

GURUGRAM UNIVERSITY, GURUGRAM

(Established under Haryana Act 17 of 2017)



Structure & Syllabi of

Bachelor of Science

(Four Year and six months Graduate Program)

Effective from the Academic Session-2020-21

**Department of Physiotherapy
Gurugram University Gurugram
Haryana**

Dr. Anshu
Sharma

BACHELOR DEGREE IN PHYSIOTHERAPY

Objective: To prepare highly skilled and efficient physiotherapists who have a thorough knowledge of the theoretical and practical aspects of the field

- a. Name of the Program: Bachelor in Physiotherapy (BPT)
- b. Nature: Regular
- c. Duration: Four and a half years.
- d. Pattern: Semester System

Introduction

A candidate for the Bachelor Degree in Physiotherapy will pursue his/ her studies in Gurugram University, Gurugram for four academic Sessions (Eight Semesters) and six months compulsory internship after passing the final examination. The course will comprise of four and half years, first year, second year, third year and fourth year and six months internship. Each year consist of two semesters. The date of examinations for first, third, fifth and seventh semesters will be held in the month of November/December and the examination for the second, fourth, sixth and eighth semesters shall be held in the month of April/ May or such other dates as may be fixed by the University Authorities.

Eligibility Criteria: Candidate seeking admission must possess the following:

Have attained or shall attain the age of 17 Years on 31st December of the year of his/her admission to the department.

Have Passed 12th standard examination conforming to 10+2 system (Medical Stream i.e. Physics, Chemistry, Biology) of the Central Board of Secondary Examination or equivalent with 50% marks.

The admission will be based on the Criteria decided by the Gurugram University, Gurugram for admission.

1. Every candidate shall pay the fees as prescribed by the authorities at the time of admission.
2. The students admitted to the course shall attend such lecture classes, practical classes, clinical postings and seminars as prescribed in the course.
3. The students shall be considered to have completed the course, if they have attended not less than 75% of the theory & practical. Condonation of lectures will be as per University rules.
4. The candidate shall be examined in such theory papers and practical examinations as may be prescribed in the syllabus approved by the Academic Council.

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5. The medium of instruction shall be English. The Candidate must answer questions in the examination in English only.
6. A Candidate shall be declared to have passed the examination if he/she obtained not less than 50% of the marks in theory & practical papers separately.
7. The examination will consist of papers according to the syllabus prescribed for that part. The duration of each paper and the allotment of marks for each paper will be as per the scheme of examination approved by the concerned Board of studies.
8. The teacher/teachers concerned/in charge of each paper/practical class will be responsible for the evaluation and submission of the internal assessment.

(i) For internal assessment in Practical/clinics Department may decide according to the requirements of course.

(ii) To pass in a paper the candidate must secure 50% marks in the external examination and 50% marks in aggregate (internal and external).

(iii) For a candidate who fails in a paper(s), his internal assessment examination for all paper will be carried over and the supplementary examination will; therefore, consists of only an external examination.

Internship: After passing VIII semester in university examination, student may start Compulsory Rotatory Internship (CRI) in different clinical areas like orthopaedic, cardiothoracic, neurology, general surgery, medicine and paediatric unit immediately. All medical colleges/district hospitals shall be presumed to be recognized to be training centres for the purpose of internship. The internship will be considered to be completed only on successful presentation of the project in front of the board, appointed for this purpose. In case the project is found unsatisfactory the internship period can be extended maximum upto two months, left to the discretion of the Chairman. In such case the extended duration of internship has to be completed in the university OPD only. The candidate shall submit a project under the supervision of a teacher of the department during internship.

The interns maintain the record of work which is to be verified and certified by Sr. Physiotherapist under whom he/she works. Based on the record of work/project and date of evaluation the Chairman shall issue "Certificate of Satisfactory Completion" of training following which the University shall award the BPT degree or declare the candidate eligible for the same.

All successful candidates will be classified as under:

- a. Those who obtain not less than 60% marks-First division (in aggregate of theory and practical examination taken together)
- b. All candidates who obtain less than 60% marks- Second Division
- c. All candidate securing 75% marks or above, in theory paper OR in practical shall be declared to have obtained distinction that paper(s)

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SEMESTER – I THEORY

Course Code	Course Title
BPT 111	Human Anatomy-I
BPT 112	Physiology- I
BPT 113	Exercise Therapy –I
BPT 114	Electro Therapy -I
BPT 115	Biochemistry
BPT 116	Environment Sciences

Course Code	Course Title	Hours/ Week	Credit	Maximum Marks Allowed		
				External Assessment	Internal Assessment	Total
BPT 111	Human Anatomy-I	4 hrs	4	80	20	100
BPT 112	Physiology- I	4 hrs	4	80	20	100
BPT 113	Exercise Therapy –I	4 hrs	4	80	20	100
BPT 114	Electro Therapy -I	4 hrs	4	80	20	100
BPT 115	Biochemistry	2 hrs	2	80	20	100
BPT 116	Environment Sciences	2 hrs	2	80	20	100

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SEMESTER-I PRACTICAL

Course Code	Course Title
BPT 117P	Human Anatomy-I
BPT 118P	Physiology- I
BPT 119P	Exercise Therapy -I
BPT 1110P	Electro Therapy -I

SEMESTER-I PRACTICAL

Course Code	Course Title	Hours/ Week	Credit	Maximum Marks Allowed		
				External Assessment	Internal Assessment	Total
BPT 117P	Human Anatomy-I	4 hrs	2	80	20	100
BPT 118P	Physiology- I	4 hrs	2	80	20	100
BPT 119P	Exercise Therapy -I	4 hrs	2	80	20	100
BPT 1110P	Electro Therapy -I	4 hrs	2	80	20	100

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**SEMESTER – II
THEORY**

Course Code	Course Title
BPT 121	Human Anatomy-II
BPT 122	Physiology- II
BPT 123	Exercise Therapy –II
BPT 124	Electro Therapy -II-
BPT 125	Sociology
BPT 126	Communication Skills

**SEMESTER – II
THEORY**

Course Code	Course Title	Hours/ Week	Credit	Maximum Marks Allowed		
				External Assessment	Internal Assessment	Total
BPT 121	Human Anatomy-II	4 hrs	4	80	20	100
BPT 122	Physiology- II	4 hrs	4	80	20	100
BPT 123	Exercise Therapy –II	4 hrs	4	80	20	100
BPT 124	Electro Therapy -II-	4 hrs	4	80	20	100
BPT 125	Sociology	2 hrs	2	80	20	100
BPT 126	Communication Skills	2 hrs	2	80	20	100

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**SEMESTER – II
PRACTICAL**

Course Code	Course Title
BPT 127P	Human Anatomy-II
BPT 128P	Physiology- II
BPT 129P	Exercise Therapy –II
BPT 1210P	Electro Therapy -II-

**SEMESTER – II
PRACTICAL**

Course Code	Course Title	Hours/ Week	Credit	Maximum Marks Allowed		
				External Assessment	Internal Assessment	Total
BPT 127P	Human Anatomy-II	4 hrs	2	80	20	100
BPT 128P	Physiology- II	4 hrs	2	80	20	100
BPT 129P	Exercise Therapy –II	4 hrs	2	80	20	100
BPT1210P	Electro Therapy -II-	4 hrs	2	80	20	100

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SEMESTER - III THEORY

Course Code	Course Title
BPT 131	Exercise Therapy-III
BPT 132	Electrotherapy-III
BPT 133	Biomechanics & Kinesiology
BPT 134	Pharmacology
BPT 135	Pathology & Microbiology
BPT 136	Psychology

Course Code	Course Title	Hours/ Week	Credit	Maximum Marks Allowed		
				External Assessment	Internal Assessment	Total
BPT 131	Exercise Therapy-III	4 hrs	4	80	20	100
BPT 132	Electrotherapy-III	4 hrs	4	80	20	100
BPT 133	Biomechanics & Kinesiology	4 hrs	4	80	20	100
BPT 134	Pharmacology	4 hrs	4	80	20	100
BPT 135	Pathology & Microbiology	4 hrs	4	80	20	100
BPT 136	Psychology	4 hrs	4	80	20	100

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SEMESTER - III PRACTICAL

Course code	Course Title
BPT 137P	Exercise Therapy-III
BPT 138P	Electrotherapy-III
BPT 139P	Biomechanics & Kinesiology

Course code	Course Title	Hours/ Week	Credit	Maximum Marks Allowed		
				External Assessment	Internal Assessment	Total
BPT 137P	Exercise Therapy-III	4 hrs	2	80	20	100
BPT 138P	Electrotherapy-III	4 hrs	2	80	20	100
BPT 139P	Biomechanics & Kinesiology	4 hrs	2	80	20	100

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SEMESTER IV THEORY

Paper Code	TITLE PAPER
BPT241	Exercise Therapy-IV
BPT242	Electrotherapy-IV
BPT243	Biomechanics & Kinesiology-II
BPT244	Computer Applications

Paper Code	TITLE PAPER	Teaching Hrs/wk	CREDIT	MAXIMUM MARKS ALLOWED		
				External Assessment	Internal Assessment	Total
BPT241	Exercise Therapy-IV	4Hrs	4	80	20	100
BPT242	Electrotherapy-IV	4Hrs	4	80	20	100
BPT243	Biomechanics & Kinesiology-II	4Hrs	4	80	20	100
BPT244	Computer Applications	4Hrs	4	80	20	100
	Clinical training	4Hrs	4	80	20	----

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**SEMESTER IV
PRACTICAL**

Paper Code	TITLE PAPER
BPT245P	Exercise Therapy-IV
BPT246P	Electrotherapy-IV
BPT247P	Biomechanics & Kinesiology-II
BPT248P	Computer Applications

Paper Code	TITLE PAPER	Teaching Hrs/wk	Credit	MAXIMUM External Assessment	MARKS Internal Assessment	Allowed Total
BPT245P	Exercise Therapy-IV	4Hrs	2	80	20	100
BPT246P	Electrotherapy-IV	4Hrs	2	80	20	100
BPT247P	Biomechanics & Kinesiology-II	4Hrs	2	80	20	100
BPT248P	Computer Applications	4Hrs	2	80	20	100

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**SEMESTER- V
THEORY**

Paper Code	TITLE PAPER
BPT 351	Orthopaedics-I
BPT 352	Neurology-I
BPT 353	Medicine
BPT 354	Surgery
BPT 355	PT in Obstetrics & Gynecology
BPT 356	Research Methodology
	Clinical Training

Course Code	Course Title	Hours/ Week	Credit	Maximum Marks Allowed		
				External Assessment	Internal Assessment	Total
BPT 351	Orthopaedics-I	4 hrs	4	80	20	100
BPT 352	Neurology-I	4 hrs	4	80	20	100
BPT 353	Medicine	4 hrs	4	80	20	100
BPT 354	Surgery	4 hrs	4	80	20	100
BPT 355	PT in Obstetrics & Gynecology	2 hrs	2	80	20	100
BPT 356	Research Methodology	2 hrs	2	80	20	100
	Clinical Training	8 Hrs				

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**SEMESTER- V
PRACTICAL**

Paper Code	TITLE PAPER
BPT 357P	Orthopaedics-I
BPT 358P	Neurology-I

Course Code	Course Title	Hours/ Week	Credit	Maximum Marks Allowed		
				External Assessment	Internal Assessment	Total
BPT 357P	Orthopaedics-I	4 hrs	2	80	20	100
BPT 358P	Neurology-I	4 hrs	2	80	20	100

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SEMESTER- VI THEORY

Course Code	Course Title
BPT 361	Orthopaedics-II
BPT 362	Neurology-II
BPT 363	Biostatistics
BPT 364	PT in Geriatrics
BPT 365	Organisation in PT Ethics
	Clinical training

Course Code	Course Title	Hours/ Week	Credit	Maximum Marks Allowed		
				External Assessment	Internal Assessment	Total
BPT 361	Orthopaedics-II	4 hrs	4	80	20	100
BPT 362	Neurology-II	4 hrs	4	80	20	100
BPT 363	Biostatistics	4 hrs	4	80	20	100
BPT 364	PT in Geriatrics	4 hrs	4	80	20	100
BPT 365	Organisation in PT Ethics	2 hrs	2	80	20	100
	Clinical training	4 hrs				

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SEMESTER- VI PRACTICAL

Paper Code	TITLE PAPER
BPT 367P	Orthopaedics-II
BPT 368P	Neurology-II

Course Code	Course Title	Hours/ Week	Credit	Maximum Marks Allowed		
				External Assessment	Internal Assessment	Total
BPT 367P	Orthopaedics-II	4 hrs	2	80	20	100
BPT 368P	Neurology-II	4 hrs	2	80	20	100

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SEMESTER VII THEORY

Course Code	Course Title
BPT 471	Physiotherapy in Orthopaedic conditions-I
BPT 472	Physiotherapy in Neurology conditions-I
BPT 473	Physiotherapy in Medicine & Surgery-I
BPT 474	Physiotherapy in Cardiopulmonary Conditions-I
BPT 475	Physiotherapy in Community health
	Clinical Training

Course Code	Course Title	Hours Week	Credit	Maximum Marks Allowed		
				External Assessment	Internal Assessment	Total
BPT 471	Physiotherapy in Orthopaedic conditions-I	4 hrs	4	80	20	100
BPT 472	Physiotherapy in Neurology conditions-I	4 hrs	4	80	20	100
BPT 473	Physiotherapy in Medicine & Surgery-I	4 hrs	4	80	20	100
BPT 474	Physiotherapy in Cardiopulmonary Conditions-I	4 hrs	4	80	20	100
BPT 475	Physiotherapy in Community health	2 hrs	2	80	20	100
	Clinical Training	10 hrs				

SEMESTER-VII PRACTICAL

Course Code	Course Title
BPT 476P	Physiotherapy in Orthopaedic conditions-I
BPT 477P	Physiotherapy in Neurology conditions-I
BPT 478P	Physiotherapy in Medicine & Surgery
BPT 479P	Physiotherapy in Cardiopulmonary Conditions-I
	Clinical Training

Course Code	Course Title	Hours/ Week	Credit	Maximum Marks Allowed		
				External Assessment	Internal Assessment	Total
BPT 476P	Physiotherapy in Orthopaedic conditions-I	4 hrs	4	80	20	100
BPT 477P	Physiotherapy in Neurology conditions-I	4 hrs	4	80	20	100
BPT 478P	Physiotherapy in Medicine & Surgery	4 hrs	4	80	20	100
BPT 479P	Physiotherapy in Cardiopulmonary Conditions-I	4 hrs	4	80	20	100

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SEMESTER-VIII THEORY

Course Code	Course Title
BPT 481	Physiotherapy in Orthopaedic conditions-II
BPT 482	Physiotherapy in Neurology conditions-II
BPT 483	Physiotherapy in Cardiopulmonary Conditions-II
BPT 484	Rehab medicine including orthotics & prosthetics
BPT 485	Project work

Course Code	Course Title	Hours/ Week	Credit	Maximum Marks Allowed		
				External Assessment	Internal Assessment	Total
BPT 481	Physiotherapy in Orthopaedic conditions-II	4 hrs	4	80	20	100
BPT 482	Physiotherapy in Neurology conditions-II	4 hrs	4	80	20	100
BPT 483	Physiotherapy in Cardiopulmonary Conditions-II	4 hrs	4	80	20	100
BPT 484	Rehab medicine including orthotics & prosthetics	4 hrs	4	80	20	100
BPT 485	Project work	8 Hrs	4	80	20	100

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SEMESTER- VIII PRACTICAL

Course Code	Course Title
BPT 486P	Physiotherapy in Orthopaedic conditions
BPT 487P	Physiotherapy in Neurology conditions
BPT 488P	Physiotherapy in Cardiopulmonary Conditions

Course Code	Course Title	Hours/Week	Credit	Maximum Marks Allowed		
				External Assessment	Internal Assessment	Total
BPT 486P	Physiotherapy in Orthopaedic conditions-II	4 hrs	2	80	20	100
BPT 487P	Physiotherapy in Neurology conditions-II	4 hrs	2	80	20	100
BPT 488P	Physiotherapy in Cardiopulmonary Conditions-II	4 hrs	2	80	20	100

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SEMESTER -I

Human Anatomy- I

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 111	Human Anatomy -I	4	4	20	80	100

INSTRUCTION FOR THE PAPER SETTER

The question paper will consist of three sections i.e. A, B, and C. Section A and B will have four questions each from respective sections of the syllabus and will carry 15 marks each.

Out of which students have to attempt two questions from section A and B. Section C will consist of 10 short answers type questions of 2 marks each. This section will cover the entire syllabus uniformly and will carry 20 marks in all.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt two questions each from sections A and B. Section C is a compulsory section consisting of 10 short answer type questions of 2 marks each.

SECTION – A

General and Systemic Anatomy:

1. Introduction: Definition & Scope of Anatomy, Anatomical Position, anatomical Terminology
2. Bones: Composition, Functions, Classification based on Morphology, Development and Structure; Formation / Development of Bones esp. Long Bones; Parts of Long Bones; Blood Supply of Bones;
3. Cartilage: Types and Features
4. Joints: Definition, types, features of fibrous, Cartilaginous & Synovial joints, subtypes of synovial joints, movements of joints, factors permitting and limiting these movements; blood supply of joints; applied aspects.
5. Muscles : Definition, Types, Comparative Feature of Skeletal, Smooth and Cardiac Muscles, parts & structure of Skeletal Muscle including fascicular architecture thereof; Blood supply and nerve supply of Skeletal Muscle; Motor Unit, Types of Skeletal Muscles based on their action i.e. Agonists, Antagonists, Fixators, Synergists, Origin & Insertion, Tendon ;Isometric & Isotonic contractions; Applied Aspects,
6. Connective Tissue: Introduction; Composition i.e. Cellular & Non-Cellular components; Types of connective tissue, Functions; Ligaments; Applied Aspects.

SECTION B

Systemic Anatomy:

- i. Cardiovascular System – General anatomy of heart,
- ii. Respiratory System – Outline of respiratory tract as a whole, trachea, bronchi, pleura & broncho-pulmonary segments of lungs
- iii. Urogenital System – A general anatomy of urogenital system of male and female
- iv. Integumentary System: Structure of skin and its appendages.

Regional Anatomy

1. Head & Neck: Cranial bones, cervical vertebrae, temporo-mandibular joint, atlanto occipital joint, atlanto axial joint, scalp, facial muscles, triangles of neck.
2. Thorax: Ribs, Vertebrae, Intercostal space, joints of thorax, mediastinum, intercostal nerves, muscles and fascia as related to vertebral column, diaphragm.
3. Superior extremity: Bones in detail, muscles origin insertion action nerve supply, joints and their applied anatomy, Breast, axilla, cubital fossa, important spaces, brachial plexus, course of nerves & arteries of the upper extremity, lymphatic and venous drainage.

Books Recommended: -

1. L. Williams & Warwick, Gray's Anatomy – Churchill Livingstone.
2. Inderbir Singh, Textbook of Anatomy with colour Atlas – Vol. 1, 2, 3. Jaypee Brothers.
3. B.D. Chaurasia, Human Anatomy – Volume 1, 2, 3, CBS Publishers & Distributors.
4. McMinn's Last's Anatomy – Regional and applied, Churchill Livingstone.
5. McMinn, et al - A Colour Atlas of Human Anatomy, Mosby.
6. Cunningham Manual of Practical Anatomy Vol. I, II, III, Churchill Livingstone.
7. Inderbir Singh, A Textbook on Human NeuroAnatomy, Jaypee Brothers.
8. Snell – Clinical Anatomy- Lippincott.
9. Halim A. Surface marking and Radiology. Jaypee Brothers

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PHYSIOLOGY- I

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 112	Physiology- I	4	4	20	80	100

INSTRUCTION FOR THE PAPER SETTER

The question paper will consist of three sections i.e. A, B, and C. Section A and B will have four questions each from respective sections of the syllabus and will carry 15 marks each.

Out of which students have to attempt two questions from section A and B. Section C will consist of 10 short answers type questions of 2 marks each. This section will cover the entire syllabus uniformly and will carry 20 marks in all.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt two questions each from sections A and B. Section C is a compulsory section consisting of 10 short answer type questions of 2 marks each.

SECTION-A

- 1. Cell Structure and organelles**
- 2. Blood:** Composition of blood, plasma, proteins formation and their function. functions of R.B.C. Structure, formation and functions of W.B.C.s and platelets. Coagulation and its defects, Bleeding and Clotting time. Blood groups and their significance Rh Factor. Blood transfusion. Reticuloendothelial system, jaundice. Structure and functions of spleen Haemoglobin and E.S.R.
- 3. Cardiovascular System:** Structure, properties of Heart muscle and nerve supply of Heart. Structure, formation and Structure and function of Arteries, arterioles, capillaries and veins. Cardiac cycle and heart sounds, Cardiac output, measurement factors affecting cardiac output, Heart rate and its regulation. Cardiovascular reflexes Blood Pressure its regulations and physiological variations, Haemorrhage, E.C.G, Changes in Muscular exercises.
- 4. Respiratory System:** Mechanics of respiration, IntraPleural and Intra Pulmonary Pressure. Lung Volumes and capacities. O₂ and CO₂ carriage and their exchange in tissues and lungs. Nervous and chemical regulation of respiration-respiratory centres, respiratory states, anoxia, asphyxia, cyanosis and acclimatization.

SECTION-B

- 1. Digestive System:** General outline and salivary digestion. Gastric secretion and its mechanism of secretion and functions. Mechanism of secretion of mucous, intestinal and pancreatic secretions and their functions. Structure, secretions and functions of liver.
- 2. Endocrine System:** Anterior pituitary post pituitary and parathyroid thyroid, Adrenal cortex, Adrenal Medulla, Thymus Pancreas and Blood sugar regulation.

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3. **Reproductive System:** Male sex hormones and their functions, spermatogenesis. Female sex hormones and functions, menstrual cycle, ovulation and contraception. Pregnancy, functions of placenta.
4. **Excretory System:** Structure and Functions of Kidney, Renal Circulation, Auto regulation, G.F.R. Re-absorption of substances by renal tubule, counter current hypothesis. Renal function Tests. Physiology of micturition.

Books Recommended:-

1. Textbook of Medical Physiology –Guyton Arthur (Mosby.)
2. Text book of Physiology –Anand & Manchanda, Tata McGraw Hill.
3. Human Physiology – Vol. 1 & 2, Chatterjee. CC, Calcutta. Medical Allied.
4. Concise Medical Physiology. Chaudhari, S.K, New Central Agency, Calcutta.
5. Principles of Anatomy and Physiology. Tortora & Grabowski –Harper Collins.
6. Text book of Practical Physiology – Ghai – Jaypee

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EXERCISE THERAPY- I

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 113	Exercise Therapy- I	4	4	20	80	100

INSTRUCTION FOR THE PAPER SETTER

The question paper will consist of three sections i.e. A, B, and C. Section A and B will have four questions each from respective sections of the syllabus and will carry 15 marks each.

Out of which students have to attempt two questions from section A and B. Section C will consist of 10 short answers type questions of 2 marks each. This section will cover the entire syllabus uniformly and will carry 20 marks in all.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt two questions each from sections A and B. Section C is a compulsory section consisting of 10 short answer type questions of 2 marks each.

SECTION-A

1. Introduction to therapeutic exercises
2. Review of the principles of mechanics applied to Exercise Therapy: Force, Composition, Resolution, Equilibrium stable, unstable, neutral gravity-LOG-COG, levers-types, application in physiotherapy. Speed, velocity, work, energy, power, acceleration, momentum, friction and inertia
3. Muscle work group action of muscles, angle of pull and mechanical efficiency of the muscles.
4. Starting Positions: Describe the following starting positions, their muscle work, effects and uses. Specify the importance and derived position for each. Standing, Kneeling, Sitting, Lying and Hanging.
5. Classification of therapeutic exercises: Technique, effects, therapeutic uses Active exercise, (free, active, active assisted, resisted). Passive exercises: Relaxed passive movement, forced passive movement

SECTION-B

1. Goniometry: Different methods of measuring range of motion (ROM). Reliability and validity of goniometry. Functional ROM and normal range of motion of various joints. Technique of Goniometry. Demonstration of measurement of individual joint's ROM using goniometer.
2. Mobilisation exercises of the joints region-wise- passive, active and active assisted.

Books Recommended:-

1. Practical Exercise Therapy - Hollis - Blackwell Scientific Publications.
2. Therapeutic Exercises - Basmajian - Williams and Wilkins.
3. Therapeutic Exercises Foundations and Techniques - Kisner and Colby -F.A. Davis.
4. Proprioceptive Neuromuscular Facilitation - Voss et al - Williams and Wilkins.
5. Principle of Exercise Therapy -Gardiner - C.B.S. Delhi.
6. Principles and practices of therapeutic massage - Sinha. Jaypee brothers Delhi.
7. Margaret Hollis- Textbook of Massage.

8. Motor Control: Theory and Practical Applications Shumway - Cook & Woollacott - Lippincott.
9. Hydrotherapy, Principles and Practices - Campion - Butterworth Heinmann.
10. Muscle testing and functions - Kendall - Williams & Wilkins.
11. Daniels and Worthingham's - Muscle testing - Hislop & Montgomery - W.B. Saunders.
12. Measurement of Joint Motion: A Guide to Goniometry - Norkins & White - F.A. Davis.

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ELECTROTHERAPY-1

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 114	Electrotherapy-I	4	4	20	80	100

INSTRUCTION FOR THE PAPER SETTER

The question paper will consist of three sections i.e. A, B, and C. Section A and B will have four questions each from respective sections of the syllabus and will carry 15 marks each.

Out of which students have to attempt two questions from section A and B. Section C will consist of 10 short answers type questions of 2 marks each. This section will cover the entire syllabus uniformly and will carry 20 marks in all.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt two questions each from sections A and B. Section C is a compulsory section consisting of 10 short answer type questions of 2 marks each.

SECTION-A

1. Physical Principles In Relation to Physiotherapy

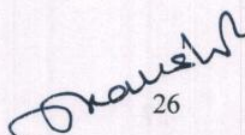
- I. Structure and Properties of matter-solids, liquids and gases, adhesion, surface tension, viscosity, density and elasticity.
Structure of atoms, molecules, elements and compounds, electron theory, static and current electricity.
- II. Conduction, Insulators, Potential difference, Resistance and Intensity. Ohm's Law its application to AC and DC currents.
- III. Rectifying Devices-Thermionic valves, semiconductors, Transistors, Amplifiers, Transducers, Oscillator Circuits. Capacitance, Condensers in DC and AC circuits.
Display devices and indicators-analogue & digital

2. Effects of Current Electricity

- I. Chemical effects- ions and electrolytes, ionization, production of E.M.F by chemical actions.
- II. Magnetic effects, Molecular theory of Magnetism. Magnetic fields, electromagnetic induction.
- III. Milli ammeter and voltmeter, transformers and chosen coil, thermal effects-joules law and heat production.
- IV. Physical principles of light and its properties.
- V. Physical principles of sound and its properties.
- VI. Electromagnetic spectrum-biophysical application.

3. Electrical Supply

- I. Brief outline of main supply of electric current.
- II. Dangers short circuits, electric shocks.
- III. Precautions safety devices, earthing, fuses etc.
- IV. First and initial management of electric shock.


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SECTION-B

1. Low Frequency Currents

- I. Introduction to direct, alternating and modified currents.
- II. Iontophoresis: Biophysics, principles, therapeutic uses, indications, contra- indications, operational skills of equipment and patient preparation.
- III. Faradic current: Biophysics, principles, therapeutic uses, indications, contra- indications, operational skills of equipment and patient preparation
- IV. Interrupted direct current: Biophysics, principles, therapeutic uses, indications, contra-indications, operational skills of equipment and patient preparation.

2. Transcutaneous Electrical Nerve Stimulations (TENS)

- I. Types of low frequency, pulse widths, frequencies and intensities used as TENS applications.
- II. Theories of pain relief by TENS.
- III. Principles of clinical application, effects and uses, indications, contraindications, precautions. Operational skills of equipment and patient preparation.

BOOKS RECOMMENDED:-

1. Electrotherapy Explained: Principles & Practice
2. Low & Reed, Butterworth Heinemann.
3. Clayton's Electrotherapy, Forster & Palastange Baillier Tindal.
4. Therapeutic Heat & Cold, Lehmann, Williams & Wilkins.

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BIOCHEMISTRY

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 115	Biochemistry	2	2	20	80	100

INSTRUCTION FOR THE PAPER SETTER

The question paper will consist of three sections i.e. A, B, and C. Section A and B will have four questions each from respective sections of the syllabus and will carry 15 marks each.

Out of which students have to attempt two questions from section A and B. Section C will consist of 10 short answer type questions of 2 marks each. This section will cover the entire syllabus uniformly and will carry 20 marks in all.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt two questions each from sections A and B. Section C is a compulsory section consisting of 10 short answer type questions of 2 marks each.

SECTION -A

1. **Concepts** of pH and buffers, acid base equilibrium osmotic pressure and its physiological application.
2. **Cell:** morphology, structure, cell membrane, Nucleus, chromatin, Mitochondria, Endoplasmic Reticulum, Ribosomes.
3. **Carbohydrates:** Definition, functions, sources, monosaccharides, Disaccharides, Polysaccharides, mucopolysaccharide and its importance.
4. **Lipids:** Definition, function, sources classification, simple lipid, compound lipid, derived lipid, unsaturated and saturated fatty acid, Essential fatty acids and their importance.
5. **Proteins:** Definition, sources, Classification, simple protein conjugated protein, derived proteins, properties and varieties of proteins.
6. **Bioenergetics:** Concept of free energy charge, Exogenic and endogenic reactions, concepts regarding energy rich compounds. Respiratory chain and Biological oxidation.
7. **Carbohydrate Metabolism:** Glycolysis, HMP shunt pathway, TCA cycle, glycogenesis, glycogenolysis, Gluconeogenesis, Maintenance of Blood glucose, interconversions of different sugars.
8. **Lipid Metabolism:** Fatty acid oxidation, fatty acid synthesis, Metabolism of cholesterol, Ketone bodies, Atherosclerosis and obesity.
9. **Protein Metabolism:** Transamination, Deamination, Fate of ammonia, urea synthesis and synthesis of creatine, inborn errors of metabolism.

SECTION-B

1. **Nucleic acid** Structure and function of DNA and RNA. Nucleosides, nucleotides, Genetic code, biologically important nucleotides. Gene Therapy.
2. **Enzymes:** Definitions, mode of action, factor affecting enzyme action, clinical importance of enzyme.
3. **Vitamins:** Classification, fat soluble vitamins, A, D.E & K water soluble vit. B complex & C, Daily Requirements Physiological functions and diseases of Vitamin deficiency.
4. **Hormones:** General Characteristics and mechanism of Hormone action insulin, glucagon. Thyroid and parathyroid hormones.
5. **Connective tissue:** Mucopolysaccharide connective tissue proteins, glycoprotein, chemistry & Metabolism of bone and tooth, metabolism of skin.
6. **Nerve tissue:** Composition, metabolism, chemical mediators of Nerve activity.
7. **Water and Electrolyte:** Fluid compartment, daily intake and output sodium and potassium metabolism.
8. **Nutrition:** Balance, diet, metabolism in exercise and injury. Diet for chronically ill and terminally ill patients, Nitrogen equilibrium, biological value of protein, special dynamic action.
9. **Dietary Management of Acute & chronic diseases** viz. Heart, Hypertension, Diabetes mellitus, Atherosclerosis, Cancer, Allergies Stomach, Liver, Gallbladder.

BOOKS RECOMMENDED:-

1. Textbook of Biochemistry- Chatterjee M.N.-Jaypee Brothers.
2. Textbook of Biochemistry for Medical Students Vasudeva D.M. Jaypee Brothers.
3. Clinical Biochemistry- metabolic & Clinical aspects- Marshall & Bangert- Churchill Livingstone.
4. Biochemistry Southerland-Churchill Livingstone.
5. Drugs in Sports: 2nd Ed; David R. Mottram and Sally Gunnel E. & F.N.Span.
6. Normal and Therapeutic Nutrition Robison H. Cortinne et al; 8th Edition. Macmillan Publish Company, New York. Physiological Chemistry 28th Ed. By Harpar.

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ENVIRONMENTAL SCIENCES

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 116	ENVIRONMENTAL SCIENCES	2	2	20	80	100

INSTRUCTION FOR THE PAPER SETTER

The question paper will consist of three sections i.e. A, B, and C. Section A and B will have four questions each from respective sections of the syllabus and will carry 15 marks each.

Out of which students have to attempt two questions from section A and B. Section C will consist of 10 short answer type questions of 2 marks each. This section will cover the entire syllabus uniformly and will carry 20 marks in all.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt two questions each from sections A and B. Section C is a compulsory section consisting of 10 short answer type questions of 2 marks each.

COURSE OBJECTIVES AND COURSE OUTCOMES

This course enhances knowledge skills and attitude towards the environment and understanding the natural environment and its relationship with human activities.

The students will be able to analyse human impacts on the environment.

SECTION-A

Unit I

1. The multidisciplinary nature of environmental studies

1. Definition, scope and importance
2. Need for public awareness.
3. Concept, structure and function of ecosystem: Producers, consumers and decomposers,
4. Energy flow in the ecosystem, Ecological succession, Food chains, Food webs and ecological pyramids

2. Ecosystems

1. Concept of an ecosystem
2. Structure and function of an ecosystem
3. Procedures, consumers and decomposers
4. Energy flow in the ecosystem
5. Ecological success.
6. Food chains food webs and ecological pyramids.

3. Introduction, types, characteristic features, structure and functions of the following ecosystem.

1. Forest ecosystem
2. Grassland ecosystem
3. Desert ecosystem
4. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

4. Biodiversity and its conservations

Introduction-Definition: genetic, species and ecosystem diversity.

- i. Value of Biodiversity: consumptive use, productive use, social, ethical, aesthetic and option value.
- ii. Biodiversity at global, national and local levels.

- iii. India as a meta-diversity
- iv. Hot-spots of Biodiversity
- v. Threats to biodiversity: habitual loss, pashing of wildlife, man-wildlife conflicts.
- vi. Endangered and endemic species of India.
- vii. Conservation of biodiversity: In-situ and ex- situ conservation of biodiversity

Unit II

1. Renewable and nor-renewable resources:

2. Nature resources and associated problems.

- i. Forest resources: Use and over-exploitation, deforestation, case studies Timber extraction, mining, dams and their effects on forests and tribal peoples.
- ii. Water resources: Use and over utilization of surface and ground water, floods, drought, conflicts over water, dam benefit and problem.
- iii. Mineral resources: Use and exploitation environmental effects of extracting and using mineral resources, case studies.
- iv. Food resources: World food problem manage caused by agriculture and overgrazing, effects of modern agriculture fertilizer-pesticide problems, water logging, salinity, case studies.
- v. Energy resources: Growing energy need, renewable and nonrenewable energy sources use of alternate energy sources' studies.
- vi. Land resources: Land as a resource and degradation, man induced landslides, soil corrosion and desertification.
- vii. Role of an individual in conservation of natural resources.
- viii. Equitable use of resources for sustainable lifestyles.

SECTION-B

Unit III

1. Environmental Pollution-Definition, causes: effects and control measures of :

- i. Air pollution.
- ii. Water pollution
- iii. Soil pollution
- iv. Marine Pollution
- v. Noise Pollution
- vi. Thermal pollution
- vii. Nuclear hazards.

2. Solid waste management: Causes, effects and control measures of urban and industrial wastes.

3. Pole of an individual in prevention of pollution

4. Pollution case studies

5. Disaster management: floods, earthquakes, cyclones and landslides. Climate change, global warming, acid rain, ozone layer depletion.

6. Different laws related to environment:

- i. Environment Protection Act
- ii. Air (Prevention and control of Pollution) Act
- iii. Water (Prevention and control of Pollution) Act
- iv. Wildlife Protection Act.
- v. Forest Conservation Act.

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7. International agreements : Montreal and Kyoto protocol and natural reserves, Tribal populations and human health

Unit IV

1. Concept of sustainability and sustainable development.
2. Water conservation, rain harvesting, and watershed management
3. Resettlement and rehabilitation of people: its problems and concerns, case studies
4. Environment ethics: Role of Indian and other religion and cultures in environmental conservation, Environmental communication and public awareness, case studies (eg, CNG vehicles in Delhi), Human Population growth: Impact on environment ,human health and welfare ,Environment movements: Chipko movement, Silent valley movement, Bishnois of Rajasthan.

BOOKS RECOMMENDED:

1. Erach Bharucha ``Environmental studies for undergraduates courses'', University grants commission and Bharati Vidyapeeth institute of environmental education and research, Pune, University press pvt. Ltd. (India).
2. Fundamental concepts in environmental studies by Dr. DD. Mishra. S Chand publications.
3. Essentials of ecology and environmental sciences by Dr. SVS Rana. PHI Learning Pvt. Ltd., Delhi
4. Environmental chemistry by Anil Kumar De, Wiley eastern limited.
5. Environmental science by T.G Miller, Wadsworth publishing Co, 13th edition
6. Ecology and environment by PD. Sharma, Rastogi publications.

SEMESTER- I
PRACTICAL EXAMINATION
HUMAN ANATOMY-I

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 117 P	HUMAN ANATOMY-I	4	2	20	80	100

1. Surface Anatomy: To study, identify and mark the surface landmarks on the human body.
2. To study the bones of the human body with special emphasis on origin on a dissected human muscles and ligaments.
3. To study the anatomy of joints of upper extremities on a dissected human body. (Interactive CD)
4. To study the gross anatomy of Respiratory, Digestive, Endocrine, Urinary and Genital system on a dissected human body/ interactive CD.

Books Recommended:

1. L. Williams & Warwick, Gray's Anatomy – Churchill Livingstone.
2. Inderbir Singh, Textbook of Anatomy with colour Atlas – Vol. 1, 2, 3. Jaypee Brothers.
3. B.D. Chaurasia, Human Anatomy – Volume 1, 2, 3, CBS Publishers & Distributors.
4. McMinn's Last's Anatomy – Regional and applied, Churchill Livingstone.
5. McMinn, et al - A Colour Atlas of Human Anatomy, Mosby.
6. Cunningham Manual of Practical Anatomy Vol. I, II, III, Churchill Livingstone.
7. Snell – Clinical Anatomy- Lippincott.

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HUMAN PHYSIOLOGY I (PRACTICAL PAPER)

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 118 P	HUMAN PHYSIOLOGY I	4	2	20	80	100

To study the following Physiological Phenomenon: -

1. Identification of blood cells and different counts.
2. W.B.C. Count.
3. R.B.C. Count.
4. Haemoglobin percentage and color index.
5. E.S.R. and Blood groups.
6. Bleeding time and clotting time.
7. Cardio - Respiratory efficiency tests.
8. Artificial respiration and C.P.R.
9. Pulse rate, Heart rate and measurement of Blood Pressure.
10. Respiratory rate and Auscultation.
11. Normal E.C.G.

Books Recommended:

1. Textbook of Medical Physiology –Guyton Arthur (Mosby.)
2. Text book of Physiology –Anand & Manchanda, Tata McGraw Hill.
3. Human Physiology – Vol. 1 & 2, Chatterjee. CC, Calcutta. Medical Allied.
4. Concise Medical Physiology. Chaudhari, S.K, New Central Agency, Calcutta.
5. Principles of Anatomy and Physiology. Tortora & Grabowski –Harper Collins.
6. Text book of Practical Physiology – Ghai – Jaypee.

EXERCISE THERAPY I (PRACTICAL PAPER)

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 119 P	EXERCISE THERAPY I	4	2	20	80	100

1. To practice all the soft tissue manipulative techniques region wise – upper limb, lower limb, neck, back and face.
2. To practice the measurement of ROM of joints – upper limb, lower limb & trunk.
3. To practice the relaxed passive movement, and demonstration of the mobilisation exercises region wise.
4. To study the position of joints, muscle work, and stability of various fundamental and derived positions.

Books Recommended:

1. Practical Exercise Therapy - Hollis - Blackwell Scientific Publications.
2. Therapeutic Exercises - Basmajian - Williams and Wilkins.
3. Therapeutic Exercises Foundations and Techniques - Kisner and Colby -F.A. Davis.
4. Proprioceptive Neuromuscular Facilitation - Voss et al - Williams and Wilkins.
5. Principle of Exercise Therapy -Gardiner - C.B.S. Delhi.
6. Principles and practices of therapeutic massage - Sinha. Jaypee brothers Delhi
7. Margaret Hollis-Textbook of Massage.
8. Motor Control: Theory and Practical Applications Shumway - Cook & Wallcott - Lippincott.
10. Daniels and Worthingham's - Muscle testing - Hislop & Montgomery - W.B. Saunders.
11. Measurement of Joint Motion: A Guide to Goniometry - Norkins & White - F.A. Davis.

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ELECTROTHERAPY I PRACTICAL PAPER

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 1110 P	ELECTROTHERAPY I	4	2	20	80	100

1. To study the basic operation of electric supply to the equipment and safety devices.
2. To experience sensory and motor stimulation of nerves and muscles by various types of low frequency currents on self.
3. To locate and stimulate different motor points region wise including the upper & lower limb, trunk face.
4. Therapeutic application of different low frequency current Faradic foot bath, faradism under pressure.
5. Iontophoresis.
6. To study a TENS simulator, its operator and application region wise.

BOOKS RECOMMENDED

1. Electrotherapy Explained: Principles & Practice Low& Reed, Butterworth Heinemann.
2. Claytons Electro Electrotherapy, Forster & Palastange Baillier Tindal.
3. Therapeutic Heat & Cold, Lehmann, Willians & Wilkins.
4. Principles & Practice of Electrotherapy, Kahn, Churchill Livingstone.

Semester II

HUMAN ANATOMY-II

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 121	Human Anatomy- II	4	4	20	80	100

INSTRUCTION FOR THE PAPER SETTER

The question paper will consist of three sections i.e. A, B, and C. Section A and B will have four questions each from respective sections of the syllabus and will carry 15 marks each. Out of which students have to attempt two questions from section A and B. Section C will consist of 10 short answer type questions of 2 marks each. This section will cover the entire syllabus uniformly and will carry 20 marks in all.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt two questions each from sections A and B. Section C is a compulsory section consisting of 10 short answer type questions of 2 marks each.

Section- A

1. **Inferior extremity :** Bones in detail, muscles origin, insertion, action, nerve supply, joints and their applied anatomy, Arches of foot and its applied anatomy, femoral triangle, popliteal fossa, Greater & Lesser Sciatic Foramen; lumbar plexus, sacral plexus, course of nerves & arteries of the lower extremity, lymphatic and venous drainage.
2. **Abdomen and pelvis:** Lumbar vertebra sacrum, bony pelvis, anterior abdominal wall, inguinal canal, liver, gallbladder, Kidney, ureter, suprarenal gland, urethra, joints of pelvis

Section – B

Neuro – Anatomy:

1. Peripheral Nerves, Neuromuscular Junction, Sensory End Organs
2. Spinal Cord Segments & Areas, Brainstem, Cerebellum, Inferior colliculi. Superior Colliculi, Diencephalon, Hypothalamus, Epithalamus, Thalamus Cerebral hemispheres. Corpus striatum.
3. Rhinencephalon, Lateral ventricles, Fourth ventricle, CSF circulation, Meninges, Blood supply of the brain Internal Capsule, Thalamocortical radiations. Pyramidal systems. Extra – pyramidal systems. Anatomic integration, Intra – cortical integration
4. Sympathetic system. Parasympathetic system, Cranial nerves.

Books Recommended: -

1. L. Williams & Warwick, Gray's Anatomy – Churchill Livingstone.
2. Inderbir Singh, Textbook of Anatomy with colour Atlas – Vol. 1, 2, 3. Jaypee Brothers.
3. B.D. Chaurasia, Human Anatomy – Volume 1, 2, 3, CBS Publishers & Distributors.
4. McMinn's Last's Anatomy – Regional and applied, Churchill Livingstone.
5. McMinn, et al - A Colour Atlas of Human Anatomy, Mosby.
6. Cunningham Manual of Practical Anatomy Vol. I, II, III, Churchill Livingstone.
7. Inderbir Singh, A Textbook on Human NeuroAnatomy, Jaypee Brothers.

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HUMAN PHYSIOLOGY-II

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 122	Human Physiology-II	4	4	20	80	100

INSTRUCTION FOR THE PAPER SETTER

The question paper will consist of three sections i.e. A, B, and C. Section A and B will have four questions each from respective sections of the syllabus and will carry 15 marks each. Out of which students have to attempt two questions from section A and B. Section C will consist of 10 short answer type questions of 2 marks each. This section will cover the entire syllabus uniformly and will carry 20 marks in all.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt two questions each from sections A and B. Section C is a compulsory section consisting of 10 short answer type questions of 2 marks each.

SECTION - A

1. **Muscle physiology:** Types of muscle, Microscopic structure of Muscle, Properties of Muscle, comparison of various types. Sarcomere, Mechanism of muscular contraction. Thermal and chemical changes during muscular contraction. Starling's law, isotonic, Isometric contractions, Chronaxie, Rheobase. Action potential. Motor units and its properties clonus, tetanus, fatigue, summation, all or none law beneficial effect. Electromyography applied aspects.
2. **Nerve physiology:** Nerve fibers- Classification, spread of impulse. Velocity of nerve conduction, factors affecting velocity. Saltatory conduction, neuromuscular junction, Drugs acting on it, Myasthenia gravis, atrophy, hypotrophy and hypertrophy. Degeneration and regeneration of Nerve fiber, Wallerian Degeneration, Electrotonus Pfluger's Law.
3. **Special senses:** Hearing, vision, Taste, Smell and Touch and speech Disorders

SECTION- B

Nervous System :

Autonomic Nervous System.

- i. Types and properties of Receptors types of sensations.
- ii. Structure of synapse, Reflex arc and its properties, occlusion summation, sub minimal fringe etc.
- iii. Sensory Tracts of Spinal cord.
- iv. Motor Tracts, Pyramidal and Extra pyramidal.

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- v. Hemisection and complete section of spinal cord, upper and lower motor neuron lesions.
- vi. Cerebral Cortex, areas and functions, E.E.G.
- vii. Structure, connections and functions of Cerebellum and Hypothalamus.
- viii. Basal ganglia and Thalamus, connection and functions.
- ix. Reticular formation tone, Posture and Vestibular apparatus.

Books Recommended:-

1. Textbook of Medical Physiology –Guyton Arthur (Mosby.)
2. Text book of Physiology –Anand & Manchanda, Tata McGraw Hill.
3. Human Physiology – Vol. 1 & 2, Chatterjee. CC, Calcutta. Medical Allied.
4. Concise Medical Physiology. Chaudhari, S.K, New Central Agency, Calcutta.
5. Principles of Anatomy and Physiology. Tortora & Grabowski –Harper Collins.
6. Text book of Practical Physiology – Ghai – Jaypee

EXERCISE THERAPY - II

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 123	Exercise Therapy- II	4	4	20	80	100

INSTRUCTION FOR THE PAPER SETTER

The question paper will consist of three sections i.e. A, B, and C. Section A and B will have four questions each from respective sections of the syllabus and will carry 15 marks each. Out of which students have to attempt two questions from section A and B. Section C will consist of 10 short answers type questions of 2 marks each. This section will cover the entire syllabus uniformly and will carry 20 marks in all.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt two questions each from sections A and B. Section C is a compulsory section consisting of 10 short answer type questions of 2 marks each.

SECTION-A

Muscle grading, basics of muscle testing, describe the testing of the muscles of

1. The upper extremities
2. Lower extremities,
3. Trunk
4. Face

SECTION-B

1. Definition and classification of various types of soft tissue manipulation techniques.
2. Physiological effects, therapeutic effects and contraindications of soft tissue manipulation.
3. Classify, define and describe: effleurage, stroking, kneading, petrissage, deep friction, vibration and shaking etc.
4. Techniques, sequence and preparation for massage of upper limb, lower limb, back and face.

BOOKS RECOMMENDED:

1. Practical Exercise Therapy - Hollis - Blackwell Scientific Publications.
2. Therapeutic Exercises - Basmajian - Williams and Wilkins.
3. Therapeutic Exercises Foundations and Techniques - Kisner and Colby -F.A. Davis.
4. Proprioceptive Neuromuscular Facilitation - Voss et al - Williams and Wilkins.
5. Principle of Exercise Therapy -Gardiner - C.B.S. Delhi.
6. Principles and practices of therapeutic massage - Sinha. Jaypee brothers Delhi
7. Margaret Hollis-Textbook of Massage.
8. Motor Control: Theory and Practical Applications Shumway - Cook & Walcott - Lippincott.
9. Hydrotherapy, Principles and Practices - Campion - Butterworth Heinmann.
10. Muscle testing and functions - Kendall - Williams & Wilkins.
11. Daniels and Worthingham"s - Muscle testing - Hislop & Montgomery - W.B. Saunders.
12. Measurement of Joint Motion: A Guide to Goniometry - Norkins & White - F.A Davis.

ELECTROTHERAPY-II

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 124	Electrotherapy-II	4	4	20	80	100

INSTRUCTION FOR THE PAPER SETTER

The question paper will consist of three sections i.e. A, B, and C. Section A and B will have four questions each from respective sections of the syllabus and will carry 15 marks each.

Out of which students have to attempt two questions from section A and B. Section C will consist of 10 short answer type questions of 2 marks each. This section will cover the entire syllabus uniformly and will carry 20 marks in all.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt two questions each from sections A and B. Section C is a compulsory section consisting of 10 short answer type questions of 2 marks each.

SECTION-A

Electrical Reactions and Electro-Diagnostic Tests

1. Electrical stimuli and normal behavior of nerve and muscle tissue.
2. Types of lesion and development of reaction of degeneration.
3. Faradic/Intermittent direct current test.
4. S.D. Curve and its application.
5. Chronaxie, Rheobase and pulse ratio.

SECTION-B

1. Infrared rays-Wavelength, frequency, types and sources of IRR generation techniques of irradiation, physiological and therapeutic effects indications, contraindications, precautions, Operational skills of equipment and patient Preparation.
2. Ultra Violet Rays(UVR)
 - i. Wavelength, frequency, types & sources of UVR, generation techniques of irradiation, physiological and therapeutic effects, indications, contraindications. Precautions, Operational skills of equipment and patient preparation.
 - ii. Dosimetry of UVR.
3. Superficial Heat: Paraffin wax bath, moist heat, electrical heating pads.
 - i. Mechanism of production.
 - ii. Mode of heat transfer.
 - iii. Physiological & therapeutic effects.
 - iv. Indications, contraindications, precautions, operational skills of equipment and patient preparation.

SOCIOLOGY

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 125	SOCIOLOGY	2	2	20	80	100

INSTRUCTION FOR THE PAPER SETTER

The question paper will consist of three sections i.e. A, B, and C. Section A and B will have four questions each from respective sections of the syllabus and will carry 15 marks each. Out of which students have to attempt two questions from section A and B. Section C will consist of 10 short answer type questions of 2 marks each. This section will cover the entire syllabus uniformly and will carry 20 marks in all.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt two questions each from sections A and B. Section C is a compulsory section consisting of 10 short answer type questions of 2 marks each.

SECTION A

- I. **Introduction: Definitions of sociology**, sociology as a science of society, uses of the study of sociology, application of knowledge of sociology in health and physiotherapy.
- II. **Sociology & Health**: Social factors affecting health status, social consciousness and perception of illness, social consciousness and meaning of illness, decision making in taking treatment. Institutions of health, their role in the improvement of the health of the people
- III. **Socialization**: Meaning of socialization, influence of social factor on personality,
- IV. **Socialization** in hospitals, socialization in the rehabilitation of patients
- V. **Social Groups**: Concept of social groups, influence of formal and informal groups on health and sickness, the role of primary groups and secondary groups in the hospitals and rehabilitation settings.
- VI. **Family** : Influence of family on human personality, discussion of changes in the functions of a family, influence of family on the individual's health, family and nutrition, the effects of sickness on family, and psychosomatic disease.
- VII. **Community**: Concept of community, role of rural and urban communities in public health, role of community in determining beliefs, practices and home remedies in treatment.
- VIII. **Culture**: Components of culture. Impact of culture on human behavior, cultural meaning of sickness, response & choice of treatment (role of culture as social consciousness in molding the perception of reality), and culture induced symptoms and disease, sub – culture of medical workers.

SECTION B

- I. Community resources and their uses
- II. Social Problems of the Disabled: Consequences of the following social problems in relation to sickness and disability; remedies to prevent these problems:
- III. Population explosion
- IV. Poverty and unemployment

- V. Beggary
- VI. Crime
- VII. Alcoholism and drug abuse
- VIII. Role of commonly leaders and health professionals in health promotion

Books Recommended

- 1) McGee - Sociology - Drydon Press Illinois.
- 2) Kupuswamy - Social Changes in India - Vikas, Delhi.
- 3) Ahuja - Social Problems - Bookhive, Delhi.
- 4) Ginnsberg - Principles of Sociology - Sterling Publications.
- 5) Parter & Alder - Psychology & Sociology applied to medicine - W.B. Saunders.
- 6) Julian - Social Problems - Prentice Hall.

COMMUNICATION SKILLS

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 126	Communication Skills	2	2	20	80	100

INSTRUCTION FOR THE PAPER SETTER

The question paper will consist of three sections i.e. A, B, and C. Section A and B will have four questions each from respective sections of the syllabus and will carry 10 marks each. Out of which students have to attempt two questions from section A and B. Section C will consist of 15 short answers type questions of 2 marks each. This section will cover the entire syllabus uniformly and will carry 30 marks in all.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt two questions each from sections A and B. Section C is a compulsory section consisting of 15 short answer type questions of 2 marks each.

Course Content

Unit 1: Language and Communication: Definition of Communication; Function and purpose of Communication; Process of Communication; Barriers of Effective Communication; Types of communication, Verbal communication, on-verbal communication; The Impact of Communication on Performance

Unit 2: Remedial English: Parts of Speech; Sentences; Subject-Verb Agreement; Active Voice and Passive Voice; Degrees of Comparison; Direct and Indirect Speech; Question Tags

Unit 3: Oral Communications: Advantages and disadvantages of oral communication; Improving oral communication; One-to-One oral communication; Oral Presentations

Unit 4: Listening Skills: What is listening; Types of Listening; Barriers of Effective Listening; Strategies for Effective Listening; Semantic Markers; Listening to Complaints.

Unit 5: Writing Skills: Note Taking; Paraphrasing; Elements of writing; Business Letter Writing; Other Business Communications.

BOOKS RECOMMENDED:

1. Adair, John. Effective Communication. London: Pan Macmillan Ltd., 2003.
2. Ajmani, J. C. Good English: Getting it Right. New Delhi: Rupa Publications, 2012.
3. Amos, Julie-Ann. Handling Tough Job Interviews. Mumbai: Jaico Publishing, 2004.

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SEMESTER-II PRACTICAL EXAMINATION

HUMAN ANATOMY-II

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 127 P	HUMAN ANATOMY-II	4	2	20	80	100

1. To study the muscles of the trunk, lower and upper extremities and face on a dissected human body.
2. To study the bones of the human body with special emphasis on origin on a dissected human muscles and ligaments.
3. To study the anatomy of joints of lower extremities and vertebral columns on a dissected human body. (Interactive CD)
4. To study the anatomy of C.N.S. and P.N.S. on a dissected human body. (Interactive CD)

Books Recommended:

1. L. Williams & Warwick, Gray's Anatomy – Churchill Livingstone.
2. Inderbir Singh, Textbook of Anatomy with colour Atlas – Vol. 1, 2, 3. Jaypee Brothers.
3. B.D. Chaurasia, Human Anatomy – Volume 1, 2, 3, CBS Publishers & Distributors.
4. McMinn's Last's Anatomy – Regional and applied, Churchill Livingstone.
5. McMinn, et al - A Colour Atlas of Human Anatomy, Mosby.
6. Cunningham Manual of Practical Anatomy Vol. I, II, III, Churchill Livingstone.
7. Snell – Clinical Anatomy- Lippincott.

**HUMAN PHYSIOLOGY II
PRACTICAL PAPER**

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 128 P	HUMAN PHYSIOLOGY II	4	2	20	80	100

To study the following Physiological Phenomenon: -

1. Reflexes – Superficial Deep.
2. Sensations.
3. Tests for functions of Cerebrum.
4. Tests for functions of Cerebellum.

Books Recommended:

1. Textbook of Medical Physiology –Guyton Arthur (Mosby.)
2. Text book of Physiology –Anand & Manchanda, Tata McGraw Hill.
3. Human Physiology – Vol. 1 & 2, Chatterjee. CC, Calcutta. Medical Allied.
4. Concise Medical Physiology. Chaudhari, S.K, New Central Agency, Calcutta.
5. Principles of Anatomy and Physiology. Tortora & Grabowski –Harper Collins.

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**EXERCISE THERAPY II
PRACTICAL PAPER**

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 129 P	EXERCISE THERAPY II	4	2	20	80	100

- 1) To practice all the soft tissue manipulative techniques region wise – upper limb, lower limb, neck, back and face.
- 2) To study the different types of muscle contraction, muscle work, group action of muscles and co- coordinated movements.

Books Recommended:

1. Practical Exercise Therapy - Hollis - Blackwell Scientific Publications.
2. Therapeutic Exercises - Basmajian - Williams and Wilkins.
3. Therapeutic Exercises Foundations and Techniques - Kisner and Colby -F.A. Davis.
4. Proprioceptive Neuromuscular Facilitation - Voss et al - Williams and Wilkins.
5. Principle of Exercise Therapy -Gardiner - C.B.S. Delhi.
6. Principles and practices of therapeutic massage - Sinha. Jaypee brothers Delhi
7. Margaret Hollis-Textbook of Massage.
8. Motor Control: Theory and Practical Applications Shumway - Cook & Wallcott - Lippincott.
10. Muscle testing and functions - Kendall - Williams & Wilkins.
11. Daniels and Worthingham"s - Muscle testing - Hislop & Montgomery - W.B. Saunders.

**ELECTROTHERAPY II
(PRACTICAL PAPER)**

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 1210 P	ELECTROTHERAPY II	4	2	20	80	100

- 1) To plot strength duration curve
- 2) To find Chronaxie and Rheobase.
- 3) To study the various types of IR lamps and their application to body region wise.
- 4) To study a paraffin wax bath unit, its operation and different methods of application region wise.
- 5) To study the different types of UV unit, their operation assessment of test does and application of UVR region wise.

BOOKS RECOMMENDED

1. Electrotherapy Explained: Principles & Practice Low& Reed, Butterworth Heinemann.
2. Clayton's therapy, Forster & Palastange Baillier Tindal.
3. Therapeutic Heat & Cold, Lehmann, Willians & Wilkins.
4. Principles & Practice of Electrotherapy, Kahn, Churchill Livingstone.

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SEMESTER-III

EXERCISE THERAPY - III

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 231	Exercise Therapy- III	4	4	20	80	100

INSTRUCTION FOR THE PAPER SETTER

The question paper will consist of three sections i.e. A, B, and C. Section A and B will have four questions each from respective sections of the syllabus and will carry 15 marks each. Out of which students have to attempt two questions from section A and B. Section C will consist of 10 short answer type questions of 2 marks each. This section will cover the entire syllabus uniformly and will carry 20 marks in all.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt two questions each from sections A and B. Section C is a compulsory section consisting of 10 short answer type questions of 2 marks each.

SECTION-A

- I. **Therapeutic Exercises:** introduction, definition of therapeutic exercises.
Range of motion, & volume evaluation-
 - Muscle evaluation methods: manual muscle testing
 - Goniometry
 - Limb girth and length measurement.
- II. **Relaxation:** Describe relaxation, muscle fatigue, muscle spasm and tension (mental & physical); Factors contributing to fatigue & tension; Techniques of relaxation (local and general) including effects, uses & clinical application.
- III. **Strength Training**
 - Etiogenesis of muscle weakness
 - General techniques of strengthening including the effects
 - Principles
 - Indication, contraindications & precautions
 - PRE
 - Endurance & training protocols
- IV. **Suspension Therapy:** Definition, principles, equipment & accessories; indications & contraindications; benefits of suspension therapy; types of suspension therapy – axial, vertical, pendulum; techniques of suspension therapy for upper limb & lower limb.
- V. **Functional re-education:** General therapeutics techniques to re-educate ADLs functions, mat activities, starting and derived positions, Hand Rehabilitation, Posture.

SECTION -B

I. Stretching :

- Definition of terms related to stretching; tissue response towards immobilization and elongation; determinants of stretching exercise; effects of stretching
- Inhibition and relaxation procedures
- Precautions and contraindications of stretching
- Techniques of stretching.

II. Breathing Mechanism:

- Review normal breathing; types, techniques, indications, contraindications, therapeutic effects and precautions of breathing exercises,
- Chest expansion measurement and evaluation
- Postural drainage

III. Neuromuscular Inco-ordination:

- Review of normal neuromuscular coordination
- Etiogenesis of neuromuscular in co-ordination
- The general techniques of improving coordination including their effects, indications, contraindications & precautions.

IV. Group Exercises: Advantages and Disadvantages; Organization of Group exercises; Recreational Activities and Sports.

V. Posture, Assessment and various postural abnormalities and corrective Exercise therapy.

Books Recommended

- 1) Practical Exercise Therapy: Hollis, Blackwell, Scientific Publications.
- 2) Therapeutic Exercises: Basmajian, Williams & Wilkins.
- 3) Therapeutic Exercise: Foundations and Techniques, Kisner & Colby.
- 4) Proprioceptive Neuromuscular Facilitation: Voss et al, Williams & Wilkins
- 5) Principles Of Exercise Therapy: Gardiner
- 6) Orthopedic Physical Therapy: Woods, Churchill Livingstone
- 7) Manipulation and Mobilization: Extremities and Spinal Techniques, Edmond, Mosby.
- 8) Aquatic Exercise Therapy-Bates and Hanson -W.B. Saunders.
- 9) Manual Examination and Treatment of Spine & Extremities: Wadsworth, Lippincott.
- 10) Hydrotherapy: Principles & Practices, Campion, Butterworth & Heinemann.
- 11) Motor Control: Theory and Practical Applications, Shumway Walcott-Lippincott
- 12) Motor Control: Theory and Practical Applications, Shumway Walcott-Lippincott.

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ELECTROTHERAPY - III

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 232	ELECTROTHERAPY - III	4	4	20	80	100

INSTRUCTION FOR THE PAPER SETTER

The question paper will consist of three sections i.e. A, B, and C. Section A and B will have four questions each from respective sections of the syllabus and will carry 15 marks each. Out of which students have to attempt two questions from section A and B. Section C will consist of 10 short answer type questions of 2 marks each. This section will cover the entire syllabus uniformly and will carry 20 marks in all.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt two questions each from sections A and B. Section C is a compulsory section consisting of 10 short answer type questions of 2 marks each.

SECTION -A

- I. Physiological responses to heat gain or loss on various tissues of the body.
- II. Physical principles of electromagnetic radiation.
- III. Physics of sound including characteristics and propagation.
- IV. **High frequency sound waves** (therapeutic Ultrasound) -Production, biophysical effects, types, therapeutics types, technique of application, indication, contraindication, precautions, operational skills and patient preparation.

SECTION B

- I. **High frequency currents** (SWD, MWD)-Production, Biophysical effects, types, therapeutic effects, techniques of application, indication, contraindications, precautions, operational skills and patient preparation.
- II. **Medium frequency currents** (Russian currents, interferential therapy)- Conceptual framework of medium frequency currents therapy , production, biophysical effects, types, therapeutic effects , techniques of applications, indications, contraindications, precautions, operational skills and patient preparation.

Books Recommended:

- 1) Electrotherapy Explained: Principle and Practice, Low and Reed, Butterworth Heinemann.
- 2) Claytons Electrotherapy -Kitchen and Basin.
- 3) Therapeutic Heat and Cold Lehman- Williams and Wilkins.
- 4) Principles and Practice of Electrotherapy -Kahn Church hill Livingstone.
- 5) Electrotherapy: Clinics in Physical therapy- Wolf Churchill Livingstone.

BIOMECHANICS & KINESIOLOGY- I

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 233	BIOMECHANICS & KINESIOLOGY- I	4	4	20	80	100

INSTRUCTION FOR THE PAPER SETTER

The question paper will consist of three sections i.e. A, B, and C. Section A and B will have four questions each from respective sections of the syllabus and will carry 15 marks each. Out of which students have to attempt two questions from section A and B. Section C will consist of 10 short answer type questions of 2 marks each. This section will cover the entire syllabus uniformly and will carry 20 marks in all.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt two questions each from sections A and B. Section C is a compulsory section consisting of 10 short answer type questions of 2 marks each.

SECTION A

I. Basic Concepts of Biomechanics:

- Introduction to mechanics including motion, forces, parallel forces system
- Newton's law of motion, concurrent force systems – composition forces, muscle action line etc.
- Axis & Planes
- Centre of Gravity, line of gravity, stability and equilibrium

II. Introduction to Biomechanical Analysis:

- Starting Positions
- Introduction to Biomechanics and kinesiology. Introduction to the techniques of biomechanical analysis.

SECTION B

I. Joint Structure and Function:

- Basic principles of Joint design and a human joint.
- Tissues present in the human joint including fibrous tissue, bone cartilage and connective tissue.
- Classification of joints.
- Joint function, Kinematics chains and range of motion
- Levers & their efficiency, anatomical levers
- Pulley & anatomical pulley

II. Muscle Structure and function:

- Mobility and stability functions of muscle.
- Elements of muscle structure and its properties.
- Types of muscle contractions and muscle work.
- Classification of muscles and their functions.
- Group action of muscles
- Coordinated movement.

III. Biomechanics of vertebral column (Spine)

Books Recommended

1. Joint Structure and Function – A Comprehensive Analysis - Norkins & Levangie - F.A. Davis.
2. Measurement of Joint Motion – A Guide to Goniometry - Norkins & White - F.A. Davis.
3. Brunnstrom's Clinical Kinesiology - Smith et al - F.A. Davis.
4. Basic Biomechanics explained - Low & Reed - Butterworth Heinemann.
5. Kinesiology: Applied to Pathological Motion - Soderberg Lippincott.

PHARMACOLOGY

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 234	PHARMACOLOGY	4	4	20	80	100

INSTRUCTION FOR THE PAPER SETTER

The question paper will consist of three sections i.e. A, B, and C. Section A and B will have four questions each from respective sections of the syllabus and will carry 15 marks each. Out of which students have to attempt two questions from section A and B. Section C will consist of 10 short answer type questions of 2 marks each. This section will cover the entire syllabus uniformly and will carry 20 marks in all.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt two questions each from sections A and B. Section C is compulsory. Each section consisting of 10 short answer type questions of 2 marks

SECTION A

I. Introduction of pharmacology & scope in physiotherapy

II. Brief introduction of following-

- Chemical character of drugs
- General Action of Drugs
- Drug Allergy and Idiosyncrasy
- Drug Toxicity
- Metabolic fate of drugs
- Methods of administration
- Process of Drug Absorption
- Dosage forms

SECTION B

I. Drugs acting on peripheral nervous systems- stimulating and inhibiting cholinergic and adrenergic activity.

II. Drugs acting on neuromuscular junction and muscles-

- Neuromuscular blockers
- Muscle Relaxants
- Anti inflammatory

III. Drugs acting on cardio-vascular system

Books Recommended

- 1) The Pharmacological basis of Therapeutics - Goodman and Gilman - MacMillan.
- 2) Pharmacology and Pharmacotherapeutics - Satoskar & Bhandarkar - Popular Publications - Bomba

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PATHOLOGY AND MICROBIOLOGY

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 235	PATHOLOGY AND MICROBIOLOGY	4	4	20	80	100

INSTRUCTION FOR THE PAPER SETTER

The question paper will consist of three sections i.e. A, B, and C. Section A and B will have four questions each from respective sections of the syllabus and will carry 15 marks each. Out of which students have to attempt two questions from section A and B. Section C will consist of 10 short answer type questions of 2 marks each. This section will cover the entire syllabus uniformly and will carry 20 marks in all.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt two questions each from sections A and B. Section C is a compulsory section consisting of 10 short answer type questions of 2 marks each.

SECTION A

- I. Aims and objectives of the study of pathology. Meaning of terms, etiology, pathogenesis and lesions
- II. Causes of disease, cell injury – causes of cell injury
- III. Cell injury: Feature, mechanism of cell injury – hypoxia, free radical injury. Necrosis and gangrene,
- IV. Inflammation- definition, events of acute inflammation, chemical mediator of Inflammation, morphological types of acute inflammation, chronic inflammation, Difference between acute and chronic inflammation
- V. Repair –primary healing, secondary healing, factors affecting healing and repair Healing of skin, muscle and bone

SECTION B

- I. Fluid and hemodynamic derangements – oedema, hyperemia, Haemorrhage, shock, embolism, thrombosis, infarction
- II. Immunity – natural and acquired, Immunological mechanisms of tissue injury, hypersensitivity reactions, general features of autoimmune diseases and immunodeficiency diseases.
- III. Neoplasia : characteristic of benign and malignant tumors ,grading and staging of malignant tumors, general effects of malignancy on the host , a brief outline of the carcinogenic agents , a brief outline of the methods of diagnosis of malignancy
- IV. An introduction to microbiology, a brief outline of classification of microorganisms, Infection – types, source, portals of entry, spread
- V. Prevention and control of infection, Disinfection and antiseptics, Sterilization

BOOKS RECOMMENDED:

1. Robbins Pathological Basis of Disease - Cotran, Kumar & Robbins - W.B. Saunders.
2. General Pathology - Walter & Israel - Churchill Livingstone.
3. Muirs Textbook of Pathology - Anderson - Edward Arnold Ltd.
4. Textbook of Pathology - Harsh Mohan - Jaypee Brothers.
5. Pathology: Implications for Physical Therapists - Goodmann and Boissonnault - W.B. Saunders.
6. Essential of Medical Microbiology - Bhatia & Lal - Jaypee Brothers.
7. Medical Microbiology - Mims - Jaypee Brothers.
8. Microbiology: An Introduction for the Health Sciences – Ackerman and Richards - W.B. Saunders Co.

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PSYCHOLOGY

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 236	Psychology	2	2	20	80	100

INSTRUCTION FOR THE PAPER SETTER

The question paper will consist of three sections i.e. A, B, and C. Section A and B will have four questions each from respective sections of the syllabus and will carry 15 marks each. Out of which students have to attempt two questions from section A and B. Section C will consist of 10 short answer type questions of 2 marks each. This section will cover the entire syllabus uniformly and will carry 20 marks in all.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt two questions each from sections A and B. Section C is a compulsory section consisting of 10 short answer type questions of 2 marks each.

SECTION-A

1. **Definition of psychology**, basic information in relation to schools, methods and branches of psychology.
2. **Growth and development** -Nature of growth and development, Characteristics of growth and development. Developmental periods of infancy. Childhood, adolescence, adulthood and old age, Factors affecting growth and development . Role of heredity and environment and their relative importance in physical, medical emotional and social characteristics.
3. **Emotions** - Concept and definition, Theories of emotions, Physiological changes due to emotional state. Nature and control of anger, fear and anxiety.
4. **Motivation** - Definition, needs, drives and motives, primary motives and secondary motives, Achievement motivation. Brief introduction to theories of motivation.
5. **Learning** - Concepts, Characteristics, Types, Laws of Learning, Theories of learning, Trial and Error theory, Conditioning-classical and operant, Insight theory of learning, Factors of learning.
6. **Personality** - Definition, meaning. Factors in personality development Measurement of Personality. Personality Inventories and projective techniques. Basic (Concept of personality as given by Freud. Erickson and Dollard & Miller.
7. **Intelligence** - Definition Characteristics, Types. IQ. mental age. Assessment of intelligence, intelligence tests-verbal and performance tests.
8. **Sensation, Perception and Attention** - Meaning and definition. Types of sensation and Perception. Principles of Perception. Illusion and hallucination concept of attention. Factors that determine attention.

SECTION- B

1. **Frustration:** Definition. Causes, Sources of frustrations, Conflict, Different types of conflicts, Adjustment and maladjustment. Defense Mechanism. Different types, Mental Health.
2. **Strains and Stresses:** Anxiety, Tension, Physiological symptoms, causes reactions to stresses, psycho-somatic problems, coping strategies. Stress management stress burnout.
3. **Mental disorders:** Psychoneurosis, psychosis, Different types, symptoms, Causes and etiological factors.

4. **Psychotherapies:** Types methods, psychoanalytical techniques. Psychological techniques.
5. **Psychological treatment for Physiotherapy.**
6. **Behavior modification:** Application of various conditioning and learning principles to modify patient behaviour.
7. **Emotional needs and psychological** factors in relation to chronic illness
8. **Psychological reactions of patients:** psychological reactions of a patient during admission and treatment. Anxiety, shock denial, suspicion. loneliness, shame, guilt, rejection, fear, withdrawal, depression, egocentric, justify and loss of hope.
9. **Personality styles:** Different personality styles of patients.
10. **Psychological aspects of substance abuse and drug addiction.**

Books Recommended:-

1. Baron, Robert A Psychology, Printer Hall of India Pvt Ltd. New Delhi.
2. Carson, Robert C. and James Butcher, Normal Psychology and Modern Life. Herber colleen publishers.
3. Hillgard EL, Atkinson RC and Atinson RI, Introduction to Psychology. Oxford and IBH publisher Pvt. Ltd. New Delhi.
4. Mergan CT, Introduction to Psychology.
5. Mehta GC, Behavioral Science in Medical Practitioner JP Brothers.
6. Holloo Developmental Psychology, Tata Mcgraw Hill.
7. Stonna GC Health psychology.
8. Ethein LH Behavioral Medicine.

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**PRACTICAL
EXERCISE THERAPY-III**

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 231 P	EXERCISE THERAPY-III	4	2	20	80	100

- i. To study the structure and functions along with application of various equipment in gymnasium.
- ii. To study and practice various techniques of mobilizations and stretching of joint region wise.
- iii. To practice the various techniques of strengthening region wise
- iv. To practice the various techniques of suspension therapy region wise
- v. To demonstrate the exercises to improve coordination and balance

Books Recommended

- 1) Practical Exercise Therapy: Hollis, Blackwell, Scientific Publications.
- 2) Therapeutic Exercises: Basmajian, Williams & Wilkins.
- 3) Therapeutic Exercise: Foundations and Techniques, Kisner & Colby.
- 4) Proprioceptive Neuromuscular Facilitation: Voss et al, Williams & Wilkins
- 5) Principles of Exercise Therapy: Gardiner
- 6) Orthopedic Physical Therapy: Woods, Churchill Livingstone
- 7) Manipulation and Mobilization: Extremities and Spinal Techniques, Edmond, Mosby.
- 8) Aquatic Exercise Therapy-Bates and Hanson -W.B. Saunders.
- 9) Manual Examination and Treatment of Spine & Extremities: Wadsworth, Lippincott.
- 10) Hydrotherapy: Principles & Practices, Campion, Butterworth & Heinemann.
- 11) Motor Control: Theory and Practical Applications, Shumway Walcott-Lippincott.

ELECTROTHERAPY-III PRACTICAL

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 232 P	ELECTROTHERAPY-III	4	2	20	80	100

- i. To study a short wave diathermy unit, its operation unit, its operation and different methods of application region wise.
- ii. To study a microwave diathermy unit its operation and different methods of application region wise.
- iii. To study ultrasound units, its operation and different methods of application region wise.
- iv. To study a laser unit its operation and different methods of application region wise.

Books Recommended

- 1) Electrotherapy Explained: Principle and Practice, Low and Reed, Butterworth Heinemann.
- 2) Claytons Electrotherapy -Kitchen and Basin.
- 3) Therapeutic Heat and Cold Lehman- Williams and Wilkins.
- 4) Principles and Practice of Electrotherapy -Kahn Church hill Livingstone.
- 5) Electrotherapy: Clinics in Physical therapy- Wolf Churchill Livingstone.

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Dr. Anshu

BIOMECHANICS AND KINESIOLOGY-I
PRACTICAL

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 233 P	BIOMECHANICS AND KINESIOLOGY	4	2	20	80	100

- i. To study anatomical levers.
- ii. To name and sketch the anatomical movements at different joints in various planes, as observed
- iii. To study different types of muscle contraction, muscle work, group action of muscles, resolution of muscular forces at different joints, coordinated movements.
- iv. To study biomechanics of the vertebral column - lumbar pelvic rhythm.

Books Recommended

1. Joint Structure and Function – A Comprehensive Analysis - Norkins & Levangie - F.A. Davis.
2. Measurement of Joint Motion – A Guide to Goniometry - Norkins & White - F.A. Davis.
3. Brunnstrom's Clinical Kinesiology - Smith et al - F.A. Davis.
4. Basic Biomechanics explained - Low & Reed - Butterworth Heinmann.
5. Kinesiology: Applied to Pathological Motion - Soderberg Lippincott.

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**COMPUTER APPLICATIONS
PRACTICAL**

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 238 P	COMPUTER APPLICATIONS	4	4	20	80	100

Practicals as related to the concepts outlined in theory syllabus

Books Recommended

- 1.) P.K. Sinha, Introduction to Computers.
- 2.) Rachpal Singh & Gurinder Singh, PC Softwares
- 3.) R.K. Texali, PC Softwares
- 4.) Alan Simpson, Internet to Go.

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SEMESTER IV

EXERCISE THERAPY - IV

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 241	Exercise Therapy- IV	4	4	20	80	100

INSTRUCTION FOR THE PAPER SETTER

The question paper will consist of three sections i.e. A, B, and C. Section A and B will have four questions each from respective sections of the syllabus and will carry 15 marks each. Out of which students have to attempt two questions from section A and B. Section C will consist of 10 short answer type questions of 2 marks each. This section will cover the entire syllabus uniformly and will carry 20 marks in all.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt two questions each from sections A and B. Section C is a compulsory section consisting of 10 short answer type questions of 2 marks each.

SECTION A

- I. **Hydrotherapy:** Basic principles of fluid mechanics as they relate to hydrotherapy; Physiological and therapeutic effects of hydrotherapy including, joint mobility, muscle strengthening and wound care; Types of Hydrotherapy equipment including indications, contraindications, operational skills and patient preparation.
- II. **Therapeutic Gymnasium:** gymnasium and its importance; various equipment in gymnasium; Operational skills including effects and uses of each equipment.
- III. **Aerobic Exercise:** Definition and key terms, Determinants of an Exercise Program, designing the aerobic Exercise Program, types and phases of aerobic training. Effects of aerobic exercises acute and long term (in brief)
- IV. **Manual Therapy & Peripheral Joint Mobilization:**
 - Introduction to special mobilization and manipulation techniques
 - Principles of Mobilizing Techniques
 - Physiological & accessory movements Schools of Manual Therapy (Maitland, Kaltenborn, Mulligan, Cyriax); Principles, Grades, Indications and Contraindications, Effects and Uses
- V. **Traction:** Principle of traction, physiological and therapeutic effects, classification and types, indications, contraindications, techniques applications, operational skills and precautions

SECTION B

I. Motor Learning and Functional Re-education:

- Introduction to Motor Learning:
 - Classification of Motor skills
 - Measurement of Motor Performance
- Introduction to motor control
 - Theories of Motor control
 - Application
- Learning Environment:
 - Learning of skill

- Instruction and augmented feedback.
- Practice Conditions

II. PNF :

- Conceptual framework , principle of Proprioceptive neuromuscular facilitation techniques, general techniques, special techniques

III. Static and Dynamic Balance and Posture

- Assessment & management including therapeutic exercises.
- Coordination

IV. Gait training: Normal gait cycle and its phases, Principles of gait selection and training, Types of walking aids, indications, effects and various training techniques, transfer techniques, Stair climbing training, Pathological gait.

V. Therapeutic Exercises for various clinical conditions and principles of Exercise Prescription.

BOOKS RECOMMENDED:

- 1) Practical Exercise Therapy: Hollis, Blackwell, Scientific Publications.
- 2) Therapeutic Exercises: Basmajian, Williams & Wilkins.
- 3) Therapeutic Exercise: Foundations and Techniques, Kisner & Colby.
- 4) Proprioceptive Neuromuscular Facilitation: Voss et al, Williams & Wilkins
- 5) Principles Of Exercise Therapy: Gardiner
- 6) Orthopedic Physical Therapy: Woods, Churchill Livingstone
- 7) Manipulation and Mobilization: Extremities and Spinal Techniques, Edmond, Mosby.
- 8) Aquatic Exercise Therapy-Bates and Hanson -W.B. Saunders.
- 9) Manual Examination and Treatment of Spine & Extremities: Wadsworth, Lippincott.
- 10) Hydrotherapy: Principles & Practices, Campion, Butterworth & Heinemann.
- 11) Motor Control: Theory and Practical Applications, Shumway Walcott-Lippincott.

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ELECTROTHERAPY-IV

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 242	ELECTROTHERAPY-IV	4	4	20	80	100

INSTRUCTION FOR THE PAPER SETTER

The question paper will consist of three sections i.e. A, B, and C. Section A and B will have four questions each from respective sections of the syllabus and will carry 15 marks each. Out of which students have to attempt two questions from section A and B. Section C will consist of 10 short answer type questions of 2 marks each. This section will cover the entire syllabus uniformly and will carry 20 marks in all.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt two questions each from sections A and B. Section C is a compulsory section consisting of 10 short answer type questions of 2 marks each.

SECTION A

- I. **Radiation therapy-** LASER- Definition , historical background ,physical principles, biophysical effects , types, therapeutic effects ,techniques of applications, indications, contraindications , precautions, operational skills and patient preparation.
- II. **Therapeutic Cold (Cryotherapy)-** Sources, biophysical effects, types, therapeutic effects, techniques of applications, indication, contraindications, precaution, operational skills and patient preparation.
- III. **Therapeutic mechanical pressure (Intermittent Compression Therapy)** - Principle, biophysical effects, types, therapeutic effects, indications, contraindications, precautions, operational skills and patient preparation.

SECTION B

- I. **Review** of Neuromuscular physiology including effects of electrical stimulation
- II. **Electro- diagnosis:** Instrumentation, definition and basic techniques of Strength Duration Techniques, EMG and NCV.
- III. **Biofeedback:** instrumentation, principles, therapeutic effects, indications,precautions, operational skills and patient preparation.

Books Recommended

- 1) Electrotherapy Explained: Principle and Practice, Low and Reed, Butterworth Heinemann.
- 2) Claytons Electrotherapy -Kitchen and Basin.
- 3) Therapeutic Heat and Cold Lehman- Williams and Wilkins.
- 4) Principles and Practice of Electrotherapy -Kahn Church hill Livingstone.
- 5) Electrotherapy: Clinics in Physical therapy- Wolf Churchill Livingstone.

BIOMECHANICS & KINESIOLOGY- II

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 243	BIOMECHANICS & KINESIOLOGY- II	4	4	20	80	100

INSTRUCTION FOR THE PAPER SETTER

The question paper will consist of three sections i.e. A, B, and C. Section A and B will have four questions each from respective sections of the syllabus and will carry 15 marks each. Out of which students have to attempt two questions from section A and B. Section C will consist of 10 short answer type questions of 2 marks each. This section will cover the entire syllabus uniformly and will carry 20 marks in all.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt two questions each from sections A and B. Section C is a compulsory section consisting of 10 short answer type questions of 2 marks each.

SECTION A

I. The Biomechanics of:

- Shoulder joint
- Elbow Joint
- Wrist & Hand
- Hip joint
- Knee joint
- Ankle joint

SECTION B

I. Posture:

- Definition, factors responsible for posture, relationship of gravity on posture.
- Postural imbalance – factors responsible for imbalance in Static and dynamic positions.
- Introduction to ergonomics

II. Gait:

- Description of Normal gait, determinants of gait, spatio temporal features and analysis.
- Gait deviations – Types, Causative factors and analysis.

III. Activities of daily living (ADLs): BADL, IADL.

Books Recommended

1. Joint Structure and Function – A Comprehensive Analysis - Norkins & Levangie - F.A. Davis.
2. Measurement of Joint Motion – A Guide to Goniometry - Norkins & White - F.A. Davis.
3. Brunnstrom's Clinical Kinesiology - Smith et al - F.A. Davis.
4. Basic Biomechanics explained - Low & Reed - Butterworth Heinmann.
5. Kinesiology: Applied to Pathological Motion - Soderberg Lippincott.

COMPUTER APPLICATION

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 244	COMPUTER APPLICATIONS	3	2	20	80	100

INSTRUCTION FOR THE PAPER SETTER

The question paper will consist of three sections i.e. A, B, and C. Section A and B will have four questions each from respective sections of the syllabus and will carry 15 marks each. Out of which students have to attempt two questions from section A and B. Section C will consist of 10 short answer type questions of 2 marks each. This section will cover the entire syllabus uniformly and will carry 20 marks in all.

INSTRUCTIONS FOR THE CANDIDATES

Candidates are required to attempt two questions each from sections A and B. Section C is a compulsory section consisting of 10 short answer type questions of 2 marks each.

SECTION A

- I. **Computer Fundamentals:** Computer Concepts and its components, characteristics of computer, Storage device, input output devices, software, application of computers in different areas.
- II. **Operating System:** Introduction, Functions, Characteristics of operating system, user interface, types: DOS, DOS Commands, Windows its features.

SECTION B

- I. **Application Packages:** Working knowledge of MS-WORD, MS EXCEL and MS-POWERPOINT.
- II. **Multimedia and Internet:** Introduction of multimedia, its components, application areas, Networks: LAN, WAN, MAN. Internet and its applications: www, e-mail, Surfing, Browsing, Modem

Books Recommended

- 1) P.K. Sinha, Introduction to Computers.
- 2) Rachpal Singh & Gurinder Singh, PC Softwares
- 3) R.K. Texali, PC Softwares
- 4) Alan Simpson, Internet to Go.

EXERCISE THERAPY -IV

(PRACTICAL)

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 245 P	EXERCISE THERAPY- IV	4	4	20	80	100

- i. To study the structure and functions along with application of various equipment in gymnasium.
- ii. To study and practice various techniques of mobilizations and stretching of joint region wise.
- iii. To practice the various techniques of strengthening region wise
- iv. To practice the various techniques of suspension therapy region wise
- v. To demonstrate the exercises to improve coordination and balance
- vi. To study and practice the uses of various ambulation aids in gait training.
- vii. To study the various structures and functions of hydrotherapy equipment and their applications.
- viii. To study and practice various traction techniques including manual and mechanical procedures.
- ix. To study, plan and practice various exercise programs for normal persons of various age groups.

Books Recommended

1. Practical Exercise Therapy: Hollis, Blackwell, Scientific Publications.
2. Therapeutic Exercises: Basmajian, Williams & Wilkins.
3. Therapeutic Exercise: Foundations and Techniques, Kisner & Colby.
4. Proprioceptive Neuromuscular Facilitation: Voss et al, Williams & Wilkins
5. Principles of Exercise Therapy: Gardiner
6. Orthopedic Physical Therapy: Woods, Churchill Livingstone
7. Manipulation and Mobilization: Extremities and Spinal Techniques, Edmond, Mosby.
8. Aquatic Exercise Therapy-Bates and Hanson -W.B. Saunders.
9. Manual Examination and Treatment of Spine & Extremities: Wadsworth, Lippincott.
10. Hydrotherapy: Principles & Practices, Campion, Butterworth & Heinemann.
11. Motor Control: Theory and Practical Applications, Shumway Walcott-Lippincott.

**ELECTROTHERAPY-IV
PRACTICAL**

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 246 P	ELECTROTHERAPY-IV	4	2	20	80	100

- i. To study a laser unit its operation and different methods of application region wise.
- ii. To study various forms of therapeutic cold application region wise including - ice, cold packs, vapor coolant sprays, etc.
- iii. To study an intermittent compression therapy unit, its operation and different methods of application region wise.
- iv. To observe various Electromyography procedures.
- v. To study a Biofeedback unit its operation and different methods of application region wise.

Books Recommended

1. Electrotherapy Explained: Principle and Practice, Low and Reed, Butterworth Heinemann
2. Claytons Electrotherapy -Kitchen and Basin.
3. Therapeutic Heat and Cold Lehman- Williams and Wilkins.
4. Principles and Practice of Electrotherapy -Kahn Church hill Livingstone.
5. Electrotherapy: Clinics in Physical therapy- Wolf Churchill Livingstone.

BIOMECHANICS AND KINESIOLOGY -II

PRACTICAL

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 247 P	BIOMECHANICS AND KINESIOLOGY-II	4	2	20	80	100

- i. To study glenohumeral rhythm
- ii. To measure angle of torsions
- iii. Analysis of normal posture with respect to COG and optimal position of joints in anterior, posterior and lateral views.
- iv. Analysis of normal gait, measurement of spatio temporal features - step length, stride length, cadence.

Books Recommended

1. Joint Structure and Function – A Comprehensive Analysis - Norkins & Levangie - F.A. Davis.
2. Measurement of Joint Motion – A Guide to Goniometry - Norkins & White - F.A. Davis.
3. Brunnstrom's Clinical Kinesiology - Smith et al - F.A. Davis.
4. Basic Biomechanics explained - Low & Reed - Butterworth Heinmann.
5. Kinesiology: Applied to Pathological Motion - Soderberg Lippincott.

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COMPUTER APPLICATIONS
PRACTICAL

Subject Code	Title	Hours /week	Credits	IA Marks	EA Marks	Total Marks
BPT 248 P	COMPUTER APPLICATIONS	4	4	20	80	100

Practicals as related to the concepts outlined in theory syllabus

Books Recommended

- 1.) P.K. Sinha, Introduction to Computers.
- 2.) Rachpal Singh & Gurinder Singh, PC Softwares
- 3.) R.K. Texali, PC Softwares
- 4.) Alan Simpson, Internet to Go.