

TWO YEARS POST MATRIC TEACHING PROGRAM OF PARAMEDICS

F. Sc. (PHYSIOTHERAPY Technology)

**CURRICULUM WING
MINISTRY OF EDUCATION, ISLAMABAD**

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PREFACE

Live nations continue to develop. New fields emerge with the laps of time and pace of development. Medical Technology has gained importance with technological development in diagnostic, therapeutic, and preventive aspects of health care delivery system. This has produced a need for trained and skilled manpower in this field. Present curriculum is one of the outcomes of that necessity.

These curricula will not only help in providing a base for better healthcare but also decrease unemployment in our country. It will open up new avenues for our youngsters.

Curriculum development is a hectic task and is not possible in a day. Present curriculum also passed through many phases of development. Initially it was developed by consultants of Pakistan Institute of Medical Sciences on request of the then Project Director, College of Medical Technology, PIMS 1987.

In 1990, it was later on suggested by the faculty of the College of Medical Technology to bring it at par with F. Sc. The Committee of two members i.e. Dr. M.A. Aziz Shahzada and Engr. Sher Afzal Awan expanded it over a period of two years. The same curricula was revised and updated by Engr. Sher Afzal Awan in 1995.

In 1995, equivalence it was granted by IBCC on continuous struggle for three years of Lt.Col.(r) Dr. Azra Javed. Qureshi, Principal, CMT.

The college approached Curriculum Wing, Ministry of Education in 2001 for approval and standardization. The process continued till to date. National Review Committee, constituted by the Curriculum Wing has discussed it in its meeting held from 18th May 2004 to 20th May 2004. The Committee has approved this draft.

Curriculum development is a continuous process. It may have many mistakes or it may be better than this. We have tried our best to update it so that trained people under this program may fulfill the needs and requirements of the hospitals in Pakistan.

This curriculum is first trail of its kind in Pakistan in the field of medical education. All our colleagues have made the history by taking part its preparation, review and approval. We do hope that both educationists and Paramedical Institutes will accept it. At last, we thank to Lt.Col.[r] Dr. Azra J. Qureshi, Mr. Sher Afzal Awan (PIMS) and Mr. Saeed Ahmad Meher (Curriculum Wing) for their valuable co-operation and contribution in completing this difficult task.

The Ministry of Education appreciates the contributions of all the Provincial Governments and Health Departments.

(Prof. Dr. Haroona Jatoi)
Joint Educational Advisor
Curriculum wing.

Ministry of Education Islamabad.

ACKNOWLEDGEMENT

Grateful acknowledgement is hereby made to all the contributors from all provinces of Pakistan, from Ministry of Education and different hospitals at Federal area Islamabad who reviewed drafts of curricula of five disciplines and gave fruitful suggestions for its improvement.

Above all, I am indebted to Prof. Dr. Haroona Jatui, Mr. Aurang Zeb Rehman and Mr. Saeed Ahmad Meher (Curriculum Wing) for their valuable co-operation and contribution in completing this difficult task.

My gratitude goes to Engr. Sher Afzal Awan, Registrar, CMT for his contribution in developing, updating, incorporating changes proposed by NRC and giving it a present shape.

I am also indebted to all the secretarial staff of Curriculum Wing and CMT for helping in clerical work. And above formal way of acknowledgement to past concerns, gratitude goes to all those who will use it in shaping the future of coming generations in the field of medical education.

I am also indebted to W.H.O.EMRO for its contribution in standardization of curricula for Paramedics Resource development in Pakistan.

(Col. Dr. Azra J. Qureshi) T.I[M]
Principal,
College Of Medical Technology,
Pakistan Institute of Medical Sciences,
Islamabad.

Date:- 12th June,2004.

Objectives:

- a) To assist physiotherapist in carrying out his rehabilitation program.
- b) To take care of equipment/machinery in Physiotherapy department.
- c) To handle and operate the equipment/Machines.
- d) To assist/instruct the handicapped patients to carry out their rehabilitation programmes.
- e) To repair the minor defects in equipment.
- f) To physically carry out the passive/active exercises in case of patients who require such exercises.
- g) To maintain records of physiotherapy programme of patients/department.
- h) To develop special skill for rehabilitation of paraplegic, quadriplegics and patient with other, musculoskeletal diseases post operative, neurological etc.

PHYSIOTHERAPY

Name of Subject	Theory / Practical	Topics Included	Marks
Basic Medical Sciences	Theory	Anatomy, Physiology, Public Health and First Aid	150
	Practical	As per above subjects through charts and models etc. only for anatomy and physiology	50
Physiotherapy Techniques	Theory	Biophysics, Physiotherapy related diseases, Special Anatomy and physiology, Kinesiology, Electrotherapy, Clinical Myology.	150
	Practical	As per above.	100
Applied Sciences	Theory	Physics, Chemistry, Computer & Hospital Safety	100
	Practical	Physics, Chemistry related.	50

PHYSIOTHERAPY

Name of Subject	Theory / Practical	Topics Included	Marks
Part - I			
Basic Medical Sciences	Theory	Anatomy, Physiology	75
	Practical	As per above subjects through charts and models etc. only for anatomy and physiology	25
Physiotherapy Techniques	Theory	Biophysics, Special Anatomy and physiology, Electrotherapy.	75
	Practical	As per above.	50
Applied Sciences	Theory	Physics, Chemistry.	50
	Practical	Physics, Chemistry related.	25

PHYSIOTHERAPY

Name of Subject	Theory / Practical	Topics Included	Marks
Part - II			
Basic Medical Sciences	Theory	Public Health and First Aid	75
	Practical	As per above subjects through charts and models etc. only for anatomy and physiology	25
Physiotherapy Techniques	Theory	Physiotherapy related diseases, Kinesiology, Clinical Mycology	75
	Practical	As per above.	50
Applied Sciences	Theory	Computer & Hospital Safety	75

PHYSIOTHERAPY

PART – I

HOURS DISTRIBUTION PER WEEK

S.No.	Subject	Theory	Practical	Total
1	Physiotherapy Technique-I	06	06	12
2	Basic Medical Sciences - I	03	03	06
3	Applied Sciences - I	02	01	03
4	English - I	06	-	06
5	Urdu - I	06	-	06
6	Islamic Studies	01	-	01

HOURS DISTRIBUTION PER YEAR

S.No.	Subject	Theory	Practical	Total
1	Physiotherapy Technique-I	240	240	480
2	Basic Medical Sciences - I	120	120	240
3	Applied Sciences - I	80	40	120
4	English – I	240	-	240
5	Urdu – I	240	-	240
6	Islamic Studies	40	-	40
		960	400	1360

PART– II

HOURS DISTRIBUTION PER WEEK

S.No.	Subject	Theory	Practical	Total
1	Physiotherapy Technique-II	06	09	15
2	Basic Medical Sciences – II	02	01	03
3	Applied Sciences – II	02	01	03
4	English – II	06	-	06
5	Urdu – II	06	-	06
6	Pak Studies	01	-	01
		23	11	34

HOURS DISTRIBUTION PER YEAR

S.No.	Subject	Theory	Practical	Total
1	Physiotherapy Technique-II	240	360	600
2	Basic Medical Sciences – II	80	40	120
3	Applied Sciences – II	80	40	120
4	English – II	240	-	240
5	Urdu – II	240	-	240
6	Pak Studies	40	-	40
		920	440	1360

APPLIED SCIENCES
PART - I

PHYSICS AND CHEMISTRY

1. The nature of Science, Divisions of Science, and Scientific method.
2. The Measurement – Metric System, scientific notation, units of mass, length and volume.
3. Mechanics – Force, equation of motion, laws of motion.
4. Gravity – speed, velocity and acceleration, center of gravity, weight and mass.
5. Work, Power, Energy.
6. Simple machines – principles of machines, friction, levers.
7. Density, Specific gravity, Archimedes's Principle.
8. Pressure – Definition, pressure in hydrostatic fluids, pressure in flowing liquids.
9. Gas Laws – Boyle's and Charles laws, gas laws applicable to respiratory process, effects of changes in atmospheric pressure on physiology of the human body.
10. Heat – nature and measurement, effects of heat, methods of transfer.
11. Light – Transmission, reflection and refraction of light, lenses.
12. Sound – How it is produced, characteristic, transmission, reflection of sound, echoes, ultrasound.
13. Electricity – Atomic structure, free electrons, conductor and insulators, Definition of current, P.D., Resistance, Resistance laws, Ohm's law, circuit, series circuit, parallel circuit, Power and energy.
14. Magnets and Magnetism – Properties, magnetic field, magnetic lines of force, electromagnet, magnetic effect of electric current, Motor and generator effect of current, magnetic and electric induction, Transformer.
15. Charge – Coulomb's law, capacitor and capacitance, capacitor in series and in parallel.
16. A.C. Definition, RMS value, Peak value Sine wave.
17. Electromagnetic Radiation – Spectrum, ionization, excitation, Inverse Square law, frequency, wave length, terms and their definitions.
18. Composition of Substance – Atoms and molecules, symbols, formulae, Elements and compounds, chemical formula.
19. Chemical Reactions and Equations.
20. Water – physical and chemical properties, Deliquescent, efflorescent, hygroscopic substances, solvent properties, Hydrolysis, Water cycle, impurities, hard and soft water.
21. Solutions – Terms, Solubility, Concentrations, dilutions, properties of solution.
22. Acid, Bases, and salts.
23. pH Scale and buffer system.
24. Electrolytes and electrolysis.
25. Amines and amides
26. Proteins – compositions, properties of amino acids, classifications.
27. Carbohydrates
28. Lipids

Practical Chemistry

1. How fitting up a wash bottle is prepared?
2. To purify the given sample of impure naphthalene by crystallization.
3. To purify the given sample of naphthalene by sublimation.
4. To determine the melting & boiling point of organic compound.
5. To prepare the standard solution of acid or Base.
6. To prepare a standard solution of oxalic acid and with its help standardize a solution of NaOH.
7. To prepare approximate N/10 solution of H_2SO_4 determine its exact normality by titrating it against standard N/10 NaOH?
8. To standardize a given solution by direct method.
9. To standardize a given solution by indirect method.

Practical Physics

- a. To find the unknown force.
- b. To find the center of gravity of an irregular shape.
- c. To verify the law of reflection.
- d. To find the path of light passing through a prism.
- e. To find the focal point of a lens.
- f. Determine the critical angle of glass using a glass prism.
- g. Determine the focal length of convex lens.
- h. To find the refractive index of a liquid using a concave mirror.
- i. Determine the speed of sound at a room temperature.

APPLIED SCIENCES
PART – II

APPLIED COMPUTER SCIENCES

Note: This is an introduction to computer science. A brief description and definitions of terms will be taught to the students.

1. An over view of Computer system.
2. The shapes of computer today–Super Computer, Main frame, mini computer, Works stations and PC.
3. Input methods–Key board , Mouse,
4. Alter native methods of input – hand devices, optical devices, Audio-visual input devices.
5. Monitors and sound system – Monitors – PC. Projectors, sound system.
6. Printer and brief introduction to its types.
7. Transforming data in to information representation, process, speed etc.
8. CPU – types with definition
9. Types of storage devices – Magnetic and optical.
10. Measuring drive information- access time, file compression, transfer rate, interface standard.
11. Basic of operating system–interface, programme, files, hardware and software management
12. Definitions of Unix, DOS, Macintosh operating system, Windows, OS / 2, Windows NT, 95, 98, 2000, Linux.
13. Words processing and Desk tope Publishing software.
14. Spread sheet software.
15. Presentation programme
16. Data base management System.
17. Networking basics – brief of use, structure, LANs, Media, Hardware and Software.
18. Networking – Standard telephone lines, digital lines, Network in the home.
19. Internet basics
20. Accessing, connecting, working on internet, introduction to DICOM, PACS.
21. Working with images.
22. Graphics software.
23. Understanding multi-media.
24. Creating and distributing media contents.
25. Basics of information system- Use, Parts.
26. Building information system – five phases – need, Design, development, implementation, maintenance.
27. Creating programmes – definitions of programme and approaches.
28. Programming languages and system development life cycle.
29. Ergonomics, health and privacy issues.
30. Brief of computer crimes, Viruses, Theft and computer environment

PATIENT SAFETY

1-10 **Electrical Hazards**

- Electrical current and body muscles
- Electric shock
- Defibrillators
- Pace makers
- High and low frequency electricity in medicine
- Classification of medical equipment
- Degree of protection in equipment
- Earth leakage current
- Maximum current limits and safety tests

11-15 **Fire and explosion in hospitals**

- Inflammable gases and liquids
- Static electricity
- Precaution against fire and explosion

16-26 **Surgical diathermy and other possible hazards in hospitals**

- Surgical diathermy and precautions
- Mechanical hazards
- Heat and light hazards
- Chemical burns

27-35 **Radiation**

- Non-ionizing radiation
- Ionizing radiation
- Microwave ovens
- Ultrasound therapy equipment
- Lasers

36-40 **Infection in hospitals**

- The hospital environment
- Pathogenic, non-pathogenic microorganisms
- Modes of spread of infection
- Kinds of infection
- Cross-infection
- Precautions and prevention.

BASIC MEDICAL SCIENCES
PART - I

ANATOMY

The depth of the subject will only be diagram and labeling of the diagram.

Week	Contents
1. Introduction	
2-3.	The study of human cell and functions of organelles, Nucleus, DNA helix, RNA, genetic code, Chromosomes. Cell Division Mitosis and Meiosis of cell
4-9.	BASIC TISSUES <ul style="list-style-type: none">- Different Types of tissues.- Connective tissues.- Epithelial tissues.- Muscle tissues.- Nervous tissues.- Blood tissues.
10-11.	The circulatory system- Structure of heart. Different chambers of heart, main arteries arising from the heart and main veins of the heart, branches of arch of aorta, Thoracic aorta, abdominal aorta, main vessels of upper and lower limbs.
12-13.	Lymphatic System
14-17.	The Gastro Intestinal Systems <ul style="list-style-type: none">- Mouth- Pharynx- Esophagus- Stomach- Small Intestine- Large Intestine- Accessory organs (Liver, Spleen, Pancreas & Gall Bladder)
18-20.	Respiratory System <ol style="list-style-type: none">1. Organs of respiration2. Upper respiratory tract3. Lower respiratory tract
21-22.	The Skin <ul style="list-style-type: none">- Epidermis- Dermis- Sebaceous glands- Nails

23-25. The Nervous System

1. CNS central nervous system
2. Peripheral Nervous System
 - Different parts of nervous system
 - Structure of cerebrum, mid brain, cerebellum, pons and medulla oblongata, spinal cord and
 - Autonomic nervous system

26-28. The Endo Crine Glands

Short description and position of:-

- Pituitary gland
- Thyroid gland
- Parathyroid gland
- Adrenal gland
- Hormones of Testis
- Prostate
- Ovaries
- Pancreas and Thymus

29-31. The urinary system

Structure of kidney, urethra, urinary bladder, prostate gland and ureter. Difference of right and left kidneys.

32-33. The Reproductive System

- Male reproductive system
- Female Reproductive System
- Different organs of male reproductive system, structure of testis, the scrotum, seminal vesicles, prostate gland, the penis and urethra.
- Different organs of females reproductive system, Mammary glands, Structure of ovaries, uterus, cervix and vagina,

34-35. The Skeleton

Different bones of skull. Bones of upper limbs, lower limbs, thorax, pelvis and vertebral column.

36-38. Structure of individual bones, scapula, humerus, radius, ulna, femur, tibia and hip bones, hands, foot, ribs, sternum, clavical, sacrum, thyroid, hyoid, */

The Joints

1. All joints and their movements
2. Main muscles of body.

39-40. The Special Senses:

Brief anatomy of eye. Three coats of eye ball. Brief anatomy of ear Outer, middle and inner ear, nose- inner and outer, tounge, salivary glands, skin.

Recommended Books:

Foundations of anatomy and physiology by Kathleen J.W. Wilson.

PHYSIOLOGY

The physiology of the following topics will consist of brief description of the function of part of the body.

1-3. The cell and its functions

1. Structure and Functions of a human cell

The cytoplasm and its organelles

Comparison with animal cell

Functional system of the cell

2. Endocytosis & Phagocytosis

Ingestion and digestion by the cell

Functions/Structures of Golgi apparatus

3. Cell Division

Mitochondria and reticulum.

Cell reproduction.

4-9. Tissues and fluids of body.

10-11. Cardiovascular system (Heart and circulation)

Description of Heart and vessels (arteries, vein, and capillaries)

Cardiac cycle, diastole and systole

Functions of atria and ventricles

Functions of valves

Heart pumping (work output of heart)

Cardiac output, stroke volume etc.

Heart sounds

Lymphatic system function

12-14. Respiratory System

Basic mechanism of respiration

Inspiration expiration mechanism

Pulmonary capacities and pulmonary volumes

Respiratory rate and tidal volume definitions

Functions of respiratory pathways (Chemical & Neural Control)

Artificial respiration, mouth breathing

Transport of oxygen and carbon dioxide in the blood and body fluids

15-18. Gastro intestinal tract.

Ingestion of food, mastication (Chewing)/ Digestion and Swallowing

Functions of stomach

Storage function, mixing of food

19-20. Secretions of GIT

Saliva, Salivary glands functions of

Saliva, Gastric Secretion, Functions of

Pancreatic secretion, Bile secretion and its function

Secretions of the small intestine, secretion of large intestine, Digestion and absorption of food

21-25. Metabolism

Introduction to Fat and Protein Metabolism

Introduction to Carbohydrates Metabolism, Role of glucose in Carbohydrate metabolism, Transport of glucose in body tissue, Lipid metabolism transport of lipids in the blood.

Transport from the GIT, and fat deposits, Proteins metabolism, basic properties of protein, use of proteins for energy, Vitamins and their metabolic role.

27-28. Endocrine Glands.

Endocrine glands and their hormones

The pituitary hormones and their functions

The thyroid hormone, The adrenocortical hormones

Parathyroid hormones and their functions

29-32. Reproductive System.

Functions of the male reproductive organs

Functions of the female reproductive system

Testosterone and other male sex hormones

Pregnancy, lactation and female hormones

33-37. Special Senses

Introduction to Sensory organs and their function

The eye functions and elements of eye, Sclera, choroid retina, The eye as a camera, Sense of Hearing, tympanic membrane and external ear, middle ear and vesicles, Internal ear and its functions

Conduction of sound to the cochlea

The functions of Tongue and salivary glands.

The functions of nose and tonsils / Adenoids.

The functions of skin and its appendages

38-40. Nervous System

General design of nervous system types and parts of nervous system Functions of brain, cerebrum cerebellum spinal cord. Cranial nerves. Autonomic nervous system (Parts and functions)

BASIC MEDICAL SCIENCES
PART - II

FIRST AID

1. First Aid

- Definition
- Principles
- Actions at emergency

2. Dressing + Bandages
3. Short structure & function of respiratory system
4. Asphyxia
5. Assisted respiration
6. Short structure and function of C.V.S.
7. Shock (Circulatory failure) Patho-Physiology
8. Cardiogenic shock Treatment
9. Hypo-volumic shock (Haemotologic) with treatment other condition.
10. Anaphylactic shock
 - Signs
 - Symptoms
 - Treatment
11. Septic Shock "
12. Neurogenic shock "
13. Cardiopulmonary resuscitation principles practical demonstration.
14. Assessment of newborn
15. Resuscitation of newborn
16. Short structure & function of locomotive, Sprains and strains
17. Fractures, First Aid Management
18. Burns, Scalds causes and First Aid Management
19. Wounds cuts stabs and management
20. Management of Bleeding from wound/NOSE/mouth/misc.
21. Drowning-First Aid management
22. Road traffic accidents (First Aid Management)
23. Transport of injured persons especially spinal care
24. Care of Coma / stupor unconscious victim
25. Poisonings-Swallowed persons and first aid management
26. Poisonings inhalation poisonings first aid management
27. Bites Stings management human, cat dog insect
28. Snake bite and first aid management
29. Anaphylactic Shock and its management
30. Choking (Foreign body in airway)
31. Abdominal pain (First aid)

32. Sport injuries
33. Safety at home precautions / safety
34. Precautions at kitchen to avoid accidents.
35. Precautions at bathroom
36. Precautions in living room
37. Precautions at stairs and at terraces

PUBLIC HEALTH

- 1. Introduction:** To health field, definition of health, preventive, social, community and family medicine.
2. Health care organization in Pakistan.
 - i. General introduction to federal, provincial, divisional and district level organizational structure.
 - ii. Role of paramedics in hospitals.

3-6. AIR

Composition and functions-Pollution and pollution indicators-impurities in air-cleaning methods (an over view)

7-12. WATER

Sources of water with special reference to Pakistan. Impurities-Safety-Purification, Natural and artificial methods.

13-17. VENTILATION

Objectives and merits. Over crowding and its effects on human body. Natural ventilation and artificial ventilation.

18-25. Wastage

Introduction-refuse and its collection. Methods of collection and disposal of refuse-Excreta-Methods of collection and disposal of Excreta.

26-27. Infection and disinfecting

Introduction-Terminology-Methods of disaffection.

28-29. Sources of infection-routes of transmission i.e., air, water and food.

30-39. Communicable diseases

Introduction-EPI and diseases related to it, vaccination schedule.

Communicable diseases like T.B., diphtheria, tetanus, polio, whooping cough and measles Epidemiology and prevention methods for above diseases.

40. Family Planning

Need and objectives-general methods.

PHYSIOTHERAPY TECHNIQUES

PART -I

ELECTRO MECHANIC AND ELECTROTHERAPY

1. Current for treatment.

- Sinusoidal and Faradic currents.
- High frequency current production.
- Low Frequency Currents
- Interrupted direct current
- Electrodiagnosis
- Inferential Therapy

2. Electro Checks/Electrical shocks.

3. Physical effects of heat and temperature. Transmission of heat. Wave length and frequency.

4. Infra red rays and its sources.

5. Ultraviolet ray and its sources. Choice of lamp for treatment.

6. Sound Waves:

Sound waves and their velocity, reflection and refraction of sound waves, characteristics of tone, resonance, Inter ference of waves.

7. Currents from cell and Main's supply, Ohm's Law: Electrical Units. Resistance in series and parallel. Chemical effects of currents.

ELECTROTHERAPY

(Application of Electromechanics to Electromedical work)

1. Technique and application of Galvanic current.

Its effects and Uses.

Indications and Precautions.

2. Technique and application of Faradic current.

Its effect, uses, dangers, indications and contra-indications.

3. Short Wave Diathermy.

- Introduction and general consideration.
 - Heating of Tissues
 - The machine circuit
 - The patient circuit
 - Physiological effects of SWD
 - Therapeutic effects of SWD
 - Dangers in SWD
- a) **Condenser field Method.**

- i) Cross fire ii) Through & Through
 - ii) Co Planar. iii) Mono Planar.
 - i) Cable method V) Disk Method
 - ii) Pads Method
- b) **Cable Method:**

Special Techniques: Dangers and precautions. Contra - indications

4. Infra Red Rays.

- Physiological effects of Infra - Red Rays.
- Therapeutic effects of Infrared rays.
- Technique of irradiation.
- Dangers and precautions.

5. Ultrasonic:

- Introduction.
- Characteristics.
- Physiological effects.
- Physical effects.
- Therapeutic effects.
- Technique of application.

PRACTICALS OF ELECTROTHERAPY

LOW FREQUENCY CURRENTS

Electrical stimulation

1. Types of current used - low or high
2. Apparatus – Developing diagram, identification of main parts, electrodes, connections etc.

1. Low frequency currents – types like TENS etc
 1. Indications for use like Bell's Palsy
 2. Methods of use
 3. Safety precautions for self and for patients.
2. Study of electrodes and their application.
3. Study of methods to avoid electric shock.
4. Study of the situations in which burns may occur.
5. Study of different faults in the system and their effects.

HIGH FREQUENCY CURRENTS

1. Study of Short Wave Diathermy and types of currents used.
2. Study of production of heat by low and high frequency currents.
3. Study of movement produced by low frequency currents.
4. Developing a general diagram of Short Wave Diathermy and studying different parts at the machine available in the lab.
5. Studying Pads, Disc, & cable
6. Study of physiological effect of Short Wave Diathermy
7. Study of therapeutic effects of SWD
8. Study of indications for use of SWD
9. Study of methods for avoiding burns and contraindications.
10. Study of applications of SWD on soft tissues such as eyes.

BIO-MECHANICS

1. Preliminary exercise on measurement, involving different geometrical dimensions.
2. Force, measurements of force and its effects. Tensile & compressive forces.
3. Moments, its kinds, Effects of opposite moment & principle of moments.
4. Reaction or supporting forces of a horizontal beam & reaction at sacrum.
5. Work done in Machines used for lifting, principle of work applied to a machine.
6. Some simple machines.
7. Power, power of engines & pumps its mechanical efficiency.
8. Transmission of motion & Power.
9. The inclined plane and screw.
10. Energy.
11. application of physical principles to body system.
12. Mode of transmission of heat.
13. Light.
14. Wave motion, different kind of wave motion reflection & refraction of waves.
15. Sound, factors necessary for production of sound. Sound as a energy. The nature of sound, propagation of sound in air, water & solid. Characteristics of sound.
16. _____ principle.

Practical

1. To find the centre of gravity of a irregular shape bodies.
2. To verify the principle of lever $\text{load} \times \text{load arm} = \text{Effort} \times \text{effort arm}$
3. To resolve the forces, of a weight rolling down on an inclined plane.
4. To resolve the different forces at different angle on a single joint and to find their net effect on that joint.
5. To find the centre of gravity of a lever area place on a fulcrum under specific loading.
6. To find the unknown reaction of a lever under a specific concentrated loading.
7. To resolve an inclined force making an angle θ with X-axis and to find the component forces of that inclined force by making use of trigonometric function.

ELECTRO-MAGNETISM

Weeks

1. Introduction to the course.
2. The structure of the atom.
3. Isotopes.
4. Ionization and excitation.
5. Electric charges.
6. Electric introduction-electroscopes.
7. Electric charge and electrical potential.
8. Capacitance and capacitors.
9. Electric current-ampere, volt, resistance.
10. Resistance and ohms law.
11. Circuit laws.
12. Energy and power.
13. The heating effect of electric current.
14. Sources of electrical energy.
15. Magnetism-introduction.
16. The magnetic effect of electric current.
17. Applications of magnetic effect.
18. Electro-magnetic induction.
19. Mutual induction and self-induction.
20. Introduction of A.C.
21. Transformer-theory.
22. Transformer-practical aspects.
23. Introduction A.C. circuits.
24. Reactance, resonance, impedance.
25. Power factor-power in single-phase circuit.
26. Single phase three phase, comparison and contrast.
27. Electrical distribution system in Pakistan.
28. Different supply systems.
29. A.C. in three-phase system.
30. Introduction to electrical machines.
31. Generator-A.C. & D.C. Principle, working-main parts.
32. Motor-Principle, Main parts working.
33. Electrical measuring instruments and measurements.
34. Indicating instrument-types, Principle and working.
35. Thermionic emission and P.N. Junction.
36. Diode structures and working.
37. Characteristic of diodes.
38. Triode-its working and characteristics.
39. Rectification.
40. Introduction to amplification.

PHYSIOTHERAPY INSTRUMENTS

Physiotherapy equipment. Application of electrical technology in physiotherapy equipment. Control and Operative component of the equipment like switches circuit breakers, relays and other details as follows.

1. Ultra Sonic Therapy Unit (Circuit Description, Dosage control, Constant and pulsed Operation).
2. Microwave Diathermy.
3. Surgical Diathermy Machines.
4. Precautions to be used while using Physiotherapy Instruments.
5. Baths all types
6. Exercise Machines – Types, Usage and brief introduction to circuits.

PHYSIOTHERAPY TECHNIQUES

PART -II

SPECIAL PHYSIOLOGY

- 1-6.A Physical principles of resting membrane potential in nerve & muscle, action potential and Physiology of nerve impulse Synaptic Transmission.
- 7-8 Sympathetic and parasympathetic system.
- 9-10 Sensory system various types of sensations, their pathways and brain centers.
- 11-12 Special senses.
Eye, ear, taste, olfaction.
- 15-16 Motor system pyramidal and Extrapyramidal.
- 17-20 Cerebellum RAS. Sleep, higher brain functions, EEG,
- 21-28 Functions of Hypothalamus.
Physiology skeletal muscle, smooth, cardiac muscle Neuromuscular Physiology. EMG, myo neural junctions.
- 29-32 Physiology of respiration, cardiovascular system, Endocrine GIT, urinary system, blood, immune system.
- 33-34 Physiology of bones and Ca ++ metabolism.
- 35-36 Physiology of Exercise.
- 37-38 Metabolism. Diet & Nourishment especially in handicapped & paralysed individuals.
- 39-40 Electrolyte physiology, water & Electrolyte balance PH regulation.

Special Anatomy

41-44 Skeletal system

- (i) Classification and general features of bones & joints
- (ii) Bones of upper limb
- (iii) Bones of Lower limb
- (iv) Joints of upper & lower limbs, classification of joints and Bones.
 - Essential features of each type.

45-46 Kind of mov permitted in joint institution of movements structure of each joint chief relations.

47-50 Skull - general features, bone and position of bone.

- Vertebral column
- Sternum & Ribs.
- Foot
- Description of Carpus, metacarpus and phalangeal bones and their movements

51-56 Muscles: General anatomy of muscles, their classification and action. Nerve supply & actions of various limbs & body muscles including diagrams, their nerve supply with special emphasis on their group action as against antagonist, synergist. Mechanism and action of muscles acting on joints and movements they produce.

57-62 C.N.S. - General Orientation of CN.S.

- Brain & Spinal cord.
- Sympathetic & para sympathetic system.
- Cranial and peripheral nerves.

- Distribution of 5,7,10,11. Name, & functions only of the other nerves.
- 63-66 C.V.S. Heart – aorta, major arteries of limbs, head, neck, brain, abdomen & thorax
 - Veins of body
 - Lymphatic
- 67. Digestive System:
 - iii) Mouth
 - iv) Pharynx esophagus
 - v) Gastrointestinal tract
 - vi) Associated glands, salivary glands, liver, pancreas
- 68. Endocrines Pituitary thyroid & parathyroid suprarenal etc.

SURFACE ANATOMY

- a. Knowledge of various bony and soft land marks on body.
- b. Correlation of these marks with deep structures.
- c. Surface marking of various deep structures in body.
- d. Measurements in limbs –recognition of various parts in limbs, abdomen, thorax, head & neck.

Practical

1. Excretory System / Uro-genital
To demonstrate the Kidney, urinary Bladder gonads, Urethra, genital system and reproductive system
2. Demonstration of all the above systems on
 - i. Charts
 - ii. Equipments
 - iii. Slides / Projectors
 - iv. Dummy's
 - v. Skeleton 1. Individual bones 2. Whole

KINESIOLOGY

1. **CLASSIFICATION OF PASSIVE MOVEMENTS.**
 - Relaxed Passive Movements.
 - Forced Passive Movements.
 - Its technique and effects.
2. **CLASSIFICATION OF ACTIVE MOVEMENTS.**
 - Assisted active movement its technique and effect.
 - Resisted movement its technique and effect.
 - Free active movements technique and effect.
3. **BREATHING EXERCISES:**

Its effect and technique.
4. **Posture Drainage and control:**

Maintenance of correct posture.
5. **SUSPENSION THERAPY:**
 - Introduction to suspension therapy. Simple methods of suspension. Effects and uses.
6. **Pulley Circuits:**

Introduction to pulley and weight circuits.
Effects and uses of pulley circuits.
7. **DIFFERENT POSTURES:** Effects, uses and Muscle work;
 - Standing.
 - Kneeling.
 - Sitting.
 - Lying.
 - Hanging.
 - Pelvic Tilt.
8. **RELAXATION:**
 - Definition, Methods of promoting relaxation, effects and uses.
9. **P. N. F. TECHNIQUES**
 - Basic technique, its effects and uses.
10. **Re education of walking / Gait Training**
 - Without aids.
 - With Crutches
 - Wheel Chair
 - Stick and Braces.

PHYSIOTHERAPY TREATMENT AND TECHNIQUE

NERVOUS SYSTEM

- Classification of Nervous Diseases.
- Upper Motor Neurone Diseases.
 - Hemiplegia
 - Cerebral Palsy.
- Lower Motor neurone Diseases:
 - Acute Aneuroid Poliomyelitis.
 - Progressive Muscular Atrophy.

- Chorea and Parkinsonism.
 - Peripheral nerve Injuries.
 - Facial Paralysis.
2. **DISEASES OF MUSCLES.**
 - The Dystrophies.
 - Myasthenia Gavis.
 3. **DISEASES OF JOINTS.**
 - Osteoarthritis.
 - Ankylosing Spondylitis.
 - Rheumatoid Arthritis.
 - Septic Arthritis
 - Gout
 4. **DISEASES OF RESPIRATORY TRACT.**
 - Bronchitis
 - Bronchi - actasis.
 - Pneumonia - Lobar.
- Bronchial
 - Tuberculosis.
 - Asthma.
 - Pleurisy.
 - Pl. effusion
 5. **FRACTURES.**
 - Types, sites and its physiotherapy management.
 6. **DEFORMITIES:**
 - Acquired and congenital, General Principles of physiotherapy treatment.
 7. **GENERAL PRE OPERATIVE AND POST OPERATIVE CARE OF PATIENTS IN PHYSIOTHERAPY.**
 - Lobotomy
 - Premumonectomy.
 - DVT (Deep Vein Therapy)
 - Implanted Patients (Total Hip Joint Replacement)
 8. **PHYSIOTHERAPY IN CHEST SURGERY**
 - Lobectomy - Premumonectomy
 9. **PHYSIOTHERAPY IN TRAUMATIC CONDITIONS**
 - Joint Sprains.
 - Synovitis.
 - Bursitis.
 - Tendinites.
 10. **INTRODUCTION TO HYDROTHERAPY, OUTLINE OF METHODS. USED, TECHNIQUES, TYPES OF BATHS EFFECTS AND USES.**
 11. Introduction to paraffin baths, its application, effects and uses.
- MANUALAL THERAPY:-**
 Post operative physiotherapy.
 Chest physiotherapy
 Physiotherapy in orthopedics.

Complications in manual therapy.

Physiotherapy in peripheral nerve therapy.

Physiotherapy for hemi-pelagic patient.

Mobilization and gait training .

Physiotherapy for paraplegic patients, exercises, bed positioning, complication ,loss of sensations and management.

Wax therapy

Uses of wax therapy

Combination, diagram of the tub, and contraindication.

Temperature setting and preparation of the patient.

Alternative of wax therapy.

MECHANICAL SYSTEMS IN PHYSIOTHERAPY:-

Study the diagram of pulley and rope system .

Study and uses of Captain wheel .

User of ladders in gymnasium.

Study with diagrams required in various exercises.

Study with diagram of quadriceps drill, its uses and types of exercises.

EXERCISE THERAPY:-

1. Study of design, apparatus, equipment for passive and active exercise therapy.
2. Usage of manual exercise therapy.
3. Indications or conditions for use.
4. To study the role of exercises in hemiplegia and paraplegia.
5. Conditions for use of massage.
6. Contraindications of massage.

CHEST PHYSIOTHERAPY

1. To study Conditions, effects and diagram showing trachea, bronchi and lungs.
2. To study the effects of physiotherapy regarding expectoration and oxygenation.
3. Applications in post-operative thorocotomy.
4. Uses of chest therapy in ICU & CCU.

TRACTION APPARATUS

1. Uses of traction apparatus.
2. Study of manual traction.
3. Advantages and disadvantages
4. Study of mechanical traction.
5. Diagram for manual cervicle traction.
6. Design mechanical traction apparatus.
7. Electrical apparatus diagram.
8. Pre and post therapy precautions.
9. Time and duration the treatment required.

MYOLOGY

- demonstration of muscles (different groups with their function)
- Demonstration of ligaments
- Exercises – Physiotherapy of Sensory organs especially skin, briefly other organs, to demonstrate on flip charts or projectors.
- Surface Marking (surface anatomy / General anatomy)

WEIGHTAGE OF VARIOUS SECTION OF THE SYLLABUS

PART - I

S.No	Subject	Part / Class	Section	Weightage	Total Marks
1	Basic Medical Sciences (Anatomy & Physiology)	XI	I – Cell, Basic Tissue, Lymphatic System, Skin, Special Senses. II – GIT, Respiratory System, Cardiovascular System, Skeletal System & Joints. III – Nervous System, Reproductive System, Urinary System, Metabolism.	33 % 33% 33%	75
	Practical				25
2	Applied Sciences (Physics & Chemistry)	XI	Physics I – (1-4) Science, Measurement, Mechanic & Gravity. II – (5-8) Work & Energy, Machines, Density, Pressure. III – (9-11) Heat, Light & Sound IV – (12-14) Electricity and Magnetism V – (16) Electromagnetic Radiation Chemistry VI – (17- 19) Composition, Reactions, Gas Laws VII – (20-21) Water & Solutions VIII – (22-24) Acid, pH, Electrolytes IX – (25-28) Amines, Proteins, Carbohydrates, Lipids.	50 % 10 % 10 % 10 % 10 % 50 % 10 % 10 % 10 % 10 %	50
	Practical		As per list given		25
3	Physiotherapy Techniques - I	XI	I – Biophysics & Equipment II – Special Anatomy and Physiology III – Electrotherapy	33 % 33% 33%	75
	Practical		Biophysics Special Anatomy & Physiology Electrotherapy	20 % 40 % 40%	50
4	English	XI	As per approved syllabus for HSSC – I		100
5	Urdu		As per approved syllabus for HSSC – I		100
6	Islamiyat		As per approved syllabus for HSSC – I		50

**WEIGHTAGE OF VARIOUS SECTION OF THE SYLLABUS
PART – II**

S.No	Subject	Part / Class	Section	Weightage	Total Marks
1	Basic Medical Sciences (First Aid & Public Health)	XII	I – Topic 1, 2, 33 – 37 (First Aid), Topic 1 & 2 (Public Health) II – FA Topics 7 – 15, 18, 21 – PH Topics 3 – 17 & 40 III – FA Topics 17, 20, 22, 23, & 32 -- PH Topics 18 -27 IV – FA Topics 24 –26, 29 – 31 – PH 30 – 39	25 % 25% 25% 25%	75
	Practical		Same as above		25
2	Applied Sciences (Computer & Patient Safety)	XII	Computer I – Topics 1- 6 II – Topics 7 - 12 III – Topics 13 – 18 IV – Topics 19 – 24 V – Topics 25 – 30 Patient Safety VI – Electrical Safety VII – Fire and Explosion VIII – Surgical Diathermy IX – Radiation Safety X – Infection in Hospital	50 % 10 % 10 % 10 % 10 % 10 % 50 % 20 % 02 % 08 % 15 % 05%	75
3	Physiotherapy Techniques - II	XII	I – Kinesiology II – Special Anatomy & Physiology III – Physiotherapy Medicine IV – Surface Anatomy	30% 30% 30% 10%	75
	Practical		Same as above		50
4	English	XII	As per approved syllabus for HSSC – I		100
5	Urdu	XII	As per approved syllabus for HSSC – I		100
6	Pak Study	XII	As per approved syllabus for HSSC – I		50