscle stimulation, faradic foot bath, faradism under pressure and pelvic floor muscle re-education	20
	Interrupted Direct Current: Introduction & characteristics, Parameters of stimulation, physiological and therapeutic uses of stimulation, precautions	15



	Galvanic Current: Introduction & characteristics, Parameters of stimulation, physiological and therapeutic uses of stimulation, precautions	05
	Iontophoresis: Definition, principles of Iontophoresis, physiological and therapeutic uses, indications, techniques of Iontophoresis, principles of treatment, contra-indications and dangers	05
	a) Sinusoidal Current & Diadynamic Current in Brief b) Cathodal / Anodal galvanism c) Micro currents d) High Voltage Pulsed Galvanic Stimulation (HVPGS)	05
	TENS: a) Definition b) Theories of pain modulation emphasizing on “Pain Suppression System”, c) Types of TENS d) Techniques of application e) Types of Electrodes & Placement of Electrodes f) Physiological Effects and therapeutic uses g) Indication and contra –indications	25
2	MEDIUM FREQUENCY CURRENT	
	Interferential current: Definition, characteristics, physiological & therapeutic effects of Interferential current, techniques of application, indications, contra-indications and precautions Russian Currents Parameters, technique of application, effects and uses, Indications and Contraindications Rebox currents Parameters, technique of application, effects and uses, Indications and Contraindications.	25
	Biofeedback: a) Introduction b) Principles of biofeedback c) Therapeutic effects of biofeedback d) Different types of biofeedback e) EMG biofeedback f) Positive and negative feedback g) Technique of application h) Indications and contra-indications	10
	Advanced Electrotherapy: a) Computerization in electrotherapy, b) Programming of parameters of treatment, c) Appropriate selections of parameters and combination therapy, Combination therapy- a) Principles, b) Therapeutic uses and indications like, Ultrasound therapy with stimulation or TENS etc.	10
	Electrical currents for Care of the wound	05
3	HIGH FREQUENCY CURRENT	
	Short Wave Diathermy (SWD): a) Introduction b) Physiological effects and Therapeutic effects of SWD c) Methods of application (capacitor field method and cable method etc.) d) Techniques of treatment, indication, contra-indications and dangers.	25
	Pulsed SWD: a) Definition	05



	b) Characteristics c) Mechanism of work d) Physiological effects and therapeutic effects e) Indications, techniques of application f) Principles of treatment and contra-indications	
	Ultrasonic Therapy: a) Introduction and characteristics b) Ultrasound Therapy parameters c) Coupling media d) Therapeutic effects e) Indications contra-indications and dangers f) Testing of apparatus g) Techniques of application & dosage, Phonophoresis	30
	InfraRed Rays (IRR): a) Production of infrared rays b) Luminous and non – luminous generators, penetration, technique of application, physiological effects and therapeutic uses of infra-red rays, duration and frequency of treatment, indications and contraindications, dangers and precautions.	05
	Ultra Violet Rays(UVR): a) Production of UVR, test dose, physiological effects of UVR dissymmetry in UVR. PUVA	05
	LASER: a) Introduction and characteristics b) Effects on tissue c) Therapeutic effects d) Principles of application e) Indications f) Contra-indications and dangers	15
	Microwave Diathermy (MWD): a) Introduction and characteristics, physiological effects b) Therapeutics effects c) Techniques of application and principles of treatment d) Indications e) Contra-indications and dangers	05
	Superficial heat modalities: a) Structure of the apparatus b) Composition of wax and mineral oils physiological effects and therapeutic uses of wax bath c) Technique of application	05
	Other Heating Modalities: a) Heating pad b) Moist heat and fluid therapy	05
	Cryotherapy : a) Physiological effects and therapeutic uses of ice therapy b) Techniques of application c) Contra – indication to ice treatment	05
	Hydrotherapy: a) Properties of water buoyancy b) Effects of buoyancy on movement c) Hubbard tank d) Contrast bath,	15

	e) Whirlpool bath	
	Care of the wound: a) UVR, b) LASER c) Ultrasound	05
	Recent advances in Electro-physiotherapy: a) High power class IV LASER b) Shockwave c) PEMF (Pulse Electro Magnetic Energy), High Intensity Magneto therapy d) Spinal Decompression, e) Pneumatic Compression therapy f) Functional Electrical Stimulation g) TECAR Therapy h) Cold air cryotherapy i) Virtual and Augmented Reality j) Brief idea about Robotic therapy	34

List of References:

Text Books:

1. Clayton's Electrotherapy- Theory and Practice: Angela Foster - 8th Edition.
2. Basics of Electrotherapy: Subhash M Khatri – 2nd Edition.
3. Textbook of Electrotherapy by Jagmohan Singh – 2nd Edition.
4. Electrotherapy Simplified: Basanta Kumar Nanda – 2nd Edition.
5. Fundamentals of Electrotherapy and Biomedical Physics, Ashish Kakkad - 2nd edition.

Reference Books:

1. Electrotherapy Explained: Principles & Practice, Low & Ann reed-4th Edition
2. Modalities for Therapeutic Intervention, Michlovitz, Susan L- 4th Edition
3. Electro physical Agents: Evidence-based Practice (Physiotherapy Essentials), Tim Watson- 13th Edition.

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

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Recall the basic Principles and laws of electricity, Electromagnetic spectrum, and describe the electrical main supply, Electric shock & its precautions.	1 Remembering 2 Understanding
CLO2	Describe the production, physiological effects, therapeutic uses, merits/ demerits, indications and contraindication of various Low, Medium and High frequency currents and modes. Describe the panel diagrams of the machine	1 Remembering 2 Understanding
CLO3	Acquire the skill of application of Low, Medium and High frequency currents on models for the purpose of treatment.	1 Remembering 2 Understanding 3 Applying 5 Evaluate 6 Creating
CLO4	Describe effects of Electromodalities at the cellular and tissue level.	1 Remembering 2 Understanding 3 Applying
CLO5	Acquire an ability to select the appropriate Physiotherapeutic modalities as per the indications and contraindications.	1 Remembering 2 Understanding 3 Applying 4 Analysing 5 Evaluate
CLO6	Elaborate the Recent advances in Electro-Physiotherapy.	1 Remembering 2 Understanding 3 Applying 4 Analysing

Mapping of CLOs with POs & PSOs

Course Learning Outcomes	Program Outcomes (POs)								Program Specific Outcomes (PSOs)							
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CLO1									M							
CLO2		M	M							M						
CLO3	H		M			H					H					H
CLO4			H	L			L	M				L	L			
CLO5	M					L		M					M	M		
CLO6					M		M								M	

H: High, M: Medium, L: Low