



D. Y. Patil Education Society (Deemed to be University), Kolhapur

Re-accredited by NAAC with 'A' Grade

"Imparting knowledge with Excellence"

D. Y. PATIL COLLEGE OF PHYSIOTHERAPY

KOLHAPUR



Syllabus For

Bachelor of Physiotherapy - I

(B. P. Th.)

D. Y. PATIL EDUCATION SOCIETY, KOLHAPUR
(DEEMED TO BE UNIVERSITY)



D. Y. Patil College of Physiotherapy

SYLLABUS FOR

BACHELOR OF PHYSIOTHERAPY - I
(B. P. Th.)

Year of Implementation : 2019-20

Year of Examination : 2020-21

Vision

- To be an excellence in training Physiotherapy students
- To train future leaders for education, research and practice in Physiotherapy using advance techniques
- To promote sustainable development by using various skills and techniques in certain conditions by assuring best teaching and educational centre.
- To seek a leadership role in institutional and community research through developing innovative, multidisciplinary collaborative approaches.

Mission

- The mission of course is to impart in-depth knowledge in various specialties with regards to scope and upliftment in our profession.
- To advance basic knowledge of Physiotherapy by understanding how it works in various diseases, disorders and dysfunction.
- To develop holistic approach in society for success in life.

I - Bachelor of Physiotherapy

Program Code	Exam Code	Course Name	Subject Name	Sub/Course Code
16	1601	I B.P.Th.	Human Anatomy	160101
			Human Physiology	160102
			Biochemistry	160103
			Fundamentals of Kinesiology & Kinesiotherapy	160104
			Fundamentals of Electrotherapy	160105
	1602	II B.P.Th.	Pathology & Microbiology	160201
			Pharmacology	160202
			Psychiatry & Psychology	160203
			Kinesiology	160204
			Kinesiotherapy	160205
			Electrotherapy	160206
	1603	III B.P.Th.	Surgery I	160301
			Surgery II	160302
			Medicine I	160303
			Medicine II	160304
			Community Health & Sociology	160305
			Functional Diagnosis and Physiotherapeutic Skills	160306
	1604	IV B.P.Th.	Musculoskeletal Physiotherapy	160401
			Neuro Physiotherapy	460402
			Cardio-Vascular & Respiratory Physiotherapy	160403
			Community Physiotherapy	160404

PROGRAM OUTCOME

PO1: Ability to acquire knowledge about normal- abnormal basic medical and human movement sciences, understand relevant investigations, role of drugs related to various medical conditions, surgical treatment and application of Physiotherapy interventions.

PO2: To gain knowledge about planning and problem solving abilities to delineate the cognitive, affective and psychomotor skills to perform as a competent physiotherapist who will be able to evaluate, plan and effectively perform the physiotherapeutic skills.

PO3: Demonstrate the ability to acquire good listening potential with effective interpersonal and intra personal communication skills.

PO4: Extend the acquired knowledge to conduct research activities and publications that contribute to the upliftment in field of Physiotherapy and betterment of society.

PO5: Understand moral value, professional ethics and accountability towards patient and colleagues; develop good behaviour skills with confidentiality and humanitarian approach maintaining the respect and privacy of patient.

PO6: Develop leadership skills, time management, logical reasoning, values required for self directed and lifelong learning, soft skills for professional development and execute their professional role in society as a physiotherapist at various academic institutions, Hospital/ Clinics, Organizations, Research laboratories and Rehabilitation centres.

PO7: Understanding about society's needs in terms of health and wellness, to improve multicultural competency among professional and general public, promoting social policies that affect the demands of patients in terms of function, health and wellness, develop a character with good moral values, human values, good social behaviour, gratitude, honesty, ethics, safety, hygiene, responsibility, confidence, tolerance and critical thinking.

PO8: Able to contribute in sustainable development to achieve the national sustainable development goal, further the relationship between the environment, human health and functioning and Physiotherapy are considered and respected to mutually benefit patient's health. Ensure healthy lifestyle and promote wellbeing for all at all ages.

PO9: Demonstrate ability to acquire new knowledge skills and reflect upon their experience to enhance personal, professional growth and apply the information for patient care.

COURSE OUTCOME

ANATOMY:

CO1: Dissect and identify the normal disposition, inter relationship, gross functional and applied anatomy of various structures in the cadaver.

CO2: Ability to identify the microscopic structures of basic tissues, organs in the human body and basic principles of embryology in stages of normal development.

CO3: Demonstrate different movements of joints, there attachments, palpate important bony landmarks.

CO4: Identify and describe various parts, structures and blood circulation of CNS and spinal cord. Describe the course of peripheral nerves and its importance. Understand anatomical basis of clinical conditions of nervous system.

CO5: Identify and describe various structures, mechanism, blood supply of cardiovascular and respiratory system and understand its anatomical basis of clinical conditions.

CO6: Ability to understand the knowledge of systemic anatomy, abdomen, endocrine and exocrine system and sensory organs with their applied anatomy.

CO7: Demonstrate the knowledge and application of imaging techniques and interpretation of radiogram.

PHYSIOLOGY:

CO1: Acquire the knowledge of general physiology and its contribution in each organ system to maintain homeostasis.

CO2: Understand the basic physiological functions of various systems with special emphasis on Musculo-skeletal, Neuro-motor, cardio-respiratory, endocrine and uro-genital function and alteration in function with aging.

CO3: Acquire the knowledge about structure and function of special sense organs and its applied physiology (eye & ear).

CO4: Acquire the skills of basic clinical examination with special emphasis to peripheral and central nervous system, cardiovascular and respiratory system and exercise tolerance/ Ergography.

CO5: Analyze physiological response and adaptation to environmental stresses with special emphasis on physical activity, attitude, and temperature.

CO6: Explain and correlate the applied physiology of diseases and disorders related to organ systems of body which are commonly treated by the physiotherapist.

BIOCHEMISTRY:

CO1: Acquire and demonstrate the knowledge of formation, functioning and fate of biomolecules, their normal and abnormal levels to understand the disease process and their clinical interpretation.

CO2: Acquire the knowledge of vitamins, minerals their functions, deficiency manifestations and their role in daily nutritional requirements.

CO3: Acquire the knowledge about healthy balanced diet with its nutritional importance and dietary deficiencies.

CO4: Describe the fundamentals aspect of enzymes and hormones with their role in various metabolic disorders where in regulation of altered enzymatic and hormonal mechanism.

CO5: Ability to understand mechanism and biochemical events in connective tissues.

FUNDAMENTALS OF KINESIOLOGY AND KINESIOTHERAPY:

CO1: Understand basic principles of biomechanics, biophysics and application of these principles in Kinesiotherapy.

CO2: Understand classification of joints and muscles, types of movements along with their distinguishing characteristics. Demonstrate various starting and derived positions used in therapeutics.

CO3: Acquire the skills of assessment of basic evaluation like sensations, reflexes and vital parameters and also the skills of objective assessment of range of motion by using goniometry.

CO4: Understand physiological principles and acquire the skills of application of therapeutic massage.

CO5: Acquire the knowledge on physiological basis and principle of relaxation and the skills of relaxation methods. Understand principles of aerobic exercises for general fitness and demonstrate fitness skills on self and group.

CO6: Acquire the knowledge on physiological principles and skills of performing Pranayama and Yogasan for maintaining general fitness.

FUNDAMENTALS OF ELECTROTHERAPY:

CO1: Ability to acquire basic physics principles, laws of electricity, electromagnetic spectrum, common electrical components, fundamentals of currents, sound waves and their effects.

CO2: Ability to understand effects of environmental and man-made electromagnetic field at the cellular level and risk factors on prolong exposure.

CO3: Describe and identify various types of electrodes used in electrotherapy, electrical skin resistance and significance of various media used to reduce skin resistance.

CO4: Acquire knowledge of various superficial thermal agents and their skills of application.

CO5: Ability to understand types and production of various therapeutic electrical currents and in application on different electrotherapeutic modalities.

PHYSIOTHERAPY

DEFINITION:

'**Physiotherapy**' is a branch of modern medical science which includes examination, assessment, interpretation, physical diagnosis, planning and execution of treatment and advice to any person for the purpose of preventing, correcting, alleviating and limiting dysfunction, acute and chronic bodily malfunction including life saving measures via chest Physiotherapy in the intensive care unit, curing physical disorders or disability, promoting physical fitness, facilitating healing and pain relief and treatment of physical and psychological disorders through modulating psychological and physical response using physical agents, activities and devices including exercise, mobilization, manipulations, therapeutic ultrasound, electrical and thermal agents and electrotherapy for diagnosis, treatment and prevention.

(Definition as per the Maharashtra State Council for Occupational therapy & Physiotherapy, 2004)

'**Physiotherapist**' is a qualified professional who has acquired all the above mentioned knowledge and skills for entry into practice after being awarded a bachelor degree in the subject of "Physiotherapy" from a recognised institute affiliated to the University conducting a fulltime course not less than four years and six months of internship.

PREAMBLE

Physiotherapy or Physical Therapy (P.T.) is a **Movement Science** with an established theoretical and scientific base and widespread clinical applications in the **Prevention, Restoration & Rehabilitation, Maintenance and Promotion of optimal physical function**. Physiotherapists **diagnose and manage movement dysfunction** and enhance physical and functional abilities. This physical dysfunction may be the sequel of involvement of any of the systems like Musculoskeletal, Neurological, Cardiovascular, Respiratory or other body systems.

These practitioners contribute to society and the profession through practice, teaching, administration, and the discovery and application of new knowledge about Physiotherapy experiences of sufficient excellence and breadth by research to allow the acquisition and application of essential knowledge, skills, and behaviours as applied to the practice of Physiotherapy.

Learning experiences are provided under the guidance and supervision of competent faculty, in both, classroom as well as in clinic. The designed curriculum will prepare the entry-to-practice physiotherapist (PT), to be an autonomous, effective, safe and compassionate professional, who practices collaboratively in a variety of healthcare set ups such as neonatal to geriatric, from critical care to community fitness to sports training and is responsive to the current and future needs of the health care system.

ESSENTIAL REQUIREMENTS

The following “essential requirements” specify those attributes that the faculty consider necessary for completing the professional education enabling each graduate to subsequently enter clinical practice. The purpose of this curriculum is to delineate the cognitive, affective and psychomotor skills deemed essential for completion of this program and to perform as a competent Physiotherapist who will be able to evaluate, plan & execute Physiotherapy treatment independently.

COGNITIVE LEARNING SKILLS: The student must demonstrate the ability to receive, interpret, remember, reproduce and use information in the cognitive, affective and psychomotor domains of learning to solve problems, evaluate work, and generate new ways of processing or categorizing similar information listed in course objectives.

PSYCHOMOTOR SKILLS: The student must demonstrate the following skills.

1. Locomotion ability:

Get to lecture, laboratory and clinical locations, and move within rooms as needed for changing groups, partners and work stations. Move quickly in an emergency situation to protect the patient (e.g. from falling).

2. Manual tasks:

- a. Maneuver another person’s body parts to effectively perform evaluation techniques. Manipulate common tools used for screening tests of the cranial nerves, sensation, range of motion, blood pressure, e.g., cotton balls, safety pins, goniometers, Q-tips, sphygmomanometer. Safely and effectively guide, facilitate, inhibit, and resist movement and motor patterns through physical facilitation and inhibition techniques (including ability to give timely urgent verbal feedback).
- b. Manipulate another person’s body in transfers, gait, positioning exercise, and mobilization techniques. Manipulate evaluation and treatment equipment safely and accurately applied to patients. Manipulate bolsters, pillows, plinths, mats, gait assistive devices and other supports or chairs to aid in positioning, moving or treating a patient effectively.
- c. Competently perform and supervise cardio pulmonary resuscitation.

3. Fine motor/hand skills:

1. Legibly record thoughts for written assignments (including diagrams) and tests. Document evaluations, patient care notes, referrals, etc. in standard medical charts in hospital/clinical settings in a timely manner and consistent with the acceptable norms of clinical settings.
2. Safely apply and adjust the dials or controls of therapeutic modalities.
3. Safely and effectively position hands and apply mobilization and therapeutic techniques.

4. Visual acuity to:

- a. Read written and illustrated material in the English language, in the form of lecture handouts, textbooks, literature and patient's chart.
- b. Observe active demonstrations in the classroom.
- c. Visualize training videos, projected slides/overheads, X-ray pictures, and notes written on a blackboard/whiteboard.
- d. Receive visual information from patients, e.g., movement, posture, body mechanics, and gait necessary for comparison to normal standards for purposes of evaluation of movement dysfunctions.
- e. Receive visual information from treatment environment, e.g., dials on modalities and monitors, assistive devices, furniture, flooring, structures, etc.
- f. Receive visual clues as to the patient's tolerance of the intervention procedures. These may include facial grimaces, muscle twitching, withdrawal etc.

5. Auditory acuity to:

- a. Hear lectures and discussion in an academic and clinical setting.
- b. Distinguish between normal and abnormal breathing, lung and heart sounds using a stethoscope.

6. Communication:

- a. Effectively communicate information and safety concerns with other students, teachers, patients, peers, staff and personnel by asking questions, giving information, explaining conditions and procedures, or teaching home programs. These all need to be done in a timely manner and within the acceptable norms of academic and clinical settings.
 - b. Receive and interpret written communication in both academic and clinical settings in a timely manner.
 - c. Receive and send verbal communication in life threatening situations in a timely manner within the acceptable norms of clinical settings.
 - d. Physiotherapy education presents exceptional challenges in the volume and breadth of required reading and the necessity to impart information to others. Students must be able to communicate quickly, effectively and efficiently in oral and written English with all members of the health care team.
- 7. Self care:** Maintain general good health and self care in order not to jeopardize the health and safety of self and individuals with whom one interacts in the academic and clinical settings.

AFFECTIVE LEARNING SKILLS: The student must be able to:

1. Demonstrate respect to all people, including students, teachers, patients and medical personnel, without showing bias or preference on the grounds of age, race, gender, sexual preference, disease, mental status, lifestyle, opinions or personal values.
2. Demonstrate appropriate affective behaviors and mental attitudes in order not to jeopardize the emotional, physical, mental, and behavioral safety of patients and other individuals with whom one interacts in the academic and clinical settings and to be in compliance with the ethical standards of the profession.
3. Acknowledge and respect individual values and opinions in order to foster harmonious working relationships with colleagues, peers, and patients.

PROFESSIONAL DRESS CODE STANDARDS:

It is important to portray a professional image. A clinician with inappropriate dress, grooming or conduct can damage the patient's confidence in the quality of their care, sometimes even resulting in a delay in the restoration of health.

Haircuts, hairstyling, and personal grooming need to be neat, conservative and inconspicuous. Grooming and style should be practical and allow one's duties to be performed without embarrassment or inconvenience

DRESS:

Modest casual wear is appropriate on campus and in class.

Clinical /Lab Dress: Aprons for all clinical assignments, any class that is held in a clinical facility and in any class where patients are present.

FRAMEWORK OF THE CURRICULUM

COURSE DURATION: Four years and Six months of Internship.

I B.P.Th

- a. Deals with the basic foundation in medical as well as Physiotherapy subjects. The foundation of human body structure & function & energy utilization is achieved by studying the subjects Human Anatomy, Physiology, and Biochemistry.
- b. Students knowledge of Physics i.e. – Mechanics, Electricity, Water , Sound & Light is recalled to apply it on human body in understanding movements and the various physiotherapeutic modalities under the subject of Fundamentals of Electrotherapy & Fundamentals of Kinesiology & Kinesiotherapy.

II B.P.Th

- a. Deals with understanding of altered Physiology by studying Pathology & Microbiology.
- b. The students get oriented to various Pharmacotherapeutic agents used along with their effects by studying Pharmacology.
- c. The students will study about normal and altered human mind & behavior by studying Psychology & Psychiatry. They will also learn skills required for effective communication with the patients and caregivers.
- d. Students will acquire the knowledge of Biomechanics as applicable to human body in the context of Kinetics & kinematics of Joints, Movements & Daily activities under subject of Kinesiology and shall acquire knowledge and learn various physiotherapeutic skills on models in subject of Kinesiotherapy.
- e. In the subject of Electrotherapeutics, students will acquire knowledge and learn application & uses of various electrotherapeutic modalities on models.

III B.P.Th

- a. Students acquire knowledge of all the clinical subjects like Orthopedics, General Surgery, Medicine, Neurology, Pediatrics, Dermatology & Gynecology & Obstetrics, Community Medicine and Sociology.
- b. Students will acquire knowledge about the principles of International Classification of Functioning (I.C.F.) and its applicability in context to movement dysfunctions.
- c. Students will learn the physiotherapeutic evaluation skills including electro diagnosis on patients to arrive at a Functional/ Physical Diagnosis in Neuromuscular, Cardiovascular & Respiratory dysfunction. They will also acquire knowledge of various specialized manual therapy and neuro developmental techniques and practice these skills on models under the subject of functional diagnosis and physiotherapeutic skills.

IV B.P.Th

- a. Students will revise, recall and integrate the knowledge of previous years to evaluate, functionally diagnose, plan and execute short and long term management of various musculoskeletal, neurological & cardiovascular- respiratory dysfunctions in hospital and community settings.
- b. Students also acquire knowledge pertaining to health promotion & disease prevention throughout lifespan in the community. They will also be able to analyze, prevent and treat problems associated with various industries in community Physiotherapy.
- c. Students will also acquire knowledge about biomechanical principles & application of variety of aids & appliances used for ambulation, protection & prevention by studying Bioengineering.
- d. Professional Practice and ethics as a subject will be studied in continuum from first year, so students will acquire the knowledge of ethical code of professional practice, as well as its moral & legal aspects. The principles of Hospital Administration, Management & Marketing will be studied separately.
- e. Students will also acquire knowledge of Research Methodology and Biostatistics and apply the knowledge in project work in community Physiotherapy.

INTERNSHIP

- a. A period of 6 months (26 weeks) of continuous clinical practice to enhance the clinical reasoning, judgment, programme planning, intervention, evaluation of intervention, follow up and referral skills of all the dysfunctions and impairments learnt throughout the curriculum of four years.
- b. Those candidates declared to have passed the final year examination in all subjects shall be eligible for internship.
- c. Internship shall be done in a teaching hospital recognized by the University. A degree certificate shall be awarded ONLY on successful completion of six months of internship.
- d. The Internship will be rotatory and shall cover clinical branches concerned with Physiotherapy such as Orthopedics, Cardiovascular & Respiratory including ICU, Neurology & Neurosurgery Pediatrics, General Medicine, Surgery, Obstetrics and Gynecology both inpatient and outpatient services.
- e. Successful Completion: The student must maintain a logbook. On completion of each posting, the same will have to be certified by the faculty in charge of the posting for both attendance as well as work done. On completion of all the postings, the duly completed logbook will be submitted to the Principal/Head of program to be considered as having successfully completed the internship program.

HUMAN ANATOMY

1st Year B.P.Th

(Didactic-138 hrs. + Practical/Laboratory -72hrs.) **Total- 210 Hrs**

COURSE DESCRIPTION:

The focus of this course is an in-depth study and analysis of the regional and systemic organization of the body. Emphasis is placed upon structure and function of human movement. A comprehensive study of human anatomy with emphasis on the nervous, musculoskeletal, and circulatory systems is incorporated. Introduction to general anatomy lays the foundation of the course. Dissection and identification of structures in the cadaver supplemented with the study of charts, models, prosected material, and radiographs are utilized to identify anatomical landmarks and configurations of the :

- Upper limb and thoracic region
- Lower limb, abdomen, and pelvis
- Head and Neck
- Nervous system

Sr. No	Regions	Didactic Hours	Practical Hours	Total Hours
1	GENERAL ANATOMY AND HISTOLOGY	17	08	25
2	MUSCULOSKELETAL SYSTEM	50	40	90
3	NEURO ANATOMY	37	12	49
4	SYSTEMIC ANATOMY	06	06	12
5	CARDIOVASCULAR & RESPIRATORY ANATOMY	10	04	14
6	ABDOMEN	04	02	06
7	SENSORY ORGANS	04	-	04
8	ENDOCRINE & EXOCRINE SYSTEM	04	-	04
9	RADIOLOGY	06	-	06
	TOTAL	138	72	210

OBJECTIVES :

1) MUSCULOSKELETAL ANATOMY

- i. The student be able to identify & describe Anatomical aspects of muscles, bones, joints, their attachments & to understand and analyse movements.
- ii. Application of knowledge of anatomy on the living (living anatomy)
- iii. To understand the Anatomical basis of various clinical conditions.

2) NEURO ANATOMY

- i. To identify & describe various parts of nervous system.
- ii. To describe blood supply of C. N. S. & spinal cord.
- iii. To identify and describe the course of cranial nerves.
- iv. To identify and describe the course of peripheral nerves.
- v. To understand anatomical basis of clinical conditions of nervous system.

3) CARDIOVASCULAR & RESPIRATORY ANATOMY

- i. To identify & describe various structures of the Cardiovascular & Respiratory system and the course of major blood vessels
- ii. Identify and describe various structures of Thoracic cage and mechanisms of Respiration
- iii. To understand anatomical basis of clinical conditions of cardiovascular & Respiratory system

4) To obtain Knowledge of OTHER SYSTEMS, SENSORY ORGANS & Radiology.

Cognitive –

- a. Able to understand the biochemical change of the various elements of the body at cellular level and extra cellular level
- b. Able to understand various biomolecules which are present in the body and functions
- c. Acquire the knowledge of the formation and fate of these biomolecules
- d. Able to understand their normal levels in body fluids required for functioning and their abnormal levels to understand the disease process
- e. Able to understand the metabolism process that occur in the body

Affective –

1. Students formed positive characteristics related to attitudes, interests, self-concepts, and values.
2. With the implementation of the curriculum in anatomy lectures through mini-research learning patterns have a positive impact on honesty, responsibility, cooperation, respect for others, and always want to do well.

Psychomotor –

- Describe biochemical change of the various elements of the body at cellular level and extra cellular level
- Describe various biomolecules which are present in the body and functions
- Describe their normal levels in body fluids required for functioning and their abnormal levels
- Describe the cycles and the processes that occur at the cellular level in the human body

SYLLABUS

GENERAL ANATOMY AND HISTOLOGY	Didactic Hours-17		Practical Hours-08		Total hours-25
a. General Anatomy	Topic	Hours-7	Topic	Hours-02	Total hours-09
	Skin & Fascia	1	Cadaveric Oath	02	
	Muscular System	1			
	Bones	1			
	Joints	2			
	Vascular System	1			
	Nervous System	1			
b. General Histology	Topic	Hours 7	Topic	Hours 06	Total hours-13
	Epithelial	1	Epithelial & connective Tissue	2	
	Connective Tissue	1	Muscular Tissue, Bone & Cartilage	2	
	Muscular Tissue	1	Vessels & Nerves	2	
	Bone	1			
	Cartilage	1			
	Vessels	1			
	Nerves	1			
c. Embryology	Topic	Hours 3	Topic	00	Total hours-03
	Cell Division	1			
	Oogenesis	1			
	Spermatogenesis	1			
MUSCULOSKELETAL SYSTEM	Didactic Hours-50		Practical Hours-40		Total hours-90
a. Superior extremity	Topic	14	Topic	10	Total hours-24
	Muscles of Pectoral Region	1	Clavicle & Scapula	2	
	Scapular Muscles	1	Humerus & Radius	2	
	Pectoral Girdle	1	Ulna & Articulated Hand	2	
	Axilla	1	Axilla & Arm	2	
	Muscles of Arm	1	Forearm & Hand	2	
	Shoulder Joint	1			
	Muscles of Forearm (Anterior)	1			
	Muscles of Forearm (Posterior)	1			
	Cubital Fossa	1			

	Elbow Joint	1			
	Muscles of Hand	1			
	Pronation & Supination	1			
	Carpal Tunnel	1			
	First Metacarpophalangeal joint	1			
b. Lower extremity	Topic	15	Topic	12	Total hours-27
	Muscles of Thigh (Anterior)	1	Hip Bone	2	
	Femoral Triangle	1	Femur & Patella	2	
	Muscles of Thigh (Medial)	1	Tibia, Fibula & Articulated Foot	2	
	Muscles of Gluteal Region	1	Thigh	2	
	Muscles of Thigh (Posterior)	1	Gluteal Region	2	
	Hip Joint	1	Leg & Foot	2	
	Muscles of Leg (Anterior)	1			
	Muscles of Leg (Lateral)	1			
	Muscles of Leg (Posterior)	1			
	Popliteal Fossa	1			
	Knee joint	1			
	Ankle joint	1			
	Muscles of Foot	1			
	Arches of foot	1			
	Inversion & Eversion	1			
	c. Back & Thoracic Cage	Topic	06	Topic	08
Superficial muscles of back		1	Cervical Vertebra	2	
Deep muscles of back		1	Thoracic Vertebra	2	
Sub-occipital triangle		1	Ribs & Sternum	2	
Trapezius & Latissimus Dorsi		1	Lumbar vertebrae & Sacrum	2	
Vertebral Column		1			
Bony Pelvis		1			
d. Head Neck & Face	Topic	11	Topic	10	Total hours-21
	Deep Cervical Fascia	1	Skull Frontalis & Lateralis	2	
	Triangles of Neck (Stemocleidomastoid)	1	Skull Occipitalis & Basalis	2	
	Facial Muscles	1	Skull Interior & Vault	2	
	Muscles of Mastication	1	Mandible & Hyoid Bone	2	
	Suprahyoid & Infrahyoid Muslces	1	Cut Section (Soft palate, Tongue, Pharynx & Larynx)	2	
	Temporomandibular Joint	1			
	Extraocular Muscles	1			
	Muscles of Soft Palate	1			
	Muscles of Tongue	1			
	Muscles of Pharynx	1			
	Muscles of Larynx	1			

e. Living Anatomy	Topic	04	Topic	00	Total hours-04
	Superior Extremity	1			
	Lower Extremity	1			
	Head, neck & Face	1			
	Trunk	1			
NEURO ANATOMY	Didactic Hours-37		Practical Hours-12		Total hours - 49
a. Peripheral Nerves	Topic	12	Topic	4	16
	Autonomic Nervous System	1	Nervous of Lower limb	2	
	Lumbosacral Plexus	1	Nervous of Upper Limb	2	
	Femoral Nerve	1			
	Obturator Nerve	1			
	Sciatic Nerve	1			
	Tibial Nerve	1			
	Common Peroneal Nerve	1			
	Brachial Plexus	1			
	Axillary & Musculocutaneous Nerve	1			
	Median Nerve	1			
	Radial Nerve	1			
	Ulnar Nerve	1			
b. Cranial nerves	Topic	10		-	Total hours-10
	Cranial Nerve Nuclei	1			
	Olfactory & Optic Nerve	1			
	Oculomotor Nerve	1			
	Trochlear & Abducent Nerve	1			
	Trigeminal Nerve	1			
	Facial Nerve	1			
	Vestibulocochlear nerve	1			
	Glossopharyngeal nerve	1			
	Vagus & Accessory Nerve	1			
	Hypoglossal nerve	1			
c. Central Nervous system	Topic	15	Topic	8	Total hours-23
	Meninges	1	Spinal Cord	2	
	Spinal Cord Gross	1	Brain Stem	2	
	Spinal Cord Descending Tracts	1	Cerebellum	2	
	Spinal Cord Ascending Tracts	1	Cerebrum	2	
	Brain stem Gross	1			
	Medulla	1			
	Pons	1			
	Mid-brain	1			
	Cerebellum	1			
	Cerebrum Functional areas	1			
	Cerebrum White Matter	1			
	Thalamus	1			
	Basal Ganglia	1			

	Hypothalamus	1			
	Ventricle& C.S.F	1			
SYSTEMIC ANATOMY	Didactic Hours-06		Practical Hours-06		Total hours-12
a. Alimentary system	Topic	2	Topic	2	4
	Gross Anatomy of Stomach	1	Stomach & Liver		
	Gross Anatomy of Liver				
b. Urinary System	Topic	2	Topic	2	4
	Gross Anatomy of Kidney		Kidney & Urinary Bladder		
	Gross Anatomy of Urinary Bladder				
c. Genital system	Topic	2	Topic	2	6
	Gross Anatomy of Testis		Uterus & Testis		
	Gross Anatomy of Uterus				
CARDIOVASCULAR & RESPIRATORY ANATOMY	Didactic Hours-10		Practical Hours-04		Total hours-14
a. Thoracic Cavity	Topic	2		-	2
	Thoracic cage & movements of respiration	1			
	Mediastinum	1			
b. Heart and major blood vessels	Topic	4		2	6
	Pericardium	1	Heart	2	
	Gross Anatomy of Heart	1			
	Coronary Circulation	1			
	Arch of Aorta	1			
c. Lungs	Topic	2		2	4
	Pleura	1	Lungs	2	
	Lungs	1			
a. Diaphragm & Intercostals	Topic	2		-	2
	Intercostal Space	1			
	Diaphragm	1			
ABDOMEN	Didactic Hours-04		Practical Hours-02		Total hours-06
Muscles of abdomen & Pelvis	Anterior Abdominal Wall	1	Anterior Abdominal wall		
	Inguinal Canal	1			
	Pelvic Diaphragm	1			
	Perineal Body	1			
SENSORY ORGANS	Didactic Hours-03		Practical Hours-01		Total hours-04
a. Ear	External ear & Tympanic membrane	1		-	
	Middle Ear	1		-	
b. Eye	Eyeball	1		-	
c. Skin	Skin	1		-	1
ENDOCRINE & EXOCRINE SYSTEM	Didactic Hours- 04		Practical Hours-00		Total hours-04
	Pituitary	1			
	Thyroid	1			
	Suprarenal	1			
	Pancreas	1			

RADIOLOGY	Didactic Hours-06		Practical Hours-00		Total hours-06
	Introduction to Radiology	1			
	Radiology of Superior Extremity	1			
	Radiology of Inferior Extremity	1			
	Radiology of Thorax	1			
	Radiology of Abdomen	1			
	Radiology of Head Neck Face	1			

RECOMMENDED TEXT BOOKS

1. Human Anatomy – Snell
2. Anatomy- Chaurasia, Volume- I,II & III
3. Neuro anatomy -- Inderbir Singh
4. Human Anatomy – Kadasne, Volume- I,II & III
5. Neuroanatomy -- Vishrsam Singh
6. Human Anatomy – Datta

RECOMMENDED REFERENCE BOOKS

1. Gray's Anatomy
2. Extremities -- Quining Wasb
3. Atlas of Histology -- Mariano De Fiore
4. Anatomy & Physiology -- Smout and McDowell
5. Kinesiology -- Katherine Wells
6. Neuroanatomy -- Snell
7. Neuroanatomy -- Vishrsam Singh
8. Cunnigham`s- PracticalAnatomy

SCHEME OF UNIVERSITY EXAMINATION

THEORY 80 MARKS + I.A. – 20 MARKS		Marks
* The question paper will give appropriate weight age to all the topics in the syllabus.		100
Section A-MCQs	Q-1 -MCQs – based on important area [1 x 20]	20
Section B- S.A.Q.	Q-2 - Answer any 6 out of 7 [6 x 5 = 30] a) b) c) d) e) f) g) This question should include: Digestive/ Uro-genital / Reproductive system / Special senses – Eye / Ear/ Skin / Circulatory system / General Anatomy/ General Histology (should be based on Musculoskeletal anatomy)	60
	Q-3- Answer any 6 out of 7 [6 x 5 = 30] a) b) c) d) e) f) g) Should be based on: Thorax / Soft parts Upper Limb / Soft part Lower Limb/ Soft parts Thorax / Spine / Neck. (Should be based on Neuro-Anatomy -including cranial nerves with emphasis to III to XII nerves)	
Total Marks		80

PRACTICAL		Marks
80 MARKS + I.A. – 20 MARKS [15 + 5]		100
Spots	Based on: I. Musculoskeletal (7x3) = 21marks II. Systemic (5x3) = 15 marks III. Neuroanatomy (3x3) = 09marks	45
Radiology		05
Living anatomy		05
Viva	i. Hard parts ii. Soft parts	20
Journal	Year work on practical's performed	05
Total Marks		80

INTERNAL ASSESSMENT:

- Two exams – Terminal and preliminary of 80 marks each (Theory & Practical)
TOTAL - 160 marks
- I.A. to be calculated out of 20 marks (Theory & Practical)
- Internal assessment as per University pattern

HUMAN PHYSIOLOGY

(Theory -150 hrs, Practical / Laboratory -50 hrs) **TOTAL 200 hrs**

COURSE DESCRIPTION:

The course is designed to study the function of the human body at the molecular, cellular, tissue and systems levels. The major underlying themes are; the mechanisms for promoting homeostasis, cellular processes of the metabolism, membrane function and cellular signaling; the mechanisms that match supply of nutrients to tissue demands at different activity levels; the mechanisms that match the rate of excretion of waste products to their rate of production; the mechanisms that defend the body against injury and promote healing.

These topics address the consideration of nervous and endocrine regulation of the cardiovascular, hematopoietic, pulmonary, renal, gastro-intestinal and musculoskeletal systems including the control of cellular metabolism. The course stresses on the integrative nature of physiological responses in normal function and disease.

This course will serve as a pre-requisite/foundation for the further courses i.e. Exercise physiology or Pathology.

Sr. No.	Topics	Didactic hrs	Practical hrs	Total hrs
1.	GENERAL PHYSIOLOGY	25	42	172
2.	NERVOUS SYSTEM	35		
3.	EXCRETORY SYSTEM	06		
4.	TEMPERATURE REGULATION	02		
5.	ENDOCRINE SYSTEM	06		
6.	REPRODUCTIVE SYSTEM	08		
7.	SPECIAL SENSES	05		
8.	RESPIRATORY SYSTEM	20		
9.	CARDIOVASCULAR SYSTEM	20		
10.	GASTRO INTESTINAL SYSTEM	03		
11.	EXERCISE PHYSIOLOGY	015	08	023
12.	PHYSIOLOGY OF AGEING	005	-	005
Total		150	50	200

OBJECTIVES:

At the end of the course, the candidate will:

1. Acquire the knowledge of the relative contribution of each organ system in maintenance of the Milieu Interior (Homeostasis)
2. Be able to describe physiological functions of various systems, with special reference to Musculo-skeletal, Neuro-motor, Cardio-respiratory, Endocrine, Uro-genital function, & alterations in function with aging.
3. Analyse physiological response & adaptation to environmental stresses-with special emphasis on physical activity, altitude, temperature
4. Acquire the skill of basic clinical examination, with special emphasis to Peripheral & Central Nervous system, Cardiovascular & Respiratory system, & Exercise tolerance / Ergography

Cognitive –

- a. The student will be able to define the various terms used acquire the knowledge of the relative contribution of each organ system in maintenance of the Homeostasis,be able to understand physiological functions of various systems, with special reference to Musculo-skeletal, Neuro-motor, Cardio-respiratory,
- b. Endocrine, Uro- genital function, & alterations in function with aging.
- c. Analyse physiological response & adaptation to environmental stresses-with special emphasis on physical activity, altitude, temperature.
- d. Acquire the skill of basic clinical examination, with special emphasis to Peripheral & CNS, Cardiovascular & respiratory system, & Exercise tolerance.

Affective –

Psychomotor –

The student will be able to demonstrate

- a. Describe the basic function of Cell, its morphology and composition of Blood.
- b. Describe various physiology of Respiratory system, Muscular system ,Cardio Vascular System , Nervous System , digestive system, Autonomic Nervous System,
- c. Able to describe the basic physiology of exercises and its effects on various system.

SYLLABUS

Sr. No.	Topics	Didactic Hrs
1	GENERAL PHYSIOLOGY	25
	a. Cell: i. Structure of cell membrane ii. Transport across cell membrane iii. Homeostasis	4
	b. Blood: i. Rh- ABO system & mismatch-transfusion ii. WBC iii. Plasma protein iv. Platelets v. Hemoglobin, Anemia, Immunity vi. Normal values of blood (composition & function) vii. Bleeding time & clotting time	7
	c. Nerve: i. Structure, classification & Properties ii. R.M.P & action potential iii. Propagation of nerve impulse iv. Nerve injuries –degeneration, regeneration and reaction of degeneration	6
	d. Muscle: i. Structure- properties- classification- smooth, skeletal, cardiac, excitation/ contraction coupling ii. Factors affecting development of muscle tension, fatigue, load. iii. Neuro-muscular transmission; applied physiology: Myasthenia gravis, Eaton Lambert Syndrome.	8
2	NERVOUS SYSTEM: a. Introduction of nervous system, classification –C.N.S., P.N.S. & A.N.S. b. Synapse-structure, properties, & transmission; c. Reflexes-classification & properties; d. Receptor physiology: classification, properties. e. Physiology of Touch, Pain, Temperature & Proprioception; f. Sensory and motor tracts: effect of transaction (complete and incomplete) at various levels g. Physiology of Muscle Tone (muscle spindle); Stretch reflex h. Connection & function of Basal ganglia, Thalamus, Hypothalamus, Sensory and Motor cortex, Cerebellum, Limbic system, Vestibular Apparatus i. Autonomic nervous system: Structure and functions of the sympathetic and the parasympathetic nervous system. j. Learning, memory & conditioned reflex k. Physiology of Voluntary movement	35

3	EXCRETORY SYSTEM:	6
	<ul style="list-style-type: none"> a. Kidneys-structure & function; b. Urine formation;(to exclude concentration and dilution) c. Juxtaglomerular apparatus d. Fluid and electrolyte balance – Na, K, H₂O e. Neural control of Micturition f. Applied physiology: Types of bladder 	
4	TEMPERATURE REGULATION	2
5	ENDOCRINE SYSTEM:	6
	<ul style="list-style-type: none"> a. Secretion- regulation & function of Pituitary-Thyroid-Adrenal-Parathyroid-Pancreas b. Applied physiology (abnormalities) of the above mentioned glands 	
6	REPRODUCTIVE SYSTEM:	8
	<ul style="list-style-type: none"> a. Physiology of ovary and testis b. Physiology of menstrual cycle and spermatogenesis c. Functions of progesterone, estrogen and testosterone d. Puberty & menopause e. Physiological changes during pregnancy 	
7	SPECIAL SENSES:	5
	<ul style="list-style-type: none"> a. Structure and function of the eye b. Applied physiology: errors of refraction, accommodation, reflexes – dark and light adaptation, photosensitivity. c. Structure and function of the ear d. Applied physiology- types of deafness 	
8	RESPIRATORY SYSTEM:	20
	<ul style="list-style-type: none"> a. Introduction, structure and function of the RS b. Mechanics of respiration; c. Pulmonary Volumes & capacities; d. Anatomical & Physiological Dead space-ventilation/perfusion ratio, alveolar ventilation e. Transport of respiratory gases f. Nervous & Chemical control of respiration g. Pulmonary Function Tests-Direct & indirect method of measurement h. Physiological changes with altitude & acclimatization 	
9	CARDIOVASCULAR SYSTEM:	20
	<ul style="list-style-type: none"> a. Structure & properties of cardiac muscle b. Cardiac impulse- initiation and conduction c. Cardiac cycle d. Heart rate regulation e. Blood pressure- definition-regulation- Cardiac output- regulation & function affecting; Peripheral resistance, venous return f. Regional circulation-coronary-muscular, cerebral g. Normal ECG. 	

10	GASTRO INTESTINAL SYSTEM:	3
	<ul style="list-style-type: none"> a. Absorption and digestion in brief b. Liver function 	
11	EXERCISE PHYSIOLOGY	15
	<ul style="list-style-type: none"> a. Basal Metabolic Rate and Respiratory Quotient b. Energy metabolism c. Fatigue d. Oxygen debt e. Acute cardio vascular changes during exercise, difference between mild, moderate and severe exercise, concept of endurance f. Acute respiratory changes during exercise g. Concept of training/conditioning, effects of chronic exercise/effect of training on the cardiovascular & respiratory system h. Body temperature regulation during exercise i. Hormonal and metabolic effects during exercise j. Effects of exercise on muscle strength, power, endurance k. Physical fitness and its components 	
12	PHYSIOLOGY OF AGEING (With respect to all systems)	05

PRACTICALS

Sr. No.	Topics	Practical Hours
1.	Hematology – (demonstration only)	6hrs
2.	GRAPHS:	5hrs
	a. Skeletal muscle and its properties	
	b. Cardiac muscle-properties-effect of Ach & Adrenaline	
3.	Blood pressure- effects of change in posture & exercise	4hrs
4.	Examination of pulse	2hrs
5.	Spirometry	4hrs
	a. Lung volumes and capacities	
	b. Timed vital capacity	
6.	Perimetry	1hr
7.	Physical fitness:	10 hrs
	a. Breath holding	
	b. Mercury column test;	
	c. Cardiac efficiency test- Harvard step test-Master Step test	
	d. Ergography	
	e. Guidelines for Covid - 19 pandemic	
8.	Clinical examination: History taking and general examination /Respiratory system / cardio vascular system /Higher functions /Cranial nerves /Reflexes / Motor & Sensory system	18 hrs
TOTAL		50 hrs

RECOMMENDED TEXT BOOKS

1. Text book on Medical Physiology – Guyton
2. Textbook of Physiology – A K Jain
3. Textbook of Physiology- G K Pal

RECOMMENDED REFERENCE BOOKS

1. Review of Medical Physiology – Ganong
2. Samson & Wright's Applied Physiology
3. Textbook of Medical Physiology – Bern and Levy

SCHEME OF UNIVERSITY EXAMINATION

THEORY		Marks
80 MARKS + I.A. – 20 MARKS		100
* The question paper will give appropriate weight age to all the topics in the syllabus.		
Section A-MCQs	Q-1 -MCQs – based on important area [1 x 20]	20
Section B- S.A.Q.	Q-2 - Answer any 6 out of 7 [6 x 5 = 30] a) b) c) d) e) f) g) Based on: Blood/G.I. tract / Electrolyte balance / Endocrine / Uro-genital System / General physiology /Special Senses (Eye/Ear/Skin)	60
	Q-3 - Answer any 6 out of 7 [6 x 5 = 30] a) b) c) d) e) f) g) Based on: Cardio-vascular system / Respiratory system / Exercise Physiology/ Nerve Based on: C.N.S./ Spinal Cord/ Electro-Neuro- Physiology /C.V.S. /R.S.	
Total Marks		80

PRACTICAL 80 MARKS + I.A. – 20 MARKS [15 + 5]		Marks
		100
Spots	Based on: Topic 1,2,3,6,7,8,9,11&12 (10 X 2 Marks)	20
Viva	Based on theory	20
Demonstration	On Clinical Physiology C.V.S. 10 Marks R.S. 10 Marks C.N.S. Cranial Nerves and Special Senses 15 Marks	35
Journal	Year work on practicals performed	05
Total Marks		80

INTERNAL ASSESSMENT:

1. Two exams – Terminal and preliminary of 80 marks each (Theory & Practical)
TOTAL - 160 marks
2. I.A. to be calculated out of 20 marks (Theory & Practical)
3. Internal assessment as per University pattern.

BIOCHEMISTRY

(Didactic 46hrs+Demonstrations 4hrs) **TOTAL 50 HRS**

COURSE DESCRIPTION:

This course provides the knowledge and skills in fundamental organic chemistry and introductory biochemistry that are essential for further studies. It covers basic biochemical, cellular, biological and microbiological processes, basic chemical reactions in the prokaryotic and eukaryotic cells, the structure of biological molecules, introduction to the nutrients i.e. carbohydrates, fats, enzymes, nucleic acids and amino acids.

Sr. No.	Topics	Didactic Hours	Total Hours
1	CARBOHYDRATES	10	10
2	PROTEINS	06	06
3	ENZYMES	05	05
4	VITAMINS	05	05
5	MINERALS	05	05
6	NUTRITION	04	04
7	CLINICAL BIOCHEMISTRY	07	07
8	LIPID	04	04
9	MUSCLE CONTRACTION	04	04
10	TOTAL	50	50

OBJECTIVES:

The student would know:

1. Various biomolecules which are present in the body and functions
2. The formation and fate of biomolecules
3. Their normal levels in body fluids required for functioning and their abnormal levels to understand the disease process.

Cognitive –

- a. Able to understand the biochemical change of the various elements of the body at cellular level and extra cellular level
- b. Able to understand various biomolecules which are present in the body and functions
Acquire the knowledge of the formation and fate of these biomolecules
- c. Able to understand their normal levels in body fluids required for functioning and their abnormal levels to understand the disease process
- d. Able to understand the metabolism process that occur in the body

Affective –

Psychomotor –

- Describe biochemical change of the various elements of the body at cellular level and extra cellular level
- Describe various biomolecules which are present in the body and functions
- Describe their normal levels in body fluids required for functioning and their abnormal levels
- Describe the cycles and the processes that occur at the cellular level in the human body

SYLLABUS

Sr. No.	Topics	Total Hours
1	CARBOHYDRATES	10
	a. Chemistry, Definition, Classification with examples, Functions	
	b. Digestion and Absorption, Glycogenesis, Gluconeogenesis, Glycogenolysis and HMP pathway, Glycolysis, Electron transport chain for ATP synthesis, TCA cycle. Hormonal regulation of blood	
	c. Glucose, Glycogen storage disorders, Diabetes mellitus, Glycosuria, changes in Carbohydrate, Protein & Lipid metabolism.	
	d. All the metabolisms should be taught based on the following points such as starting and ending products, tissues of occurrence and the conditions when the pathway is activated, deactivated and significance of the pathway.	
2	PROTEINS	06
	a. Definition, Importance, Functional Classification, Digestion & Absorption, decarboxylation, deamination, transamination, transmethylation, Urea cycle, clinical significance of serum urea, function of glycine, Phenylalanine, tryptophan, methionine tyrosine.	
	b. There should be an emphasis on understanding the structure of protein, the essential and non-essential amino acids.	
3	ENZYMES	05
	Definition, Modern Classification, Factors affecting enzymes Action, diagnostic & therapeutics uses & enzymes, Isoenzymes, Competitive & Noncompetitive inhibition, Glycolysis.	
4	VITAMINS	05
	Definition, Classification, Fat & water soluble vitamins, functions, Deficiency manifestations sources & RDA	
5	MINERALS	5
	Ca, P, Fe, I, Zinc, Selenium, Fluorine, Magnesium include Na and K. Function sources, Deficiency manifestations	
6	NUTRITION	4
	Composition of food, balanced diet, Kwashiorkor, Marasmus, Nitrogen balance, major Dietary constituent &	

	their importance. Include energy requirements, factors affecting B.M.R., S.D.A. (Specific Dynamic Action) and R.Q. (Respiratory Quotient)	
7	CLINICAL BIOCHEMISTRY	7
	a. Liver Function Test, Renal Function Test, Lipid profile in serum b. Starvation metabolism, Hemoglobin chemistry and metabolism c. Demonstrations: Demonstration of estimation of various biomolecules and their interpretation Interpret reports of various conditions (including Diabetic profile, Cardiac profile, Uric acid and Gout)	
8	LIPID	4
	Definition, classification with examples biomedical importance, Phospholipids & lipoproteins functions. Digestion & absorption of lipid, β oxidation of fatty acid with Energetics, Ketone bodies and their metabolism, Prostaglandins and essential fatty acids, Cholesterol, importance of cholesterol, obesity	
9	MUSCLE CONTRACTION	4
	Mechanism & Biochemical events Connective Tissue- Biochemistry of connective tissue Collagen-Glyco-protein proteoglycans	
	TOTAL	50

RECOMMENDED TEXT BOOKS

1. Biochemistry – Dr. Pankaja Naik
2. Text book of Biochemistry for Medical students – Dr. Vasudevan / ShriKumar
3. Biochemistry – Dr. Satyanarayan

RECOMMENDED REFERENCE BOOK

1. Review of Biochemistry (24th edition) – Harpar

SCHEME OF UNIVERSITY EXAMINATION

THEORY ONLY 40 marks + I.A. – 10 Marks [7 + 3] [There shall be no LAQ in this paper] * The question paper will give appropriate weight age to all the topics in the syllabus.		Marks
		50
Section –A Q-1	MCQs – based on important area ½ marks x 20 MCQ= 10 marks	10
Section-B Q-2	SAQ-to Answer any 6 out of 7 [6 x 5 = 30] a) b) c) d) e) f) g)	30
Total Marks		40

INTERNAL ASSESEMENT

1. Two exams – Terminal and preliminary of 40 marks each TOTAL - 80 marks
2. I.A. to be calculated out of 10 marks (Theory only)
3. Internal assessment as per University pattern.

FUNDAMENTALS OF KINESIOLOGY & KINESIOTHERAPY

(Didactic – 100 Hrs & Practical / Laboratory – 150 Hrs) **TOTAL 250 HRS**

COURSE DESCRIPTION:

This course covers the definition of various terms used in mechanics, biomechanics kinesiology as well as its importance in physical therapy. It applies the mechanical principles to simple equipments of therapeutic gymnasium and familiarizes the candidate to its use. It covers the types of human motions as well as planes and relative axes of motion. It also explains the inter-relationship among kinematic variables and utilizes this knowledge to describe and analyse motion. It covers the classification of the joints and muscles along their distinguishing characteristics and skill of measurement of its ranges in various planes and axes. This course additionally covers therapeutic principles and skills of application of massage, yoga, aerobic exercise and use of suspension therapy. It also enhances the skill of evaluation of vital parameters & sensory system.

Sr. No.	Topics	Didactic Hours	Practical/ Laboratory Hours	Total Hours
1	MECHANICS & BASIC BIOMECHANICS	25	---	25
2	BIO-PHYSICS RELATED TO KINESIOTHERAPY	15	30	45
3	CLASSIFICATION OF MOVEMENTS	10	15	25
4	BASIC EVALUATION	15	35	50
5	MASSAGE	05	20	25
6	RELAXATION	05	10	15
7	AEROBIC EXERCISE	05	05	10
8	YOGA	15	40	55
TOTAL		95	155	250

OBJECTIVE:

Cognitive:

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

- a) Define the various terms used in relation to Mechanics, Biomechanics & Kinesiology
- b) Recall the basic principles of Biophysics related to mechanics of movement / motion & understand the application of these principles to the simple equipment designs along with their efficacy in Therapeutic Gymnasium & various starting positions used in therapeutics.

Affective: The student will be able to

- a. To maintain proper communication with the model/subjects for correct delivery of instructions during demonstration.
- b. To follow the appropriate principle of the handling technique e.g. stabilization, fixation, hand placement
- c. To perform safer respectful and effective handling during demonstration.

Psychomotor:

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

- a. Describe & also acquire the skills of use of various tools of the Therapeutic Gymnasium
- b. Demonstrate the movements in terms of various anatomical planes and axes.
- c. Demonstrate various starting & derived positions used in therapeutics.
- d. Describe physiological principles & acquire the skills of application of therapeutic massage
- e. Acquire the skills of assessment of basic evaluation like sensations, reflexes & vital parameters
- f. Acquire the skill of objective assessment of Range of Motion of the joints by Goniometry
- g. Describe physiological basis and principle of relaxation and acquire the skills of relaxation methods
- h. Describe physiological responses and principles of aerobic exercises for general fitness & demonstrate fitness skills on self & group.
- i. Describe physiological principles and acquire the skill of performing Pranayama & Yogasanas

SYLLABUS

Sr. No.	Topic	Didactic Hours	Practical/ Laboratory Hours	Total Hours
1.	MECHANICS & BASIC BIOMECHANICS	25	--	25
	a. Mechanics & Application to human body <ul style="list-style-type: none"> i. Definition and terminologies: Mechanics (Statics & Dynamics), Biomechanics, Kinetics, Kinematics (Osteokinematics, Arthrokinematics, Open Chain & Closed Chain kinematics) ii. Axes / planes, iii. Laws of inertia & motion, iv. Gravity, C.O.G., L.O.G. and B.O.S. v. Equilibrium – Types and affecting factors vi. Mechanics of Forces Work, Energy, Power, Friction, Momentum, Parallelogram of Forces vii. Torque viii. Pendulum ix. Mechanical and Anatomical pulleys x. Levers xi. Fluid mechanics related to Hydrotherapy (physics, statics & dynamics) 	20		20
	b. Muscle Mechanics <ul style="list-style-type: none"> i. Types of Muscles- Anatomical & Physiological ii. Types of muscle work / Contraction iii. Muscle Action: Roles as Agonist, Antagonist, Fixators, Synergist iv. Active & Passive insufficiency v. Range of muscle work ,Angle of pull – with importance to efficiency of muscle work and stability of joint 	5	--	5
2	BIO-PHYSICS RELATED TO KINESIOTHERAPY	20	25	45
	a. Starting Positions & Derived Positions <ul style="list-style-type: none"> i. Application of stability ii. BOS, Gravity and muscle work in relation to various positions 	05	10	15
	b. Therapeutic Gymnasium <ul style="list-style-type: none"> i. Use of accessories such as Pulleys Springs, Shoulder wheel, Walking aids, ii. Finger ladder, Therapeutic balls, Weights, Resistance bands, tubes, & wands iii. Applied mechanics of all above accessories 	5	5	10
	c. Suspension Therapy <ul style="list-style-type: none"> i. Principles ii. Suspension Apparatus iii. Types of Suspension iv. Effects and uses v. Techniques for individual joints 	5	15	20

3	CLASSIFICATION OF MOVEMENTS	10	15	25
	<ul style="list-style-type: none"> a. Definition and classification b. Principles of movements c. Effects, uses and Techniques (active: assisted, free, assisted-resisted, resisted & passive) 			
4	BASIC EVALUATION	15	35	50
	<ul style="list-style-type: none"> a. Assessment of Vital Parameters <ul style="list-style-type: none"> i. Temperature ii. Blood Pressure iii. Heart Rate/ Pulse rate iv. Respiratory Rate v. Chest expansion 	5	5	10
	b. Assessment of Sensations and Reflex testing	5	5	10
	<ul style="list-style-type: none"> c. Goniometry <ul style="list-style-type: none"> i. Definition and Types of Goniometers ii. Principles iii. Techniques for individual joints with biomechanical principles iv. Uses 	5	25	30
5	MASSAGE	05	20	25
	<ul style="list-style-type: none"> a. Definition b. Classification c. Principles d. Effects & uses e. Indications and contra indications f. Techniques- Upper limb, Lower Limb, Neck, Back, Abdomen, Face & Scalp 			
6	RELAXATION	05	10	15
	<ul style="list-style-type: none"> a. Principles, b. Techniques along with their effects & uses <ul style="list-style-type: none"> i. General - Jacobson's, Shavasana & Reciprocal (Laura Mitchell) ii. Local - Heat, Massage, Gentle/Rhythmic passive movements 			
7	AEROBIC CONDITIONING AND BASIC PRINCIPLES OF GENERAL FITNESS (as applied to self and group)	5	5	10
	<ul style="list-style-type: none"> a. Physiology of aerobic and anaerobic exercise. b. Components of fitness (definition of terms only) c. Warm up d. Cool down exercises e. Group & Recreational activities 			

8	YOGA	15	40	55
	<ul style="list-style-type: none"> a. Definition b. Principles of Yoga c. Yogasana- Technique, Benefits, Contraindications & cautions for each Asanas: <ul style="list-style-type: none"> i. Asanas in supine <ul style="list-style-type: none"> a) Pawanamuktasana b) Ardha Halasana c) Halasana d) Setubandhasana e) Naukasana f) Matsyasana g) Shavasana h) Sarvangasana ii. Asanas in prone <ul style="list-style-type: none"> a) Bhujangasana b) Ardha-Shalabhasana c) Dhanurasana d) Makarasana iii. Asanas in sitting <ul style="list-style-type: none"> a) Padmasana, Siddhasana, Sukhasana b) Yogamudrasana c) Virasana d) Vajrasana e) Gomukhasana f) Pashchimottanasana iv. Asanas in standing <ul style="list-style-type: none"> a) Padhastasana, Padangusthasana, Uttanasana b) Utkatasana c) Tadasana d) Trikonasana v. Pranayama <ul style="list-style-type: none"> a) Anulom-vilom b) Kapalbhati 			

PRACTICAL: Practical demonstrations of:

Sr. No.	Topics
1	Various starting and derived positions
2	The techniques of active, passive, assisted and resisted movements
3	The techniques of various accessories and equipments used in therapeutic gymnasium its biomechanical principles and uses.
4	The techniques of use of suspension method for assisted and resisted movements
5	Relaxation procedures
6	Massage techniques
7	Yogasanas and Pranayama
8	Aerobic exercise for self and others
9	Assessment of vital parameters in different body position (supine, sitting and standing) and of sensory system and reflexes.
10	Measurement of joint R.O.M. through goniometry, method of fixation and measurement.

RECOMMENDED TEXT BOOKS

1. Principles of Exercise Therapy – Dena Gardiner
2. Massage, Manipulation & Traction – Sydney Litch
3. Therapeutic Exercise – Sydney Litch
4. Massage – M. Hollis
5. Practical Exercise therapy– Margaret Hollis
6. Hydrotherapy – Kisner, Hollis
7. Measurement of Joint Motion – Cynthia Norkins.
8. Biomechanics – Cynthia Norkins
9. Clinical Kinesiology-Brunnstrom
10. Yogic Exercises-Physiologic and Psychic processes-- S. Datta Ray

RECOMMENDED REFERENCE BOOKS

1. Therapeutic Exercise – Carolyn Kisner
2. Asanas-Why & How – Omprakash Tiwari

SCHEME OF UNIVERSITY EXAMINATION

THEORY 80 MARKS + I.A. – 20 MARKS [15 + 5] * The question paper will give appropriate weightage to all the topics in the syllabus.		Marks
Section A - M.C.Qs.		100
	Q-1 -MCQs – based on important area [1 x 20]	20
Section B - S.A.Q.	Q-2 - Answer any 6 out of 7 [6 x 5 = 30] a) b) c) d) e) f) g)	60
	Q-3 - Answer any 6 out of 7 [6 x 5 = 30] a) b) c) d) e) f) g)	
Total Marks		80

PRACTICAL 80 MARKS + I.A. – 20 MARKS [15 + 5]		Marks
		100
LONG CASE	Based on Massage / Goniometry / Movements (passive) <ul style="list-style-type: none"> Cognitive – Bio-physics, Biomechanical principles, indications, contraindication <i>Documentation of findings etc</i> - 20 Marks <i>Psychomotor + Affective skills</i> - 15 Marks 	35
SHORT CASE	Two Short case based on <ul style="list-style-type: none"> Basic evaluation (any one): Sensation / Reflex testing / B.P./ & Pulse Rate/ Chest Expansion / Respiratory Rate /Aerobic fitness for self Skill performance (any one): Relaxation / Yoga posture / Starting / Derived position & Suspension Therapy (2 x 20 = 40 marks) <i>Cognitive – 05 Marks</i> <i>Psychomotor -15 Markss</i> 	40
JOURNAL	Year work on practical's performed.	5
Total Marks		80

INTERNAL ASSESSMENT:

- Two exams – Terminal and preliminary examination (Theory & Practical) of 80 marks each
TOTAL - 160 marks
- Internal Assessment to be calculated out of 20marks.
- Internal assessment as per University pattern.

FUNDAMENTALS OF ELECTROTHERAPY

Didactic 95 hrs+ Practical 105hrs [TOTAL-200HRS]

COURSE DESCRIPTION:

This course will cover the basic principles of Physics that are applicable in medical equipments used in Physiotherapy. It will also help to understand the fundamentals of currents, sound waves, Heat & its effects, electro medical radiations and their effects as well as their application in physical therapy. It covers the skill of application of superficial thermal agents and Cryotherapy.

Sr. No.	Topic	Didactic Hours	Practical/ Lab Hours	Total hours
1	MEDICAL ELECTRONICS AND ELECTRICITY :	55	15	70
	a) Fundamentals of Low frequency currents	32	09	41
	b) Fundamentals of High frequency currents	13	06	19
	c) Electro Magnetic Spectrum	5	-	5
	d) Cellular Bio-physics	3	-	3
	e) Environmental currents	2	-	2
2	ELECTRICAL MODALITIES	25	40	065
3	SUPERFICIAL THERMAL AGENTS	15	50	065
TOTAL		95	105	200

OBJECTIVES:

Cognitive:

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

- Recall the physics principles & Laws of Electricity, Electromagnetic spectrum, & ultra sound
- Describe effects of environmental & man made electromagnetic field at the cellular level & risk factors on prolonged exposure.
- Describe the Main electrical supply, Electric shock, precautions
- Enumerate Types & Production of various Therapeutic electrical currents & describe the panel diagrams of the machines

Affective:

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

- To maintain proper communication between with the models/ subjects for correct delivery of instruction during demonstration.
- To follow the appropriate method of testing of electrotherapeutic equipment's.
- To perform safe, respectful and effective handling during demonstration.
- Ability to learn about safety measures while testing of various electrotherapy equipment's.

Psychomotor:

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

- a) Test the working of the various electrotherapeutic equipments
- b) Describe in brief, certain common electrical components such as transistors, valves, capacitors, transformers etc & the simple instruments used to test / calibrate these components [such as potentiometer, oscilloscope , multimeter] of the circuit & will be able to identify such components.
- c) Describe & identify various types of electrodes used in therapeutics, describe electrical skin resistance & significance of various media used to reduce skin resistance.
- d) Acquire knowledge of various superficial thermal agents such as Paraffin wax bath, Cryotherapy, Hydrocollator packs, Home remedies, their physiological & therapeutic effects, Merits / demerits & acquire the skill of application.

SYLLABUS

Sr. No.	Topic	Didactic Hours	Practical /Lab Hrs	Total Hours
1.	MEDICAL ELECTRONICS AND ELECTRICITY	55	15	70
	a. Fundamentals of Low frequency currents	32	09	41
	i. Basic Physics: Structure of atom, Isotopes, States of matter; Compound formation-(covalent formation), Properties of Electric lines of forces, Conductors, Non-conductors, Latent heat, Transmission of heat	3	-	3
	ii. Condenser a) Principles b) Capacity c) Types & construction d) Electric field e) Charging and discharging of the condenser f) Duration of Discharge g) Discharge through inductance h) Capacitive reactance & uses of condenser	3	-	3
	iii. Main supply: a) Production of Electricity b) Types: A.C./ D.C. c) Distribution/ Grid system wiring of the house, colour coding of electrical supply to the apparatus d) Earthing and its importance e) Types of Plugs & Switches	3	3	6

	iv. Shock a) Definition b) Types (Electric Shock & Earth shock) c) Severity Causes, Effects & Precaution	2	-	2
	v. Static Electricity: a) Theory of Electricity b) Production of Electric Charge c) Characteristics of charged electrical body and capacitor and inductance: types & uses d) Potential difference vi. Current electricity a) EMF b) Resistance: Combination of resistance in series and parallel c) Ohms Law d) D.C., A.C.	3	-	3
	e) Devices for regulating current: Identification, functioning & Uses- Rheostat, Potentiometer, Ammeters, Oscilloscopes, Voltmeter f) Voltage and Power g) Thermal effects of electric current- Joule's Law.	6	6	12
	vii. Electrical Skin Resistance: a) Skin Resistance b) Factors affecting Skin resistance: types of electrodes used, electrode gels, skin threshold, skin type, skin temperature, exercises c) Methods to reduce skin resistance	2	-	2
	viii. Faradic currents: Duration, frequency, wave forms & graphical representation, surging, faradic type current, pulse width modulation,	5	-	5
	ix. Galvanic currents/ Direct current:and interrupted galvanic current, duration, frequency, waveforms & graphical representation	5	-	5
	b. Fundamentals of High frequency currents	13	06	19
	i. Electro Magnetic Induction: a) Production b) Direction of induced EMF c) Strength of induced EMF d) Type – Self & Mutual induction e) Inductive Reactance f) Eddy currents	3	-	3
	g. Principles and Laws – Faraday's , Lenz's h. Dynamo			

ii. Apparatus for Modification of Currents: a) Interruption of current – Switch & Valve b) C- R timing circuit c) Multi vibrator Circuit, Pulse Generator d) Current supplied to patient – Impulse type	2	-	2
iii. Magnetism: a) Nature and Types b) Molecular theory of Magnetism c) Property of Magnet d) Magnetic effect of electric current – Electro Magnets e) Meters for measuring A.C. iv. Sound: a) Wave motion in sound b) Infrasonic c) Normal hearing band d) Characteristics of sound waves and their velocities	2	-	2
v. Sound: a. Wave motion in sound b. Infrasonic c. Normal hearing band d. Characteristics of sound waves and their velocities e. Ultrasonic f. Reflection, Refraction and Attenuation of Sound waves g. Interference of sound waves	2	-	2
v. D.C. and A.C.: a) Source – Cell and rectified AC b) Rectification of AC c) Thermionic valves – Diode and Triode d) Metal Rectifier e) Types of Rectification f) Transformers-Types & Functions g) Smoothing circuit h) Semiconductor and its types i) Diodes & Transistors j) Choke coil	4	6	10
c. Electro Magnetic Spectrum	5	-	5
i. Laws of transmission Reflection – Refraction – ii. Absorption – Attenuation iii. Electro Magnetic Radiation iv. Laws Governing E.M.R. v. Laws of Reflection, Refraction, Absorption, Attenuation, Cosine Law, Inverse Square Law, Grothus's Law			

	d. Cellular Bio-physics	3	-	3
	i. Action potential, ii. Resting membrane potential iii. Transmission of impulses: Saltatory conduction iv. Reception & emission of E.M.F. signals			
	e. Environmental currents	2	-	2
	Environmental currents & fields risk factors on prolonged exposure to E.M. field.			
2	ELECTRICAL MODALITIES Production, Physical principles, Panel diagrams, Testing of apparatus of the following:	25	40	065
	a. S.W.D. b. Ultrasound c. U.V.R. d. I.F.T. e. I.R. f. LASER (no panel diagram) g. Diagnostic Electrical Muscle Stimulator, h. T.E.N.S.			
3	SUPERFICIAL THERMAL AGENTS	15	50	65
	Construction/Design of the Modalities, Scales of temperature, Specific heat & modes of energy transfer, Physiological effects, Therapeutic effects/ Uses, Merits/demerits, Indications/contra-indications, Skills of application: a. Home remedies b. Paraffin wax bath c. whirl pool d. contrast bath e. Hydro-collator hot packs f. Cryotherapy			

PRACTICAL

Practical demonstrations of:

Sr. No.	Topic
1.	Various ELECTRICAL COMPONENTS like Diodes & Triodes, Rheostat, Capacitor, Potentiometer, Switches, Plugs and Pulse generator
2	The technique of testing of mains supply
3	The techniques of testing the following ALONG WITH PANEL DIAGRAM:
	i. Low Frequency currents- Diagnostic Muscle stimulator, Transcutaneous Nerve Stimulation
	ii. Medium Frequency currents-I.F.T.
	iii. High Frequency currents- Short Wave Diathermy, Ultrasound
	iv. I.R. (no panel diagram)
	v. U.V.R. (no panel diagram)
4	The skill of application of THERMAL AGENTS (on models) :
	i. Hot packs
	ii. P.W.B.
	iii. Whirlpool
	iv. Contrast bath
	v. Cryotherapy

RECOMMENDED TEXT BOOKS

1. Claytons Electro therapy – 3rd & 10th edition
2. Electro therapy explained – Low & Reed
3. Electro Therapy – Kahn
4. Electrotherapy Evidence Based Practice-Sheila Kitchen 11th edition
5. Electrotherapy – by Subhash Khatri

RECOMMENDED REFERENCE BOOK

1. Clinical Electrotherapy -- Nelson & Currier
2. Electrotherapy – by Jagmohan.

SCHEME OF UNIVERSITY EXAMINATION

THEORY		Marks
80 MARKS + I.A. – 20 MARKS		
* The question paper will give appropriate weight age to all the topics in the syllabus.		100
Section A –M.C.Qs.	Q-1 MCQs – based on important area [1 x 20]	20
Section B- S.A.Q.	Q-2 - Answer any 6 out of 7 [6 x 5 = 30] a) b) c) d) e) f) g) Q-3 - Answer any 6 out of 7 [6 x 5 = 30] a) b) c) d) e) f) g)	60
Total Marks		80

PRACTICAL		Marks
80 MARKS + I.A. – 20 MARKS [15 + 5]		100
LONG CASE	Based on Superficial thermal agent: <ul style="list-style-type: none"> • <i>Cognitive – Medical Electronic, Physiological, Biophysical principles, Therapeutic effects, indications-contraindications - 20 Marks</i> • <i>Psychomotor + Affective skills - 15 Marks</i> 	35
SHORT CASE	Two Short case on Testing of equipments: 1. Low & Medium frequency 2. High frequency/Actinotherapy (2 x 20=40 marks) <ul style="list-style-type: none"> • <i>Cognitive – 05 Marks</i> • <i>Psychomotor -15 Marks</i> 	40
JOURNAL	Year work on practical's performed.	5
Total Marks		80

INTERNAL ASSESSMENT:

1. Two exams – Terminal and preliminary examination of 80 marks each (Theory & Practical)
TOTAL - 160 marks
2. Internal Assessment to be calculated out of 20marks.
3. Internal assessment as per University pattern.

SCHEME OF UNIVERSITY EXAMINATIONS AT A GLANCE | B.P.Th.

Subjects	Theory			Practical		
	University	I.A.	Total	University	I.A.	Total
Anatomy	80	20	100	80	20	100
Physiology	80	20	100	80	20	100
Biochemistry	40	10	50	-	-	-
Fundamentals of Kinesiology & Kinesiotherapy	80	20	100	80	20	100
Fundamentals of Electrotherapy	80	20	100	80	20	100
Total	360	90	450	320	80	400

Standard of Passing

B.P.Th

1. Minimum pass marks shall be 50 % in each of the theory and practical papers separately
2. A Candidate must have minimum of 80 % attendance (irrespective of the kind of absence) in theory and practical in each subject for appearing for examination
3. A Candidate must have 80 % Attendance in each of the practical areas before award of degree,
4. A Candidate has to pass in theory and practical exam separately in each of the paper
5. If candidate fails in either theory and practical paper he/she has to re-appear for both the papers (Theory and practical)
6. The candidate if fails in two subject he/she can be permitted for admission to next year
7. The candidate shall have be clear all the previous examination before appearing for final year examination
8. No institution shall be submit average internal marks of the test students more than 75% i.e. if 40 students are admitted in a course the average score of the 40 students shall not exceed 75% of total internal marks (Example of 5 students : A=25, B=20, C= 22, D=21, E=24 average score =89.6%
9. The maximum period to complete the course successfully should not exceed 8 years
10. Maximum number of candidates for practical examination should not exceed 20 per day
11. Should secure at least 35% of total marks assigned for internal assessment in particular subject in order to be eligible to appear in the University examination of that subject.
12. Who fails in any other subject/subjects of first year BPTTh, has to put one academic term before he/she becomes eligible to appear for the next examination.
13. Should secure at least 35% of total marks in college exam in subject for which University exam not recommended.
14. 1st Year B.P.Th subjects need to be cleared before writing into 3rd year B.P.Th. 2nd year B.P.Th subject need to cleared before writing into 4th year B.P.Th.
15. Grace marks will be given in only one subject student securing 39 marks in any one of the subject will be eligible for grace marks
16. Declaration of class will be as per University norms.
17. A candidate who has failed in their respective year university examination can carry over a maximum of two subjects to their next year, but will have to pass the subjects in the subsidiary examination before writing the examination of the next academic year.
18. A candidate who failed in 3 subject and more will not be allowed to keep the term.
19. Internship: There shall be six months of rotatory structured Internship after the final examination for candidate declared to have passed the examination in all the subjects. Internship should be done in a teaching hospital recognized by the university. No candidate shall be awarded degree certificate without successfully completing six months.

20. Internship. The internship should be rotatory and cover all clinical branches concerned with Physiotherapy. End of the posting oral evaluation will be done.
21. Project work: Interns has to take up a project work in the internship period. The project work shall be termed as Short Project. The protocol approval shall be obtained in the 1st month of Internship; data shall be collected in the next 3 months after the approval of the protocol and project shall be submitted at the mid of 6th month. Submission of article to the
22. journal shall be completed by end of 6th month. The written text of the project shall be of minimum 50 pages excluding references, tables, questionnaires and other annexure. It should be neatly typed in double line spacing on one side of paper (A4 size, 8.27" x 11.69")
23. times new Roman, 12 font and bound properly. Spiral binding should be avoided. The intern shall provide plagiarism declaration in his/her project. The guide, head of the institution shall certify the written text of the project. Three copies of project work thus
24. prepared shall be submitted to the head of the institution. The completion certificate of internship will be issued only after completing the research project.



**D. Y. Patil Education Society
(Deemed to be University), Kolhapur**

Re-accredited by NAAC with 'A' Grade