



University of Engineering & Management, Jaipur
Syllabus to be implemented from the Academic Year 2015-16
Bachelor in Physiotherapy

First Year		
S.no.	Subject Name	Subject Code
1	Anatomy (Theory)	ANA101
2	Anatomy (Practical)	ANA191
3	Physiology (Theory)	PHY101
4	Physiology (Practical)	PHY191
5	Biochemistry	BCH101
6	Exercise Therapy - I (Theory)	EXT101
7	Exercise Therapy - I (Practical)	EXT191
8	Electrotherapy - I (Theory)	ELT101
9	Electrotherapy - I (Practical)	ELT191
Second Year		
1	Pathology & Microbiology	PAM201
2	Pharmacology	PHA201
3	Exercise Therapy - II (Theory)	EXT201
4	Exercise Therapy - II (Practical)	EXT291
5	Electrotherapy - II (Theory)	ELT201
6	Electrotherapy - II (Practical)	ELT291
7	Community Medicine	COM201
8	Biomechanics & kinesiology	BIK201



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First Year_ Bachelor in Physiotherapy

Sr. No.	Subject	Teaching Hours			Exam
		Theory	Practical	Total	Marks
1	Anatomy	150	50	200	200
2	Physiology	150	50	200	200
3	Biochemistry	50	-	50	50
4	Exercise Therapy-I	100	100	200	200
5	Electro Therapy-I	100	100	200	200
6	Orientation to Physiotherapy		20	20	NUE
TOTAL				870	850

Second Year_ Bachelor in Physiotherapy

Sr. No.	Subject	Teaching Hours			Exam
		Theory	Practical	Total	Marks
1	Pathology & Microbiology	100 (50 Hrs. each)	-	100	100 (Section A- 50% Marks & Section B- 50%)
2	Pharmacology	100	-	100	100
3	Exercise Therapy-II	100	100	200	200
4	Electro Therapy-II	100	100	200	200
6	Community Medicine	100	-	100	100
5	Biomechanics & Kinesiology	100	50	150	100
6	Physiotherapy Clinical Training	-	450	400	NUE
TOTAL				1250	800

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Subject Name – ANATOMY

Subject Code – ANA101

Course Objectives:

The objectives of this course will be to emphasize on Identification and application of the fundamental concepts and methods of a life or physical science. To explore natural phenomena, observation & experimentation. To understand, identify, and describe the basic anatomical structures associated with cells and tissue, and muscular, skeletal and nervous systems. It helps to Develop basic dissection in the field of anatomy.

Course Outcome:

After taking this course a student will:

1. Identify and apply the fundamental concepts and methods of a life or physical science.
2. Apply the scientific method to explore natural phenomena, observe & experiment.
3. Understand, identify, and describe the basic anatomical structures associated with the circulatory / cardiovascular, respiratory, urinary, endocrine, reproductive, digestive, lymphatic and integumentary systems.
4. Develop basic dissection and laboratory techniques relevant to the field of anatomy.

Unit I

No. of lectures – 20L

General Anatomy:

Cell : (Parts, Name of Cytoplasm organelles and inclusion with their Functions)

Epithelium : Types with examples and light microscopic structure.

Connective Tissue : Classification with emphasis to tendon

Cartilage : Types with example

Bone : Types with example, types of Ossification (Stage of Ossification not required)

Joints : Classification with example, emphasis to synovial joint.

Muscles : Types (details of EM picture not required)

Nervous tissue : Structure of a Neuron, Synapse Reflex arc, Degeneration and Regeneration of the Nerve.

Embryology : a) Ovum, Spermatozoa, fertilization and formation of germ layers and their derivations

b) Development of skin, fascia, blood vessels, lymphatic.

c) Development of bones, axial and appendicular skeleton and muscles.

d) Neural tube, blood vessels spinal cord.

e) Development of brain (brain stem) structures.

REGIONAL ANATOMY

Unit II

No. of lectures – 25L

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Course Description

UPPER EXTREMITY

Theory

Axilla, Brachial plexus, shoulder joints, sterno-clavicular joints, Axillary lymph Nodes, Elbow joint, Superior Radio-ulnar joint, Nerves of arm and fore arm, Synovial Bursa of hand and palmar space, ulnar Nerve in hand, Cutaneous distribution according to dermatomes, clinical Anatomy, Surface Anatomy.

Practical/Demonstration

No. of lectures – 9L

Pectoral Region, Axilla Scapula and Clavicle, Humerus, Muscles of arm (Front & Back), Radius, Front of forearm, Ulna, back of forearm, Muscles of Palm & arterial arches, Articulated hand (Carpals and Meta Carpals name and arrangements in order only).

Unit III

No. of lectures – 30L

INFERIOR EXTREMITY

Theory

Lumbar plexus, Inguinal group of Lymph Nodes, Hip joint, Femoral triangle and femoral sheath, Knee joint, venous drainage of Inferior Extremity, Sciatic Nerve and its distribution, obturator Nerve, Arches of foot, Mid tarsal and sub-talar joint, Cutaneous distribution according to myotome, Clinical anatomy Surface Markings.

Practical/ Demonstration

No. of lectures – 10L

Hip bone , Glutei Muscles, Femur, front of thigh, Back of thigh, Medial side of thigh, Tibia, Anterior compartment of leg, Fibula, Lateral compartment of leg, Back of leg, Articulated foot (Identification of tarsal and meta tarsal only).

Unit IV

No. of lectures – 25L

Abdomen and pelvis

Theory

Abdominal wall, inguinal canal, Stomach, Liver, pancreas, kidney with ureter and spleen, small Intestine, Large Intestine, Abdominal Aorta, Portal vein, Diaphragm, Sacral plexus, Sacro-Iliac joint, Intervertebral disc.

Practical/ Demonstration

No. of lectures – 5L

Abdominal viscera, Sacrum, Bony pelvis, Viscera of Pelvis and Blood vessels.

Unit V

No. of lectures – 15L

THORAX

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Course Description

Theory

Thoracic cage and Mediastinum, Heart with its internal and external features, Blood vessels, Typical spinal Nerve, Typical Intercostal space, Mechanism of Respiration, Surface markings of Hearts and Lungs.

Practical/ Demonstration

No. of lectures – 7L

Superior Mediastinal structures, Sternum, Ribs (only general features), Vertebrae (Identification, general features, Functional Components, Development, Vertebral Column with weight transmission), Heart, pleura & Lungs.

Unit VI

No. of lectures – 14L

HEAD & NECK

Theory

Temporo-mandibular Joint, Atlanto-occipital and Atlanto-Axial joint, Cutaneous distribution of trigeminal Nerve.

Practical/ Demonstration

No. of lectures – 9L

Mouth cavity, Nasal cavity, Pharynx and Larynx (Parts, Sensory distribution), Cranial bones(Identification of Individual bone general features, different foramina in relation to cranial Nerve, Cranial fossae and their relation to brain and Hypophysis).

Identification of Anterior and Posterior triangles of Neck with their contents.

Radiological Anatomy of Musculo Skeletal system.

Unit VII

No. of lectures – 15L

NERVOUS SYSTEM

Theory

General Introduction and classification, Autonomic Nervous system (Idea about Sympathetic and Para Sympathetic with their difference in distribution and function).

Spinal cord with its meninges, spinal Reflex, Pyramidal and extra-pyramidal tracts (Detail Nucleus not required) Blood supply.

Parts of brain & meninges, Gross Discussion of Hind Brain, Mid Brain (cranial Nerve Nucleus position should be mentioned)

Fore brain – Cerebral hemisphere, functional areas and blood supply.

Practical/ Demonstration

No. of lectures – 5L

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Course Description

Spinal cord and parts of brain.

Unit VIII

No. of lectures – 6L

CRANIAL NERVES

Names in order, Individual Cranial Nerve distribution, about upper Motor Neuron and Lower Motor Neuron, applied Anatomy.

HISTOLOGY PRACTICAL

No. of lectures – 5L

Epithelium (Simple, Compound)

Connectivity tissue (Cartilage & Bone)

Muscle (smooth & skeletal)

Nervous tissue (Neuron)

Blood vessels (Large artery and vein)

Suggested Reading :

Text Books

1. B.D.Chaurasia, Human anatomy, Vol.1 – Upper limb & Thorax, All Chapters
Vol.2 – Lower Limb & abdomen, All Chapters
Vol.3 – Head, Neck & Brain, ,All Chapters

References

1. Adam W. M. Mitchell, Richard Drake, Gray's Anatomy, Churchill Livingstone
2. Frank H. Netter, Atlas of Human Anatomy.

UNIVERSITY OF ENGINEERING & MANAGEMENT

LECTURE WISE PLAN

Subject Name : Anatomy (Practical)

Subject Code - ANA191

Year - First Year

S.No.	Topics	Hours
1	HISTOLOGY PRACTICAL	5H
	Epithelium (Simple, Compound)	1H
	Connectivity tissue (Cartilage & Bone)	1H
	Muscle (smooth & skeletal)	1H
	Nervous tissue (Neuron)	1H
	Blood vessels (Large artery and vein)	1H
	UPPER EXTREMITY	9H
2	Pectoral Region,	1H
	Axilla	1H
	Scapula & Clavicle	1H
	Humerus,	1H
	Muscles of arm (Front & Back),	1H
	Radius & Front of forearm,	1H
	Ulna & Back of forearm,	1H
	Muscles of Palm & arterial arches,	1H
	Articulated hand (Carpals and Meta Carpals name and arrangements in order only).	1H
	INFERIOR EXTREMITY	10H
3	Hip bone,	1H
	Glutei Muscles,	1H
	Femur,	1H
	Front of thigh,	1H
	Back of thigh,	1H
	Medial side of thigh,	1H
	Tibia, Anterior compartment of leg,	1H
	Fibula, Lateral compartment of leg,	1H
	Back of leg,	1H
	Articulated foot (Identification of tarsal and meta tarsal only).	1H

4	ABDOMEN & PELVIS	5H
	Abdominal viscera,	1H
	Sacrum,	1H
	Bony pelvis,	1H
	Viscera of Pelvis	1H
	Blood vessels.	1H
5	THORAX	7H
	Superior Mediastinal structures,	1H
	Sternum, Ribs (only general features),	1H
	Vertebrae (Identification, general features, Functional Components, Development, Vertebral Column with weight transmission),	2H
	Heart,	1H
	Pleura	1H
	Lungs	1H
6	HEAD & NECK	9H
	Mouth cavity,	1H
	Nasal cavity,	1H
	Pharynx and Larynx (Parts, Sensory distribution),	2H
	Cranial bones(Identification of Individual bone general features, different foramina in relation to cranial Nerve, Cranial fossae and their relation to brain and Hypophysis).	2H
	Identification of Anterior and Posterior triangles of Neck with their contents.	2H
	Radiological Anatomy of Musculo Skeletal system.	1H
7	NERVOUS SYSTEM	5H
	Spinal cord (with its meninges & Blood supply)	2H
	Parts of brain (including meninges, Hind Brain, Mid Brain, Fore brain – Cerebral hemisphere, functional areas and blood supply).	3H

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Subject Name – PHYSIOLOGY

Subject Code – PHY101

Course Objectives: The following goals relate to content and processes that are intended to provide students with a full understanding of physiology. They form the unifying foundation for all topics in physiology and are to be emphasized throughout. They help to develop a vocabulary of appropriate terminology to effectively communicate information related to physiology. Recognize the anatomical structures and explain the physiological functions of body systems. Synthesize ideas to make a connection between knowledge of physiology and real-world situations, including healthy lifestyle decisions and homeostatic imbalances. Demonstrate laboratory procedures used to evaluate physiological functions of each organ system. Interpret graphs of anatomical and physiological data.

Course Outcome:

After taking this course a student will:

1. Be able to demonstrate information literacy skills to access, evaluate, and use resources to stay current in the field of physiology.
2. Approach and examine issues related to physiology from an evidence-based perspective.
3. Communicate clearly and in a way that reflects knowledge and understanding of the human body and demonstrates the ability to adapt information to different audiences and applications.

GENERAL PHYSIOLOGY:

Unit : I

No. of lectures – 20L

Introduction and scope of Physiology

Cell and tissue-Its structure, principal constituents, properties and functions including cell division.

Body Fluid.

Blood: Composition and general functions of plasma. Blood cells – structure and function - Red Blood cells, white Blood Cells – including numbers and approximate length of life – position, structure and function of cells of Reticulo endothelial system.

Blood clotting including bleeding time and clotting time, factors accelerating or slowing the process. Blood groups and their significance, Rh-factor, Hemoglobin and E.S.R.

Formation of Blood, tissue fluid and lymph.

Unit : II

No. of lectures – 30L

Cardio-Vascular System.

Structure and properties of Heart Muscles and nerve supply of Heart.

Structure and functions of arteries, capillaries and veins.

Cardiac cycle and Heart sound.

Cardiac output measurements, factors affecting Heart Rate and its regulation,

Cardio-vascular reflexes.

Blood pressure, its regulation, physiological variation, peripheral resistance, Factors Controlling Blood Pressure, Hemorrhage.

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Course Description

ECG study and stress test.

Respiratory System.

Mechanism of Respiration, Changes in diameter of thorax-Intra-pleural and Intra-pulmonary pressure.

Quantities of lung volume, tidal and residual volume, vital capacity.

Gaseous inter-changes in lung and tissues.

Control of respiration-Nervous and chemical significance of changes in rate and depth, transportation of oxygen and carbon dioxide.

Respiratory states-anoxia, asphyxia, Cyanosis Acclimatization.

Unit :III

No. of lectures – 30L

Digestive System

General arrangement of alimentary canal, liver pancreas-position, structure and functions.

Nutrition and Diet-carbohydrate, protein fat, salts, water, vitamins and minerals digestion, absorption and Metabolism.

Reproductive System.

Sex determination and development of puberty, male sex hormones, spermatogenesis, Female sex hormones, menstrual cycle. Ovulation, pregnancy, Function of placenta, lactation.

Excretory System.

Gross and minute structures of kidney, renal circulation, Mechanism of formation of urine, Glomerular filtration rate and tubular function, renal function and renal tests. Physiology of micturition.

Unit : IV

No. of lectures – 20L

Endocrine System.

Structure and function of pituitary (anterior & posterior).Thyroid, Para-thyroid, adrenal cortex, adrenal medulla, Thymus and pancreas.

Blood sugar regulation.

Skin-Structure and functions.

NEUROMUSCULAR PHYSIOLOGY

Unit : V

No. of lectures – 50L

Cell membrane – Ionic and Potential gradient and transport.

Muscle – Types of muscular tissue – Gross and Microscopic structure – function. Basis of muscle contraction – changes in muscle contraction, Electrical – Biphasic and mono-phasic action potentials, chemical, Thermal and physical changes, Isometric and Isotonic contraction.

Motor units and its properties – clonus, tetanus, all or none law, Fatigue.

Nerve – Gross and microscopic structure of nervous tissue, one neuron – Generation of action potential – Nerve impulse condition.

Neuromuscular junction.

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Course Description

Degeneration – Regeneration of peripheral nerves Wallarian degeneration, electro tonus and Pflagers law.

Types and properties, of receptions, types of sensations, synapse, reflex, are its properties occlusion, summation, sub minimal fatigue etc.

Tracts – Ascending and descending and extra-pyramidal tracts,
Functions of E.E.G.

Functions of Cerebral cortex, cerebrum, cerebellum, Basal ganglia,
Thalamus – connection and functions.

Reticular formation – tone posture & equilibrium, Autonomic nervous system.

Special Senses Eye-Errors of refraction, equilibrium, Autonomic nervous system.

Speech and its disorders.

Ear and Vestibular apparatus, taste, olfactory, somatic sensations.

PRACTICAL PHYSIOLOGY/DEMONSTRATION

1. Hematology: RBC count, WBC count, different count. ESR, Bleeding & Clotting time, Estimation of hemoglobin, Blood groups. **No. of lectures – 20L**
2. Human Physiology: Examination of (a) Respiratory system (b) heart and arterial pulse (c) deep and superficial reflexes (d) cranial nerves (e) motor system (f) sensory system including higher function (g) measurement of blood pressure. **No. of lectures – 20L**
3. Effect of Exercises on body physiology **No. of lectures – 10L**

Suggested Reading :

Text Books

1.K.Sembulingam, Essentials of Medical Physiology, Jaypee, All Chapters

References

1. Guyton & Hall, Human physiology, Elsevier

2. S.K.Chaudhari, Concise Medical Physiology, NCBA

UNIVERSITY OF ENGINEERING & MANAGEMENT

LECTURE WISE PLAN

Subject Name : Physiology (Practical)

Subject Code - PHY191

Year - First Year

S.No.	Topics	Hours
	PRACTICAL PHYSIOLOGY/DEMONSTRATION	50H
1	Hematology: RBC count, WBC count, different count. ESR, Bleeding & Clotting time, Estimation of hemoglobin, Blood groups.	20H
2	Human Physiology: Examination of (a) Respiratory system (b) heart and arterial pulse (c) deep and superficial reflexes (d) cranial nerves (e) motor system (f) sensory system including higher function (g) measurement of blood pressure.	20H
3	Effect of Exercises on body physiology	10H

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Course Description

Course Objectives: To gather conceptual knowledge of relevant sub-disciplines of biology and chemistry, including molecular and cell biology, genetics, organismal biology, organic, inorganic, analytical and physical chemistry and biochemistry.

Course Outcome: The student will be able to demonstrate skills in both chemistry and biology.

To develop competence in scientific writing, which includes:

Scientific/critical thinking;

Ability to formulate and test an hypothesis; and

Analysis of evidence and ability to draw conclusions.

Unit I

No. of Lectures 10

BIO-PHYSICS: Concepts of Ph and buffers, Acid-base equilibrium, osmotic pressure and its physiological applications.

CELL: Morphology, Structure and functions of cell, cell membrane, Nucleus, Chromatin, Mitochondria, endoplasmic reticulum, ribosome.

Unit II

No. of Lectures 10

CARBOHYDRATES, LIPIDS & PROTEINS & METABOLISM: Definition, functions, sources, classification & metabolism

VITAMINS: Classification, Fat soluble vitamins A,D,E,K Water soluble vitamins-B Complex and Vitamin 'C', Daily requirement physiological functions and disease of vitamin deficiency.

Unit III

No. of Lectures 10

BIO-ENERGETICS: Concept of free energy change, Energetic reaction and endergenic reactions, Concepts regarding energy rich compounds. Respiratory chain and Biological oxidation.

WATER METABOLISM: Fluid compartments, Daily intake and output, Dehydration, Sodium and potassium Metabolism.

Unit IV

No. of Lectures 10

MINERAL METABOLISM: Iron, Calcium, Phosphorous, Trace elements.

NUTRITION: Nutritional aspects of carbohydrate, fat and proteins, Balanced diet, Metabolism in exercise and injury, Diet for chronically ill and terminally ill patients.

CONNECTIVE TISSUE: Mucopolysaccharides, Connective tissue proteins, Glyco-proteins, Chemistry and Metabolism of bone and teeth.

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Course Description

Unit V

No. of Lectures 10

NERVE TISSUE:Composition, Metabolism, Chemical mediators of nerve activities.

MUSCLE TISSUE: Structure, Metabolism of muscles, Muscle contraction.

HORMONES:General Characteristic and Mechanism of Hormone actions

Text Books:Damodaran M. Vasudevan,Textbook of Biochemistry,Jaypee, All Chapters

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Course Description

Course Objectives: This area offers students a life span approach to physical fitness, performance and health to prepare them for a career in the physical therapy field. Exercise therapy study is designed to expand upon information provided in the basic sciences of anatomy/physiology and chemistry. By design students learn about the effects of physical activity on children, then young adults, followed by geriatric populations. The exercise science majorly prepares students for a variety of possible careers in athletic training, physical therapy, fitness and sport enterprises, education, sport science & coaching. Such occupations include, aerobics instructor, cardiopulmonary rehabilitation specialist, exercise physiologist, occupational physiologist, personal trainer, strength and conditioning specialist and more.

Course Outcome:

Upon successful completion of the program, students will be able to:

Demonstrate a sound foundational knowledge and understanding of the principles of biology, chemistry, and nutrition, and an advanced understanding of human anatomy and physiology as they relate to responses and adaptations to physical activity and exercise.

Demonstrate basic laboratory skills pertaining to assessments, laboratory methods, sound experimental and analytical practices, data acquisition and reporting in the exercise sciences.

Demonstrate knowledge of the importance and influence of physical activity, kinesiology, nutrition and exercise on health and be an advocate for physically active lifestyles as a means to improve quality of life and reduce the risk and prevalence of lifestyle related diseases.

Plan, administer, and evaluate wellness and fitness programs, nutrition projects, and exercise physiology tracks based in sport, clinical, industrial, and/or corporate environments.

Demonstrate requisite skills and abilities for meaningful employment in exercise science related areas or pursue graduate studies in an exercise therapy related area.

Unit I

10 Hours

Basic physics in exercise therapy. Mechanics: Force, Gravity, line of gravity, center of gravity in human body, Base, equilibrium, Axes and Planes, mechanical principles of lever, examples in human body, pendulum, spring.

Introduction to exercise therapy.

Unit II

20 Hours

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Course Description

Massage: Definition of massage, type of massage, general effect and uses of massage, local effects of individual manipulation (physiological effects), contra-indications, techniques of application of all manipulations-stroking, Effleurage, kneading and picking up, skin rolling (back), clapping, tapping, friction etc.

Suspension therapy: Principles of suspension, types of suspension therapy, effects and uses of suspension therapy-their application either to mobilize a joint increase joint range of motion or to increase muscle power-explaining the full details of components used for suspension therapy.

Unit III

30 Hours

Starting position-Fundamental starting position-standing, sitting, kneeling, lying and-hanging. All the derived positions of the above five fundamental starting positions.

Classification movements in details: Voluntary movement: free exercise, assisted exercises, resisted exercise, Active-Assisted and Resisted exercise.

Assisted Exercises: Technique and uses. Free exercises-Classification, technique, effects of frequent exercises on various systems etc. Resisted exercises – Techniques and types of resistance, SET system (Heavy resisted exercises, Oxford method, De Lorme method, Mc queen method.

Relaxed passive movements, basic knowledge of classification of relaxed passive movements, definition, technique, effects and uses of relaxed passive movement.

Unit IV

20 Hours

Muscles strength: Anatomy and physiology of muscle tissue causes of muscle weakness paralysis, prevention of muscle weakness/paralysis Type of muscle work and contraction ranges of muscle work, prevention of muscle atrophy.

Muscle assessment M.R.C. grading Principles of muscle strengthening/re-education, early re-education of a paralyzed muscle etc.

Joint Movement and measurement:Goniometry. Classification of joint movements causes of restriction of joint movement, Principle and application of Goniometry.

Unit V

20 Hours

Bed Rest-Its necessity & Complications. Motor Learning and motor control a) Introduction to motor learning, classification of motor skills, measurement of performance b) Theories of motor control and applications.c) Learning of skill, theories of feedback, practice conditions.

Relaxation and Therapeutic Gymnasium

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Course Description

- Describe relaxation, muscle fatigue, muscle spasm and tension.
- Factors contributing to fatigue and relaxation.
- Techniques of relaxation.
- Effects and uses, indications and contraindications.
- Set up of gymnasium and its importance
- Various equipments in the gymnasium.

Text Books: M.Dena Gardiner, Principles Of Exercise Therapy. CBS, all chapters

Suggested Readings –

1. Therapeutic Exercises- foundations and Techniques- Kisner and Colby.
2. Muscle Testing and Function- Kendall
3. Principles of exercise therapy – Gardiner.
4. Practical Exercise Therapy – Hollis.
5. Beard's Massage – Wood.
6. Motor control- theory and practical application- Shumway.
7. Hydrotherapy – Principles and practice – Champion.
8. Measurement of Joint Motion – A guide to goniometry – Norikin and White Davis.

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LECTURE WISE PLAN

Subject Name : EXERCISE therapy I (Practical)

Subject Code - EXT191

Year - First Year

S.No.	Topics	Hours
	PRACTICAL EXERCISE THERAPY – I / DEMONSTRATION	50H
1	Massage Therapy	7H
2	Suspension Therapy	3H
3	Relax passive movement/types of exercise	5H
4	MMT	10h
5	Goniometry	10H
6	Relaxation techniques- general and local	5H
7	Fundamental and derived positions	5H
8	Application of relaxed passive movements, active assisted and resisted movements to all joints in limbs.	5H

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

ELECTROTHERAPY – 1

Subject code - ELT101

Course Objectives: This course is an ideal way to bring up to date with current procedures in this field. It will expand the knowledge of the underlying principles of modalities such as ultrasound and laser therapy and will enhance the ability to adapt 'standard' treatment protocols to the specific needs of each individual patient.

Course Outcome:

At the end of the course students are able to:

- To consider the basic issues of each modality
- What the energy can (and cannot) do in terms of physiological & therapeutic effect
- To relate these issues to both the research evidence & to the clinical application of each modality
- Explain the basic nature of the applied energy
- Identify the key physiological effects of the modality
- Rationalise the main therapeutic effects
- Justify the appropriate clinical application
- Establish appropriate clinical doses
- List the key contraindications, dangers & precautions

Unit I

No.of lectures 20 hours

Physical Properties: Structure and properties of matter-solids, liquids and gases; adhesions, surface tension, viscosity, density and elasticity. Structure of atom, molecules, elements and compounds. Conductors, insulators, potential difference, Resistance and Intensity.

Ohm's Law – Its application to AC and DC a) Rectifying devices- thermionic valves, semiconductors, transistors, amplifiers, transducers, oscillator circuit. b) Capacitance, condensers and AC and DC circuits c) Display devices and indicators – analogue and digital

Effects of current electricity: 1. Chemical effects - ions and electrolytes, ionization, production of EMF by chemical action 2. Magnetic effects, molecular theory of magnetism, magnetic effects, electromagnetic induction 3. Thermal effects- joule's law and heat production 4. Milli-ammeter and voltmeter, transformers and choke coil

Physical principles of sound and its properties, Physical principles of light and its properties

Electromagnetic spectrum- biophysical application.

Unit II

15 Hours

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Course Description

Electrical Supply: a) brief outline of mains supply of current. b) dangers- short circuit, electric shock. c) Precautions- safety devices, earthing, fuses etc. d) first aid and initial management of electric shock

Unit III

25 Hours

Low frequency currents: 1. Introduction to DC, AC and modified currents 2. Production of DC- physiological and therapeutic effects of DC, anodal and cathodal galvanism. 3) Iontophoresis- principles of clinical application, indication, contraindication, precaution, operational skills of equipment and patient preparation. 4) Modified DC –various pulses, duration and frequency and their effects on nerve and muscle tissue. Production of IDC and surged currents and their effects, principle of clinical application, physiological and therapeutic effects, indication, contraindication, precaution, operational skills, equipment and patient preparation. 5) TENS a) Types of low frequency, pulse widths, frequencies and intensities used as TENS application b) Theories of pain relief. c) Principle of clinical application, physiological and therapeutic effects, indication, contraindication, precaution, operational skills, equipment and patient preparation. 6) Sinusoidal currents, didynamic pulses.

Unit IV

10Hours

Electrical Reactions and electrodiagnostic tests: Electric stimuli and normal behavior of nerve and muscle tissue. Types of lesion and development of reaction of degeneration. Faradic/ IDC test (FG test). SD curve and its application. Rheobase and chronaxie and pulse ratio.

Unit V

10 Hours

Ultra Violet Radiation: a) Wavelength, frequency, types and sources of UVR generation, techniques of irradiation, physiological and therapeutic effects, indication, contraindication, precaution, operational skills, equipment and patient preparation

b) Dosage calculation of UVR.

Unit VI

20 hours

Superficial heat – Infrared Radiation, Paraffin wax bath, moist heat, electrical heating pads, fluidotherapy, contrast bath etc

IRR-Wavelength, frequency, types and sources of IRR generation, techniques of irradiation, physiological and therapeutic effects, indication, contraindication, precaution, operational skills, equipment and patient preparation

PWB – contents, methods of application, maintenance of equipment, indication, contraindication, precaution, operational skills, equipment and patient preparation

Hydrocollator packs – contents, methods of application, indication, contraindication, precaution.

Text Books: 1) Basanta Kumar Nanda, Electrotherapy simplified, jaypee, all chapters.

2) Angela Forster, Clayton's Electrotherapy, CBS , all chapters.

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Course Description

Suggested Readings

- 1) Low and Reed – Electrotherapy Explained: Principles and Practise
- 2) Jagmohan Singh – Textbook of Electrotherapy.
- 3) Kahn - Principles and Practises of Electrotherapy
- 4) Lehmann – Therapeutic Heat and Cold

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Course Description

PATHOLOGY & MICRO BIOLOGY

Subject code – PAM201

Course Objectives: Demonstrate an investigative and analytic approach to clinical and pathological problems.

Demonstrate applied knowledge of Pathology, by describing the four aspects of the major disease processes covered in the course:

- 1) Cause (etiology)
- 2) Mechanisms of development (pathogenesis)
- 3) Functional consequences of the molecular and morphologic changes (clinical significance)
- 4) Apply the basic and clinically supportive sciences appropriate to pathology (such as anatomy, biochemistry, histology/histopathology, cytogenetics, and physiology).

Course outcome:

After completion of the study the student will be able to :

Gather and apply essential information from patient cases necessary to discuss clinic-pathologic processes in Small Group Discussions.

Develop a differential diagnosis when presented with clinical information or a histo-pathologic finding.

Utilize laboratory studies to diagnose and monitor disease states and conditions.

Demonstrate the ability to support self-education (i.e., active learning).

Demonstrate the ability to find additional information when confronted with a question or unfamiliar term, particularly when preparing for case-based exercises.

- | | |
|---|----|
| 1. Aims and objectives of study of pathology. | 2H |
| 2. Brief outline of cell injury, degeneration, necrosis and gangrene. | 3H |
| 3. Inflammation: Definition, vascular and cellular phenomenon
difference between Transudate and exudates. Granuloma. | 4H |
| 4. Circulatory disturbances: Hemorrhage, Embolism Thrombosis
Infraction, shock, Volkmann's ischemic contracture. | 4H |
| 5. Blood disorder: Anemia, Bleeding disorder. | 3H |
| 6. CVS: Heart and Blood vessels, Coronary heart disease. | 3H |
| 7. Respiratory System: Ch. Bronchitis, Asthma Bronchiectasis,
Emphysema, COPD etc. | 5H |

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Course Description

8.Bones and Muscles: Arthritis & Spondyloarthropathy.	3H
9.PNS and Muscles: Neuropathies, Poliomyelitis & Myopathies etc.	4H
10.CNS: Infection, Demyelinating disease, Degenerative disease etc.	4H
11.Neoplasia.	3H
12.Growth and its disorders like hypertrophy hyperplasia & atrophy.	3H
13.Autoimmune diseases.	3H
14.Healing and repair.	3H
15. Diabetes mellitus and gout	3H

MICROBIOLOGY

Course Objectives: Students in this course will be asked to participate in a variety of course assessment activities. Some of these activities will occur periodically and will be not be graded. The goal is to gather evidence to determine whether the course is accomplishing the defined Microbiology learning outcomes. Ultimately these assessment activities will contribute to improving the course and enhancing knowledge .

Course outcome:

After completion of the study the student will be able to :

This class investigates new and exciting material about microbes and our world, including health concerns, microbial anatomy and physiology, genetics, epidemiology, and use of antimicrobials and disinfectants.

- 1) Compare and contrast the characteristics for various microbes with regards to infections, treatment, and control. (This includes prions, viruses, bacteria, protozoans, and multicellular parasites.)
- 2) Explain the dynamics of commensal, opportunistic, and pathological relationships particularly between microbes and humans
- 3) Evaluate and apply the proper methods of microbial control necessary in sample scenarios or case studies

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4) Describe microbial metabolic pathways in general terms and specifically evaluate the implications for food production and human disease.

1. Introduction and History of Microbiology	3H
2. General lectures on Microorganisms (brief).	3H
3. Sterilization and asepsis.	3H
4. Infection- Source of infection and Entry and its Spread	4H
5. Immunity- Natural and Acquired	4H
6. Allergy and hypersensitivity.	3H
7. Outline of common pathogenic bacteria and diseases produced by them.	
1. Respiratory tract infections.	3H
2. Meningitis.	2H
3. Enteric infections.	3H
4. Anaerobic infections.	3H
5. Urinary tract infections.	3H
6. Leprosy, tuberculosis and miscellaneous infections.	3H
7. Wound infections.	2H
8. Sexually transmitted diseases.	3H
9. Hospital acquired infections.	4H
8. Virology- virus infections with special mention of Hepatitis.	4H
9. Poliomyelitis & rabies.	4H

Textbook:

1) Textbook of Pathology, Harsh Mohan, Ivan Damjanov, Jaypee,

All chapters

2) Textbook of Microbiology, R. Ananthanarayan, All chapters.

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Course Description

PHARMACOLOGY Subject code - PHA201

- 1. General Pharmacology:**-Introduction and definitions, Nature and sources of drugs: Dosage forms of drugs. Routes of drug administration, Pharmacokinetics (Absorption, Bioavailability, Distribution, Metabolism Excretion, First order Zero order Kinetics); Pharmacodynamics (sites and mechanisms of drug action in brief, Adverse drug reactions, Margin of safety of drugs and factors influencing dosage and drug response)
12H
- 2. Drugs Affecting ANS:**-General Introduction, Drug affecting parasympathetic nervous system, Drug affecting sympathetic nervous systems.
10H
- 3. Drugs Affecting Peripheral (Somatic) nervous System:**- Skeletal Muscle Relaxants: Local Anesthetics.
10H
- 4. Renal and CVS:**- Diuretics; Renin-angiotension system and its inhibitors, Drug treatment of Hypertension, Angina pectoris, Myocardial infarction Heart failure, and hypercholesterolemia.
10H
- 5. Anti-inflammatory drugs and related autacoids:**- Histamine, Bradykinin, 5-HT and their antagonists; Prostaglandin's and leukotrienes; Nonsteroidal-Anti-inflammatory drug, Antirheumatic drugs and drugs used in gout.
10H
- 6. Drugs Affecting CNS:**-General anesthetics, Anxiolytics and hypnotics; Alcohol, Opioid analgesic Drug dependence and abuse Antiepileptic drugs, Drug therapy for Neurodegenerative disorders.
10H
- 7. Endocrines:**- Parathyroid hormone, Vitamin D, calcitonin and drugs affecting Calcium balance, Thyroid and antithyroid drugs; Adrenocortical and anabolic steroids, Insulins and Oral Hypoglycaemic agents.
10H
- 8. Drugs Affecting Respiratory System:**- Drug therapy of bronchial asthma and chronic obstructive pulmonary disease.
10H
- 9. Chemotherapy:**- Introduction; sulfonamides, Fluoroquinolones, Penicillins, Cephalosporins, newer B-lactam antibiotic, aminoglycosides Macrolides and Newer antibiotics, Tetracyclines Chloramphenicol, Chemotherapy of Tuberculosis and leprosy, antiseptics-disinfectants.
10H
- 10. Miscellaneous Topics:**- Management of stroke, Toxicology and heavy metal poisoning, special aspects of paediatric and geriatric pharmacology; Drug interactions with drugs commonly used by physiotherapists; Hematinics, vitamins and antioxidants.
8H

TEXTBOOK: Essentials of Medical Pharmacology, K.D. Tripathi, Jaypee, All chapters.

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Course Description

EXERCISE THERAPY-II

Course Objectives: This area offers students a life span approach to physical fitness, performance and health to prepare them for a career in the physical therapy field. Exercise therapy study is designed to expand upon information provided in the basic sciences of anatomy/physiology and chemistry. By design students learn about the effects of physical activity on children, then young adults, followed by geriatric populations. The exercise science majorly prepares students for a variety of possible careers in athletic training, physical therapy, fitness and sport enterprises, education, sport science & coaching. Such occupations include, aerobics instructor, cardiopulmonary rehabilitation specialist, exercise physiologist, occupational physiologist, personal trainer, strength and conditioning specialist and more.

Course Outcome:

Upon successful completion of the program, students will be able to:

Demonstrate a sound foundational knowledge and understanding of the principles of biology, chemistry, and nutrition, and an advanced understanding of human anatomy and physiology as they relate to responses and adaptations to physical activity and exercise.

Demonstrate basic laboratory skills pertaining to assessments, laboratory methods, sound experimental and analytical practices, data acquisition and reporting in the exercise sciences.

Demonstrate knowledge of the importance and influence of physical activity, kinesiology, nutrition and exercise on health and be an advocate for physically active lifestyles as a means to improve quality of life and reduce the risk and prevalence of lifestyle related diseases.

Plan, administer, and evaluate wellness and fitness programs, nutrition projects, and exercise physiology tracks based in sport, clinical, industrial, and/or corporate environments.

Demonstrate requisite skills and abilities for meaningful employment in exercise science related areas or pursue graduate studies in an exercise therapy related area.

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Unit wise PLAN		
Subject Name : Exercise Therapy-II (Theory)		Subject Code - EXT201
Year - Second Year		Total Hours : 100 Hrs
UNIT No.	Topics	Hours
1	Therapeutic exercises – impact on physical function, classification, techniques, indications, contraindications, assessment and evaluation of patient. Range of motion & types of ROM exercises Resistance exercises and adaptation of skeletal muscles	15H

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Course Description

2	Principles of aerobic exercises & its physiological response, testing as basis of aerobic program Determinants of exercise program. Stretching Techniques and its determinants. Peripheral and spinal joint mobilization techniques. Individual, group and mass exercises, maintenance exercises, plan of exercise-therapy tables and schemes	25H
3	Functional Re-education- techniques to re-educate ADL functions. Principles of Traction, physiological and therapeutic effects, classification, types, indications, contraindications, techniques of application, operational skills and precautions. Taping and bandaging techniques. P.N.F: Detail theory of proprioceptive-neuro muscular facilitation techniques. Co-ordination Exercises: Definition of coordination movements. Incoordinated movements, Factors for coordinated movements, technique of coordination exercises. Techniques to improve static and dynamic balance.	26H
4	Posture: Types, factors responsible for good posture, factors for poor posture, principles of development of good posture, assessment of Posture. Gait: Analysis of normal gait with muscle work, various pathological gaits. 2point, 3point & 4point gait: Introduction, crutch measurement, crutch balance, various types of crutch gait in details. Breathing exercises: Physiology of respiration, types of breathing exercises, technique if various types of breathing excises, its effects and uses. Pulmonary exercises & postural drainage	20H
5	Hydrotherapy: Introduction, various types of hydrotherapy units, construction and equipments used in hydrotherapy Principles, indications, contraindication, effects and uses of hydrotherapy. Precautions towards patient, towards therapist, equipment unit etc. Exercises for normal person – Importance and effects of exercise to maintain optimal health and its role in prevention of disease. Exercise prescription for different age groups/ occupational demands etc. Yoga-Definition-History-Principles-Concepts, General effects of yogic posture on the body.	14H

Text Books: M.Dena Gardiner, Principles Of Exercise Therapy. CBS, all chapters

Suggested Readings –

1. Therapeutic Exercises- foundations and Techniques- Kisner and Colby.
2. Muscle Testing and Function- Kendall
3. Principles of exercise therapy – Gardiner.
4. Practical Exercise Therapy – Hollis.
5. Beard's Massage – Wood.

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6. Motor control- theory and practical application- Shumway.
7. Hydrotherapy – Principles and practice – Campion.
8. Measurement of Joint Motion – A guide to goniometry – Norkin and White Davis.

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LECTURE WISE PLAN

Subject Name : Exercise Therapy-II (Practical)

Subject Code - EXT291

Year - Second Year

Total Hours : 100 Hrs

S.No.	Topics	Hours
1	Assessment and evaluative procedures including motor, sensory, neuromotor coordination, vital capacity, limb length.	10H
2	Resistive Exercise.	10H
3	Range of motion exercise.	10H
4	Stretching.	10H
5	Traction techniques.	5H
6	Functional re-education.	10H
7	Taping and bandaging techniques.	5H
8	Assessment of Posture using plumb line.	5H
9	Assess and evaluate equilibrium/ balance and techniques to improve balance.	5H
10	Peripheral Joint Mobilization techniques.	10H
11	Breathing exercise and postural drainage	10H
12	Gait and crutch walking	5H
13	Application of PNF techniques and patterns.	5H

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Course Description

ELECTROTHERAPY – II

Subject code - ELT201

Course Objectives: This course is an ideal way to bring up to date with current procedures in this field. It will expand the knowledge of the underlying principles of modalities such as ultrasound and laser therapy and will enhance the ability to adapt 'standard' treatment protocols to the specific needs of each individual patient.

Course Outcome:

At the end of the course students are able to:

- To consider the basic issues of each modality
- What the energy can (and cannot) do in terms of physiological & therapeutic effect
- To relate these issues to both the research evidence & to the clinical application of each modality
- Explain the basic nature of the applied energy
- Identify the key physiological effects of the modality
- Rationalise the main therapeutic effects
- Justify the appropriate clinical application
- Establish appropriate clinical doses
- List the key contraindications, dangers & precautions

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UNIT wise plan		
Subject Name : Electro Therapy-II (Theory)		Subject Code -
ELT201		
Year - Second Year	100 Hrs	Total Hours :
UNIT No.	Topics	Hours
1	MEDIUM FREQUENCY CURRENT (interferential current)	30H
	Definition, characteristics, physiological/therapeutic effect of I.F current, indication, technique of application, contraindication and precaution.	
	HIGH FREQUENCY CURRENT	
	a. SHORT WAVE DIATHERMY - Introduction, physiological effect and therapeutic effect of SWD, method of application (capacitor field method and cable method etc.) technique of treatment, indication, contraindication and dangers.	
	b. PULSED SWD - Definition, characteristics, mechanism of work, physiological effect and therapeutic effects, indications, techniques of application, principle of treatment and contraindication.	
	c. MICROWAVE DIATHERMY - · Introduction and characteristics.	

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	<ul style="list-style-type: none"> · Physiological effect. · Therapeutic effect · Techniques of application and principle of treatment. · Dangers of microwave diathermy 	
2	LASER	25H
	<ul style="list-style-type: none"> · Introduction and characteristics. · Effect on tissue. · Therapeutic effect · Indication, contraindication and dangers. 	
	ULTRASONIC THERAPY	
	<ul style="list-style-type: none"> · Introduction and characteristics. · U.S therapy parameters. · Coupling media · Therapeutic effects. · Indications, contraindications and dangers. · Testing of apparatus · Technique of application and dosage 	
	CRYOTHERAPY	
	<ul style="list-style-type: none"> · Introduction, physical principles · Physiological effects · Indication and contraindication · Therapeutic effects and technique of application 	
	BIO-FEEDBACK	
	<ul style="list-style-type: none"> · Introduction, principles of bio-feedback · Therapeutic effects of bio-feedback · Indication and contraindication · Technique of treatment 	
	Electro diagnosis- EMG and ENG studies, techniques etc.	
	ADVANCED ELECTROTHERAPY	
4	Combined therapy-principle, therapeutic uses and indication like U.S therapy with stimulation or TENS etc.	20H

Text Books: 1) Basanta Kumar Nanda, Electrotherapy simplified, jaypee, all chapters.

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Course Description

2) Angela Forster, Clayton's Electrotherapy, CBS , all chapters.

Suggested Readings

- 1) Low and Reed – Electrotherapy Explained: Principles and Practise
- 2) Jagmohan Singh – Textbook of Electrotherapy.
- 3) Kahn - Principles and Practises of Electrotherapy
- 4) Lehmann – Therapeutic Heat and Cold

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LECTURE WISE PLAN

Subject Name : Electro Therapy-II (Practical)

Subject Code - ELT291

Year - Second Year

Total Hours : 100 Hrs

S.No.	Topics	Hours
1	Testing of Electrotherapy apparatus.	10H
2	Technique of application of electrotherapy treatment modalities (demonstration and practice).	50H
3	Electro-diagnosis (demonstration and practice of following electro-diagnostic measures)	20H
	a. F.G test	
4	Observe EMG and NCV- demonstration only	10H
5	Observe Biofeedback Unit.	10H

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Course Description

Community Medicine

Subject Code - COM201

COURSE OBJECTIVE:

- 1) Help Students understand health and potential interventions from a community/consumer perspective.
- 2) Provide opportunities for Students to develop skills in working collaboratively when addressing health issues.
- 3) Help community partners understand and use research skills to advance their own missions.
- 4) Experience the translation of research into action. Instill in students a sense of responsibility to the communities in which they work.
- 5) Take the skills developed through the community project to other settings in which the students may practice in the future

COURSE OUTCOME:

- 1) Education and training in community-based and collaborative research that will have transferability to other settings.
- 2) Strengthening relationships in the benefit of community-based projects of current and future students.
- 3) Advancing knowledge on community research experiences in a scholarly manuscript.

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Course Description

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UNIT WISE PLAN

Subject Name : Community Medicine (Theory)

Subject Code -

COM201

Year - Second Year

Total

Hours : 100 Hrs

UNIT No.	Topics	Hours
1	General concepts of health diseases, with reference to natural history of disease with pro-pathogenic and pathogenic phases. The role of socio-economic and cultural environment in health and disease. Epidemiology, definition and scope. Public health administration an overview of the health administration set up at Central and state levels.	18H
2	The national health programme -highlighting the role of social, economic and cultural factors in the implementation of the national programme. Health problems of vulnerable groups-pregnant and lactating women, infants and pre-school children, occupational groups. Occupational Health-definition, scope occupational disease prevention of occupational disease and hazards.	22H
3	Social security and other measurement for the protection from occupational hazard accident and diseases. Details of compensation acts. Family planning – objectives of national family planning programmes and family methods. A general idea of advantage and disadvantages of the methods. Mental health emphasis on community aspects of mental, role of Physiotherapy in mental health problems such as mental retardation etc.	22H
4	Communicable disease- an overall view of communicable disease classifies according to principle mode of transmission role of insect and other factors. International health agencies.	14H
5	Community medicine and rehabilitation epidemiology, habitat, nutrition, environment anthropology. a) The philosophy and need of rehabilitation b) Principles of physical medicine c) Basic principles of administration or organization Introduction to community health.	24H

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Course Description

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Course Description

BIOMECHANICS & KINESIOLOGY

Subject code BIK201

Course Objectives: Kinesiology is not studied merely to incite our interest in a fascinating and mysterious subject. It has a useful purpose. We study kinesiology to improve performance by learning how to analyze the movements of the human body and to discover their underlying principles. The study of kinesiology is an essential part of the educational experience of students of physical education, dance, sport, and physical medicine. Knowledge of kinesiology has a threefold purpose for practitioners in any of these fields. It should enable them to help their students or clients

Course outcome:

At the conclusion of this chapter, the student should be able to:

1. Define kinesiology and explain its importance to the student of human motion.
2. Describe the major components of a kinesio-logical analysis.
3. Prepare a description of a selected motor skill, breaking it down into component phases and identifying starting and ending points.
4. Determine the simultaneous-sequential nature of a variety of movement skills.
5. Classify motor skills using the classification system presented.
6. State the mechanical purpose of a variety of movement skills.
7. Utilize methods of observation and palpation to identify the joints and basic muscle groups active in a movement skill.

COURSE CONTENTS:

I. ESSENTIAL CONCEPTS

15H

1. Motion and forces, Axis and planes, Mechanical lever, lever in Human body.
2. Force distribution-linear force, resultant force & equilibrium, parallel forces in one plan concurrent force.
3. Newton's law – Gravity and its effects on human body
4. Forces and moments in action
5. Concepts of static equilibrium and dynamic equilibrium
6. Composition and resolution of forces
7. Friction
8. Pulleys.

II Joint Structure and Functions

10H

- a) Basic Principles of joint structure and function.

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- b) Tissues present in and around joints including fibrous tissue, bone cartilage, connective tissue, ligaments, tendons etc.
- c) Classification of joints.

III Muscle Structure and Functions	15H
a) Mobility and Stability functions of muscle	
b) Elements of muscle structures and its properties.	
c) Types of muscle contraction and muscle work.	
d) Classification of muscles and their functions	
e) Group action of muscles, coordinated movement.	
II. KINEMATICS and KINETICS CONCEPTS of following joints	25H
Upper Extremity	
Scapulo-shoulder Joint	
Elbow Joint	
Wrist Joint & Hand	
Lower Extremity	
Hip & pelvis	
Knee joint	
Patello femoral joint	
Ankle and foot	
Temporomandibular joint	
III. Biomechanics of vertebral column	10H
IV. BIOMECHANICS OF GAIT:	15H
Gait cycle	
Spatio-temporal parameters of gait	
Kinematics and Kinetics of human gait	
Determinants of gait	
Gait deviations in various orthopedic/neurological conditions	
V. POSTURE:	10H
Anatomical aspects of posture	
Factors affecting posture	
Assessment of Posture	
Types of Posture	
Postural deviation	

TEXTBOOK: Kinesiology: The Mechanics and Pathomechanics of Human Movement, Carol A. Oatis, Jaypee, All chapters.