

ELECTROTHERAPY

Subject Title	: ELECTROTHERAPY
Duration	: 13 – 24 Months
Total Hours	: 240
Theory	: 90 Hrs
Practical	: 150 Hrs
Total Hours / Week	: 8 Hrs
Lecture	: 2 Hours / Week
Practicals	: 5 Hours / Week
Seminars / Tutorials	: 1 Hour / Week
Method of Assessment	: Written, Oral, Practical

Course Description.

In this course the student will learn the Principles, Techniques, Effects, Indication, ContraIndication. and the dosage parameter for various indications of electro therapeutic modalities in the restoration of physical function. The objective of this course is that after 240hrs. of lectures, demonstration, practical and clinics the student will be able to list the indications, contra indications, dosages of electro therapy modalities, demonstrates the different techniques, and describe their effects on various conditions.

Theory

Section I - Introductory Physics.

1. Electricity definition, types [1 Hour]
2. Static electricity [2 Hour]
 - a. Production of electrical charges.
 - b. Characteristics of charged body.
 - c. Characteristics of lines of forces.
 - d. Potential difference and EMG.
3. Current Electricity [5 Hour]
 - a. Units of Electricity, faraday, volt, ampere, coulomb, watt.
 - b. Resistance in series and parallel.
 - c. Ohms law and its application to DC/AC.
 - d. Fuse.
 - e. Shock: Micro/ Macro shocks, safety precaution and management, earthing techniques & precautions.

- f. Burns: electrical & chemical burns, prevention and management.
- g. Condensors: definition, principles, types construction, working and uses.
4. Magnetism: Definition, properties, electro-magnetic induction, electro- magnetic spectrum. [1 Hour]
5. Valves, transformers, types, principles, construction and working. [1 Hour]
6. Ionization: Principles, effects of various technique of medical ionization. [1 Hour]

Section II – Therapeutic Electricity

Section II A - Low frequency Currents

1. Basic types of current [1 Hour]

- a. Direct Current: types, physiological & therapeutic effects.
- b. Alternating Current

2. Types of Current used in Therapeutics [1 Hour]

Modified D.C

- Faradic Current
- Galvanic Current

Modified A.C

- Sinusoidal Current • Diadynamic Current.

3. Faradic Current: Definition, Modifications, Techniques of Application of Individual, Muscle and Group Muscle stimulation, Physiological & Therapeutic effects of Faradic Current, Precautions, Indications & Contra-Indications, Dangers. [2 Hours]
4. Galvanic Current: Definition, Modifications, Physiological & Therapeutic effects of Galvanic Current, Indications & Contra-Indications, Dangers, Effect of interrupted galvanic current on normally innervated and denervated muscles and partially denervated muscles. [2 Hours]
5. Sinusoidal Current & Diadynamic Current in Brief. [1 Hour]
6. HVPGS – Parameters & its uses [1 Hour]
7. Ionization / Iontophoresis : Techniques of Application of Iontophoresis, Indications, Selection of Current, Commonly used Ions (Drugs) for pain, hyperhydrosis, wound healing. [1 Hour]
8. Cathodal / Anodal galvanism. [1 Hour]
9. Micro Current & Macro Current [1 Hour]

10. Types of Electrical Stimulators [1 Hour]

- NMES- Construction component.
 - Neuro muscular diagnostic stimulator- construction component.
 - Components and working Principles
11. Principles of Application: Electrode tissue interface, Tissue Impedance, Types of Electrode, Size & Placement of Electrode – Waterbath, Unipolar, Bi-polar, Electrode coupling, Current flow in tissues, Lowering of Skin Resistance. [2 Hours]
12. Nerve Muscle Physiology: Action Potential, Resting membrane potential, Propagation of Action Potential, Motor unit, synapse, Accommodation, Stimulation of Healthy Muscle, Stimulation of Denervated Muscle, Stimulation for Tissue Repair. [2 Hours]
13. TENS: Define TENS, Types of TENS, Conventional TENS, Acupuncture TENS, Burst TENS, Brief & Intense TENS, Modulated TENS. Types of Electrodes & Placement of Electrodes, Dosage parameters, Physiological & Therapeutic effects, Indications & Contraindications. [3 Hours]
14. Pain: Define Pain, Theories of Pain (Outline only), Pain Gate Control theory in detail. [2 Hours]

Section II B - Electro-diagnosis

1. FG Test
2. SD Curve: Methods of Plotting SD Curve, Apparatus selection, Characters of Normally innervated Muscle, Characters of Partially Denervated Muscle, Characters of Completely denervated Muscle, Chronaxie & Rheobase. [2 Hours]
3. Nerve conduction velocity studies [1 Hour]
4. EMG: Construction of EMG equipment.[1 Hour]
5. Bio-feed back.[1 Hour]

Section II C - Medium Frequency

1. Interferential Therapy: Define IFT, Principle of Production of IFT, Static Interference System, Dynamic Interference system, Dosage Parameters for IFT, Electrode placement in IFT, Physiological & Therapeutic effects, Indications & Contraindications. [2 Hour]
2. Russian Current

3. Rebox type Current [1 Hour]

Section III - Thermo & Actinotherapy (High Frequency Currents)

1. Electro Magnetic Spectrum. [1 Hour]
2. SWD: Define short wave, Frequency & Wavelength of SWD, Principle of Production of SWD, Circuit diagram & Production of SWD, Methods of Heat Production by SWD treatment, Types of SWD Electrode, Placement & Spacing of Electrodes, Tuning, Testing of SWD Apparatus, Physiological & Therapeutic effects, Indications & Contraindications, Dangers, Dosage parameters [8 Hours]
3. Pulsed Electro Magnetic Energy: Principles, Production & Parameters of PEME, Uses of PEME. [1 Hour]
4. Micro Wave Diathermy: Define Microwave, Wave length & Frequency, Production of MW, Applicators, Dosage Parameters, Physiological & Therapeutic effects, Indications & Contraindications, Dangers of MWD. [2 Hours]
5. Ultrasound: Define Ultrasound, Frequency, Piezo Electric effects: Direct, Reverse, Production of US, Treatment Dosage parameters: Continuous & Pulsed mode, Intensity, US Fields: Near field, Far field, Half value distance, Attenuation, Coupling Media, Thermal effects, Nonthermal effects, Principles & Application of US: Direct contact, Water bag, Water bath, Solid sterile gel pack method for wound. Uses of US, Indications & Contraindications, Dangers of Ultrasound. Phonophoresis: Define Phonophoresis, Methods of application, Commonly used drugs, Uses. Dosages of US. [8 Hours]
6. IRR: Define IRR, wavelength & parameters, Types of IR generators, Production of IR, Physiological & Therapeutic effects, Duration & frequency of treatment, Indication & Contraindication. [2 Hours]
7. UVR: Define UVR, Types of UVR, UVR generators: High pressure mercury vapour lamp, Water cooled mercury vapour lamp, Kromayer lamp, Fluorescent tube, Theraktin tunnel, PUVA apparatus. Physiological & Therapeutic effects. Sensitizers & Filters. Test dosage calculation. Calculation of E1, E2, E3, E4 doses. Indications, contraindications. Dangers. Dosages for different therapeutic effects, Distance in UVR lamp [8 Hours]
8. LASER: Define LASER. Types of LASER. Principles of Production. Production of LASER by various methods. Methods of application of LASER. Dosage of LASER. Physiological & Therapeutic effects of LASER. Safety precautions of LASER. Classifications of LASER. Energy density & power density [8 Hours]

Section IV – Superficial heating Modalities

1. Wax Therapy: Principle of Wax Therapy application – latent Heat, Composition of Wax Bath

Therapy unit, Methods of application of Wax, Physiological & Therapeutic effects, Indications & Contraindication, Dangers. [2 Hours]

2. Contrast Bath: Methods of application, Therapeutic uses, Indications & Contraindications. [1 Hour]
3. Moist Heat Therapy: Hydro collator packs – in brief, Methods of applications, Therapeutic uses, Indications & Contraindications. [1 Hour]
4. Cyclotherm: Principles of production, Therapeutic uses, Indications & Contraindications. [1 Hour]
5. Fluidotherapy: Construction, Method of application, Therapeutic uses, Indications & Contraindications. [1 Hour]
6. Whirl Pool Bath: Construction, Method of Application, Therapeutic Uses, Indications & Contraindications. [1 Hour]
7. Magnetic Stimulation, Principles, Therapeutic uses, Indications & contraindication. [1 Hour]
8. Cryotherapy: Define- Cryotherapy, Principle- Latent heat of fusion, Physiological & Therapeutics effects, Techniques of Applications, Indications & Contraindications, Dangers, Methods of application with dosages. [4 Hours]

Practical

The student of Electrotherapy must be able to demonstrate the use of electrotherapy modalities applying the principles of electrotherapy with proper techniques, choice of dosage parameters and safety precautions.

1. Demonstrate the technique for patient evaluation – receiving the patient and positioning the patient for treatment using electrotherapy.
2. Collection of materials required for treatment using electrotherapy modalities and testing of the apparatus.
3. Demonstrate placement of electrodes for various electrotherapy modalities
4. Electrical stimulation for the muscles supplied by the peripheral nerves
5. Faradism under Pressure for UL and LL
6. Plotting of SD curve with chronaxie and rheobase
7. Demonstrate FG test
8. Application of Ultrasound for different regions-various methods of application
9. Demonstrate treatment techniques using SWD, IRR and Microwave diathermy
10. Demonstrate the technique of UVR exposure for various conditions – calculation of test dose
11. Demonstrate treatment method using IFT for various regions
12. Calculation of dosage and technique of application of LASER
13. Technique of treatment and application of Hydrocollator packs, cryotherapy, contrast bath, wax therapy
14. Demonstrate the treatment method using whirl pool bath
15. Winding up procedure after any electrotherapy treatment method

Recommended Textbooks

1. *Claytons Electrotherapy by Forster & Plastangs*
2. *Electrotherapy Explained by Low & Reed*
3. *Clinical Electrotherapy by Nelson*
4. *Electrotherapy Evidence based practice by Sheila Kitchen*
5. *Physical agents by Michile Cameroon*
6. *Principles of Electrotherapy by Michile Camreeon*
7. *Thermal agents by Susan Michlovitz.*