

DIPLOMA IN PHYSIOTHERAPY – SEMESTER ONE

First Semester			
S. No.	Name of Subject	Credits	Total Marks
1	Human Anatomy	5	100
2	Human Physiology	5	100
3	Biochemistry	5	100
4	Foundation Course in Information Technology	5	100
5	Basic Principles in Physiotherapy	4	100
Total		24	

Subject Name: HUMAN ANATOMY

1. Human Anatomy - Physiology - Cell Structure - Division & Function – Cell Organelles - Tissue - Types of Tissues and Their Functions – Skeletal System.
2. Respiratory system - brief description of larynx - bronchi - lungs - cardiovascular system - anatomy and physiology of heart - arteries and veins - circulation - systematic and pulmonary (in brief) - brief review of chambers.
3. Urinary system - structure and function of the kidney - uterus - bladder - urethra and nephron give special emphasis on formation of urine - physiology and anatomy of male and female reproductive organs.
4. Endocrine - pituitary - thyroid - parathyroid - thymus - adrenals and pancreas.
5. Central nervous system - brain - spinal cord and meninges explain with its functions.
6. Skins - structure and functions - study and give small project on bones and cartilage hla system.
7. Digestive system - physiology and anatomy of mouth - stomach - intestine - absorption of food and its excretion - role of bile in digestion and excretion - liver function and a brief description of liver and biliary tree.

Subject Name: HUMAN PHYSIOLOGY

Unit 1: Study Of Cellular System: Cell: Structure and organelles - Functions of each component in the cell. Cell membrane – transport across membrane – origin of cell membrane potential (Nernst and Goldman and Katz equations) – Action potential.

Unit 2: Hematological System: Blood composition - functions of blood – functions of RBC. WBC types and their functions. Blood groups –importance of blood groups –identification of blood groups. blood flow factors regulating blood flow such as viscosity, radius, density etc (Fahreus lindqvist effect, Poiseuille’s Law).

Unit 3: Renal and Respiratory System: Structure of Kidney and nephron. Mechanism of Urine formation and acid base regulation. Dialysis. Components in of respiratory system. Oxygen and carbon dioxide transport and acid base regulation.

Unit 4: Cardiac System: Structure of heart – Properties of Cardiac muscle – Cardiac muscle and pacemaker potential - Cardiac cycle – ECG - Heart sound - volume and pressure changes and regulation of heart rate.

Unit 5: Sensory System: Structure of a Neuron. Synaptic conduction. Conduction of action potential in neuron Parts of brain cortical localization of functions. EEG. Simple reflexes, withdrawal reflexes. Autonomic nervous system and its functions, Structure of eye, ear and auditory and visual pathways.

Subject Name: BIOCHEMISTRY

Unit 1: Amino acids and Proteins: Properties, Ionization of weak acids and bases, Protein structure, Summary of covalent and non-covalent forces that maintain structures.

Unit 2: Physical properties of proteins: charge, size, hydrophobic, methods for observing these properties, Proteins, Catalytic enzymes.

Unit 3: Thermodynamics vs. kinetics: Reversibility of reactions, Conservation of energy, Standard conditions, Thermodynamics, Kinetics.

Unit 4: Protein structure as it relates to function: Mechanisms of catalysis, Involvement of protein structure in these mechanisms, Changes in structure alter the protein / enzyme properties, Things that alter proteins structure.

Unit 5: General Chemistry of biochemistry: Isomerization B. Hydrolysis C. Elimination, Oxidation/reduction, Aldol condensation/cleavage, Thermodynamics of each: use and making of ATP, coupling hydrolysis of ATP to "reverse" reactions.

Unit 6: Regulation: Different levels of regulation: protein synthesis/degradation, allosteric regulation, reversible covalent modification, proteolytic processing. Each regulation level good for different reasons, Requirements for ATP in synthesis and degradation cycle, Reversibility of the different methods of regulation, Consequences of misregulation.

Unit 7: Metabolic processes central to ATP synthesis: glycolysis: ATP synthesis, No molecular oxygen required end product lactic acid. Krebs Cycle.

Unit 8: Oxidative Phosphorylation: redox reactions provide energy to drive ATP synthesis, Requirement for molecular oxygen, coupling a pH gradient to ATP synthesis, the molecular machine required for ATP synthesis.

Subject Name: FOUNDATION COURSE IN INFORMATION TECHNOLOGY

1. **Information Concepts & Processing:** Definition of Information, Data VS Information, Introduction to Information System, Information Representation Digital Media, Images, Graphics, Animation, Audio, Video etc. Need a Value & Quality of Information the concept of Information entropy & Numerical.

2. **Computer Appreciation:** Definition of electronic Computer, History, Generation, Characteristics & Application of Computers, Classification of Computers, RAM, ROM, Computer Hardware, CPU, Various I/O Devices, Peripherals, Storage Media, Software Definition and Concepts.

3. **Data Communication & Networks:** Computer Networks, Networking of Computers, Introduction to LAN, WAN, MAN, Network Topologies, Basic Concepts in Computer Networks, Introduction to GPRS, CDMA, GSM & FM Technologies.
4. **Introduction to Internet Technologies:** HTML, DHTML, WWW, FTP, TELNET, Web Browser, Net Surfing, Search Engines, E-Mail, ISP, E-Commerce, Public Key, Private Key, Safety of Business Transaction on Web.
5. **Concepts in Operating System:** Elementary Concepts in Operating System, GUI, Introduction to DOS, MS Windows.

Subject Name: BASIC PRINCIPLES IN PHYSIOTHERAPY

A. Physical Principles

1. Structure and properties of matter- solids, liquids and gases, adhesion, surface tension viscosity, density and elasticity.
2. Structure of atom, molecules, elements and compounds.
3. Electron theory, static and current electricity.
4. Conductors, Insulators, Potential difference, Resistance & Intensity.
5. Ohm's Law- Its application to AC & DC currents.
6. Rectifying devices – Thermionic Valves, Semiconductors, Transistors, Amplifiers, Transducers Oscillator circuits.
7. Capacitance, condensers in DC and AC Circuits.
8. Display devices & indicators- analogue & digital.

B. Effects of Current Electricity

1. Chemical effects – Ions and electrolytes, Ionization, Production of E.M.F. by chemical actions.
2. Magnetic effects, Molecular theory of Magnetism, Magnetic fields, Electromagnetic induction.
3. Millimeter and Voltmeter, Transformers and Choke Coil, thermal effect-joule law, heat production.
4. Physical principles of sound and its properties.
5. Physical principles of light and its properties.
6. Electromagnetic spectrum – biophysical application.

C. Electrical supply

1. Brief outline of main supply of electric current.
2. Dangers- short circuits, electric shocks.
3. Precautions – safety devices, earthing, fuses etc.
4. First aid & initial management of electric shocks.

D. Biomechanical principles

1. Force: Composition of force, parallelogram of forces, Resolution of forces.
2. Equilibrium: Stable, unstable, neutral.

3. Gravity: Center of gravity, Line of gravity, Base of support.
 4. Levers: 1st order, 2nd order, 3rd order, their examples in the human body and their practical applications in physiotherapy, forces applied to the body levers.
 5. Pulleys: Fixed, Movable.
 6. Springs: Series; Parallel.
 7. Tension.
 8. Elasticity: Hook's law.
 9. Axis: Sagittal, frontal, vertical.
 10. Planes: Sagittal, frontal, horizontal.
 11. Definition of speed, velocity, work, energy, power, acceleration, momentum, friction and inertia.
- E. Introduction to exercise therapy, principles, technique and general areas of its application, Assessment & its importance.
 - F. Introduction to movements including analysis of joint motion, muscle work and Neuro muscular co- ordination.
 - G. Principles, classification, techniques, physiological & therapeutic effects, indications & contraindications of therapeutic exercises.
 - H. Describe the classification of movements.

Book Reference:

1. Clayton's electrotherapy theory and practice IX Edition by Angela Forester, Nigel Palastanga.
2. Clayton's electrotherapy theory and practice X Edition by Kitchen & Bazin.
3. Clinical Electrotherapy by Rogar M.Nelson & Dean P. Currier.
4. Electrotherapy explained Principles and practice III Edition by John Low & Ann Reed.
5. Principle and practice of Electrotherapy by Joseph Kahn.
6. Electrotherapy: Clinics in physical therapy- Wolf.
7. Practice exercise therapy- Hollis- Blackwell Scientific Publication
8. Therapeutic Exercises- Basmajjan- Williams and Wilkins.
9. Therapeutic Exercises Foundations and Techniques –Kisner and Colby –F.A. Davis.
10. Principle of exercise of therapy – Gardiner –C.B.S. Delhi