K.R. MANGALAM UNIVERSITY

THE COMPLETE WORLD OF EDUCATION

School of Medical and Allied Sciences

Bachelor of Physiotherapy (BPT)

Program Code: 13

(2022-2027)

Approved in the 29th Meeting of Academic Council Held on 09 August 2022

Member Secretary
Academic Council
K.R. Mangalam University

Registrar
K.R. Mangalam University
Sohna Road, Gurugram, (Haryana)

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PREFACE

K. R. Mangalam University envisions all its programmes in the best interest of their students and in this endeavour, it offers a new vision to all its courses. It imbibes an outcome-based curriculum for all its programmes to provide a focused, student-centric syllabus with an agenda to develop healthcare professionals in a more outcome based manner.

Each programme reflects the promise to accomplish the learning outcomes by studying the courses. The graduate attributes encompass values related to professionalism, teamwork, ethics, critical thinking, empathy and also clinical skills for entrepreneurship.

The updated curriculum for BPT has been designed according to the guidelines of the Haryana State Council for Physiotherapy (HSCP). It aims to strengthen students' experiences and to prepare them for being a part of a healthcare team, with emphasis on employability, sustainability and life-long learning.

The redesigned curriculum elaborates in-depth background knowledge required in clinical practice. Individuals who want to pursue their careers in physiotherapy will get diverse exposure to conditions, evidence-based therapy and research at KRMU. We help the students grow into skilled and proficient physiotherapists through rigorous learning, clinical training, research and intensive internship programmes.

K.R. Mangalam University hopes the outcome-based curriculum will help the budding physiotherapists in making an informed decision to find their place in the healthcare sector and engage in this noble profession with competence, compassion and commitment.

ACKNOWLEDGEMENT

Programme: **Bachelor of Physiotherapy**

Year/ Semester: **4½ Years**

Session: **2022-2026**

We acknowledge by signing below that we have received and have access to a copy of syllabus of the BPT Programme indicated above. We have redesigned the BPT syllabus according to the guidelines of the Haryana State Council for Physiotherapy and understand the programme outcomes of the BPT Programme. Furthermore, we acknowledge that the contents of the BPT syllabus have been explained and/or read to us. We understand the requirements concerning textbook(s), assignments, practicum, evaluation and how the final grades will be determined with respect to achieving Course Outcomes.

Faculty Signature:

Dean SMAS

Assistant Professor

Dr. Mamta Shankar (PT)

Dr. Badri Vishal (PT)

Dr. Gurpreet Singh (PT)

Date:

CONTENTS

1. INTRODUCTION

The K.R. Mangalam Group has made a name for itself in the field of education. Over a period of time, the various educational entities of the group have converged into a fully functional corporate academy. Resources at KRM have been continuously upgraded to optimize opportunities for the students. Our students are groomed in a truly inter-disciplinary environment wherein they develop integrative skills through interaction with students from engineering, education, journalism, management, media and other study streams.

The K.R. Mangalam story goes back to the chain of schools that offered an alternative option of world-class education, pitching itself against the established elite schools, which had enjoyed a position of monopoly till then. Having blazed a new trail in school education, the focus of the group was aimed at higher education. With the mushrooming of institutions of Higher Education in the National Capital Region, the university considered it very important that students take informed decisions and pursue career objectives in an institution, where the concept of education has evolved as a natural process.

K.R. Mangalam University was founded in the year 2013 by Mangalam Edu Gate, a company incorporated under Section 25 of the Companies Act, 1956.

K. R. Mangalam University is unique because of its

1. Enduring legacy of providing education to high achievers who demonstrate leadership in diverse fields.

2. Protective and nurturing environment for teaching, research, creativity, scholarship, social and economic justice.

2. OBJECTIVES

1. Enhance leadership qualities among the youth having understanding of ethical values and environmental realities.
2. Foster employability and entrepreneurship through futuristic curriculum and progressive pedagogy with cutting-edge technology.
3. Instill notion of lifelong learning through stimulating research, outcomes-based education and innovative thinking.
4. Integrate global needs and expectations through collaborative programs with premier

universities, research centers, industries and professional bodies.

3. ABOUT THE SCHOOL OF MEDICAL AND ALLIED SCIENCES

The School of Medical & Allied Sciences (SMAS) at K. R. Mangalam University started in 2013 after being approved by the Pharmacy Council of India. The SMAS comprises modular laboratories equipped with state-of-the-art infrastructure and modern amenities. SMAS currently offers D. Pharm, B. Pharm, M. Pharm, and Ph.D. courses in Pharmacy along with a B.P.T. course. The Centre for Education Growth and Research adjudged School of Medical & Allied Sciences as Best Pharmacy College in India in March 2016 at India International Centre, New Delhi.

Since its inception in 2019, the Department of Physiotherapy has been committed towards establishing a centre of excellence in an environment fostering independent thought and a commitment towards society. The department inculcates evidence based practice in order to serve the needs of the population through skilled, efficient and accessible care.

3.1.1. School Vision

To contribute towards healthcare needs of the society by producing a skilled, motivated and accessible workforce dedicated towards achieving health for all.

3.1.2. School Mission

1. To produce self-motivated, self-reliant and socially sensitive young healthcare professionals catering to the needs of academia, industry and research.
2. To create a center of excellence for learning and research in the field of pharmaceutical and allied health sciences with inter-disciplinary approach in emerging area of science and technology with focus on industry-academia interaction.
3. To nurture transformational research for the benefit of the society.
4. To interlink pharmaceutical and allied health sciences with interdisciplinary life sciences.
5. To provide lifelong learning opportunities in healthcare.

4. Bachelor of Physiotherapy (BPT)

The Bachelor of Physiotherapy programme includes diverse courses that are designed to develop and enhance clinical and diagnostic skills, nurture research oriented practices and promote learning of life

skills that are essential for the development of ethical, empathetic and skilled physiotherapy professionals.

4.1. Nature and Aims of Bachelor of Physiotherapy Program

Physiotherapy or Physical Therapy (P.T.) is a Movement Science with an established theoretical and scientific base and widespread clinical applications in the Prevention, Restoration and Rehabilitation, Maintenance and Promotion of optimal physical function. 5 Physiotherapists diagnose and manage movement dysfunction and enhance physical and functional abilities. This physical dysfunction may be the sequelae of involvement of any of the systems like Musculoskeletal, Neurological, Cardiovascular, Respiratory or other body systems. These practitioners contribute to society and the profession through practice, teaching, administration and the discovery and application of new knowledge about physiotherapy experiences of sufficient excellence and breadth by research to allow the acquisition and skills and behaviors as applied to the practice of physiotherapy. Learning experiences are provided under the guidance and supervision of competent faculty, in both, classroom as well as in clinic. The designed curriculum will prepare the entry-to-practice physiotherapist (PT) to be an autonomous, effective, safe and compassionate professional, who practices collaboratively in a variety of healthcare set ups such as neonatal to geriatric, from critical care to community fitness to sports training and is responsive to the current and future needs of the health care system.

This holistic approach incorporates a broad range of physical and physiological therapeutic interventions and aids. The core skills used by Physiotherapy include manual therapy, therapeutic exercises and the application of electro-therapeutic modalities.

Specifically, physiotherapists improve the client's quality of life by:

- Promoting optimal mobility, physical activity, and overall health and wellness;
- Preventing disease, injury, and disability;
- Geriatric care and Rehabilitation;
- Managing acute and chronic conditions, activity limitations and participation restrictions;
- Improving and maintaining optimal functional independence and physical performance;
- Rehabilitating injury and the effects of disease or disability with therapeutic exercise programs and other interventions; and
- Educating and planning maintenance and support programs to prevent re-occurrence, re-injury or functional decline

The Bachelor of Physiotherapy programme aims at complete development of the student into a competent and skilled physiotherapist, particularly acquiring knowledge and skills in diverse conditions and areas of healthcare. Students are also given an orientation to the traditional systems of medicine. The programme prepares the students to be skilled clinicians, with the expertise to examine, evaluate, diagnose, plan, execute and document physiotherapy treatment independently and competently. The programme includes Clinical Training and a six-month internship. The curriculum and regulations as set by the Haryana State Council of Physiotherapy (given in Annexure I) are followed for the Bachelor of Physiotherapy programme.

4.2 Learning Outcome based approach to the Program

The curriculum of Bachelor of Physiotherapy has been designed according to the Learning Outcome based curriculum framework (LOCF). It intends to offer a broad guideline to reorient the organization of teaching learning processes at the UG and PG level to augment the quality of learning in the context of contemporary challenges of higher education in India. It explores the opportunities to improve class room transaction, teacher preparation and sense of relevance for the learners.

In this endeavour it departs from the earlier scheme in a major way and explicitly states the learning outcomes and uses that to organize the diverse teaching-learning processes. In so doing it tries to address the needs of society, groups and the individual.

This scheme considers learning as an experiential and participatory activity with sufficient space for innovation and initiative, building the scientific spirit of objectivity and critical perspective. In this venture teachers and learners are assumed to jointly engage in a creative exercise of knowledge construction and skill building. In the last few decades, the discipline of Physiotherapy has also emerged as a new treatment measure. Its training can empower students asses diagnose and treat various disorders or diseases and mal alignments. Teaching program therefore must include the agenda/ courses which are meaningful to the surrounding society.

4.3 Graduate Attributes

The graduate attributes for Bachelor in Physiotherapy are as follows:

GA 1: **Personal attributes:** Self-awareness, empathy, compassion, honesty and integrity.

GA 2: **Knowledge of Physiotherapy:** Strong theoretical, practical and clinical knowledge for prevention, diagnosis, treatment and rehabilitation.

GA 3: **Patient relationship:** Capability to understand a patient's problems and goals, respecting their privacy and choices.

GA 4: **Professionalism:** Confidence about role in healthcare team and ability to co-ordinate with other health professionals.

GA 5: Research Related Skills: Scientific attitude, capable of instigating and interpreting research and applying it towards evidence-based practice.

GA 6: Contribution to Society: Strong moral and ethical code, dedication towards providing healthcare to all.

4.4 Qualification Descriptors

On completion of this program, the student will be able to:

· Integrate concepts from the biological, physical, behavioral, and clinical sciences into physical therapy services

· Exhibit professional conduct and behaviors that are consistent with the legal and ethical practice of physical therapy

· Demonstrate compassion, caring, integrity, and respect for differences, values, and preferences in all interactions with patients/clients, family members, health care providers, students, other consumers, and payers

· Demonstrate culturally sensitive verbal, nonverbal, and written communications that are effective, accurate, and timely

· Collect and critically evaluate data and published literature to apply in the delivery of care, practice management, and to examine the theoretical and scientific basis for physical therapy

· Screen patients/clients to determine if they are candidates for physical therapy services or if a referral to, or consultation with, another health care professional or agency is warranted

· Complete a patient/client examination/ re-examination and evaluate and interpret the examination data to determine a physical therapy diagnosis and prognosis

· Employ critical thinking, self-reflection, and evidence-based practice to make clinical decisions about physical therapy services

· Collaborate with patients/clients, caregivers, and other health care providers to develop and implement an evidence-based plan of care that coordinates human and financial resources

· Provide services and information related to health promotion, fitness, wellness, health risks, and disease prevention within the scope of physical therapy practice.

· Advocate for patient/client and profession

· Provide consultative services and education to patients/clients, caregivers, health care workers, and the public using culturally sensitive methods that are adapted to the learning needs, content, and context

· Employ effective leadership skills in the context of supervising, delegating, and mentoring within the profession

4.5 Program Educational Objectives (PEOs)

The Programme Educational Objectives of the Bachelor of Physiotherapy programme are:

PEO 1: To develop effective communication and interpersonal skills amongst the physiotherapits who are adapted to meet the needs of the community and the society.

PEO 2: To adhere to safe, ethical and legal standards of current practice (as identified by professional organizations, federal and state law and accrediting bodies)

PEO 3: To Diagnose and implement Plan of Care: Development of physiotherapy diagnoses and an individualized plan of care for the management and prevention of movement dysfunction across the life span

PEO 4: To ensure effective participation of physiotherapists as an intra- and inter-professional team member.

PEO 5: To ensure effective clinical practice management for delivery of physiotherapy services in diverse settings.

PEO 6: To Apply teaching and learning principles in educational, practice, and community settings

PEO 7: To Apply of principles of critical thinking and clinical reasoning to evidence-based physiotherapist practice.

PEO 8: To showcase responsibility and commitment to the profession and society through life – long learning and involvement in activities beyond the job responsibilities

4.6 Program Learning Outcomes (POs)

Students of Bachelor of Physiotherapy (BPT) at the time of graduation will be able to:

PO1. Physiotherapy Knowledge: Develop skills related to physiotherapy and apply them for assessment, treatment and prevention. Recognize the role of physiotherapy in the context of the health needs of the community and national priorities in the health sector.

PO2. Multidisciplinary/ Medical knowledge: Acquire knowledge of basic medical sciences, human movement sciences, various medical conditions and surgical treatments to identify psychological, social, economic, cultural aspects of diseases and their impact on the community.

PO3. Clinical and Practical Skills: Analyze and interpret physical assessment and diagnosis and set appropriate short and long term goals, develop patient interaction skills and be able to apply modalities and manual techniques for treatment and rehabilitation.

PO4. Utilisation of Modern Technology: Be familiar with developments in technology related to assessment, diagnosis and treatment.

PO5. Evidence Based Practice: Interpret research and implement clinical practice that is proven to be safe, efficient, patient-centred and documented.

PO6. Life Skills: Develop critical thinking and communication skills, acknowledge role towards the environment and sustainability, demonstrate professional and ethical behavior, be a valuable member of the community and develop an empathetic attitude, show curiosity and be a lifelong learner.

The **Program Specific Outcomes (PSOs)** for the Bachelor of Physiotherapy programme are:

PSO1. Assessment and Management: Develop the ability to collect history, perform relevant clinical assessment and frame appropriate electrotherapeutic and exercise therapy management for the patients.

PSO2. Teamwork: Work effectively in various inter professional collaborative settings like hospitals, rehabilitation centres, special schools, educational institutions, health and fitness centers, geriatric centers, ergonomic consultant in corporate sectors, private consultation, home care services, sports management, etc.

PSO3. Research and Entrepreneurial Skills: Enable to understand different research methods, conducting research work, prepare research papers and develop entrepreneurial skills.

4.7 Course Learning Outcomes (COs)

The programme learning outcomes are attained by learners through the essential learnings acquired on completion of selected courses (subjects) of study within a programme. Course learning outcomes are specific to the learning for a given course of study related to a disciplinary or interdisciplinary/multi-disciplinary area.

The Bachelor of Physiotherapy programme is structured, with a progression of compulsory/ core courses to be taken in a prescribed order. The courses/ subjects are divided into medical, physiotherapy, multi-disciplinary and clinical courses.

Course-level learning outcomes are aligned to programme learning outcomes. Course level learning outcomes are specific to a course of study within a given programme of study. The achievement by students of course-level learning outcomes leads to the attainment of the programme learning outcomes. At the course level, each course may well have links to some but not all graduate attributes as these are developed through the totality of student learning experiences across the years of their study. A course map indicating the linkage between course learning outcomes and each programme learning outcome is attached as Annexure-II.

4.8 Program Structure

The Bachelor of Physiotherapy programme includes four years comprising of 30 courses or subjects and followed by a six month rotatory internship. The structure is given below:

FOUR AND A HALF YEAR BPT PROGRAM AT A GLANCE

	Year I	Year II	Year III	Year IV	Internship	Total
Courses	6	8	6	10	1	**31**
Hours	1170	1320	1420	1420	1150	**6480**
Marks	900	1000	1000	1130		**4030**

YEAR	Annual Pattern		
FIRST	Course code	Course Title	Hours
			Theory + Practical

	BPT101	Anatomy	320
	BPT102	Physiology	280
	BPT103	Biochemistry	120
	BPT104	Electrotherapy-I	200
	BPT105	Exercise Therapy-I	200
	BPT106	Environmental Studies	50
	Total		**1170**
SECOND	BPT201	Pathology and Microbiology	120
	BPT202	Pharmacology	80
	BPT203	Electrotherapy-II	200
	BPT204	Exercise Therapy-II	200
	BPT205	Biomechanics	120
	BPT206	Sociology and Psychology	200
	BPT207	Computer Application	80
	BPT208	Clinical Training	10 hrs per week for 32 weeks
	Total		**1320**
THIRD	BPT301	General Medicine	200
	BPT302	General Surgery	200
	BPT303	Orthopaedics	200
	BPT304	Physiotherapy in Cardiorespiratory Conditions	200
	BPT305	Physiotherapy in Orthopaedic and Sports Conditions	300
	BPT306	Clinical Training	10 hrs per week for 32 weeks
	Total		**1420**
FINAL	BPT401	Neurology	120
	BPT402	Pediatrics	40
	BPT403	Geriatrics	40
	BPT404	OBS & Gynae, Ent, Ophthalmology	40
	BPT405	Physiotherapy in Neurology	300
	BPT406	Physiotherapy in General Medical and Surgical Condition	240
	BPT407	Rationale of Rehabilitation	120
	BPT408	Physiotherapy Ethics and Law	80
	BPT409	Research Methodology and Biostatistics	120
	BPT410	Clinical Training	10 hrs per week for 32 weeks
		Total	**1420**
INTERNSHIP		Internship	**1150**

		Total	**1150**

Compulsory Rotatory Internship: All students of Bachelor of Physiotherapy must undergo a compulsory rotatory internship for a period of 6 months after passing 4th year BPT examination in all subjects. Candidate will have to join internship within 15 days of declaration of 4th year University examination result. Internship should be done in only Hospitals/Institutions recognized by the Council (List will be declared later). No candidate shall be awarded degree certificate without successfully completing six months of Internship.

The Internship should be rotatory and cover clinical branches concerned with Physiotherapy such as Orthopedics, Cardiothoracic including ICU, Neurology, Pediatrics, General Medicine, General Surgery, Obstetrics, Geriatrics, Women's health, CBR and Gynecology both in-patient and out-patient services.

4.9Eligibility Criteria and Admission

4.9.1 Eligibility

- A candidate applying for the degree of B.P.T being eligible for admission to the Physiotherapy College affiliated to UGC recognized University must have passed the Higher Secondary (10+2) or equivalent examination recognized by any Indian University or a duly constituted Board and passed in Physics, Chemistry and Biology and English. Or
- Candidates who have studied abroad and have passed the equivalent examination as per the guidelines of the Association of Indian Universities to determine the eligibility and must have passed in the subjects: Physics, Chemistry, Biology, and English up to 12th Standard level.
- Admission to Bachelor of Physiotherapy course shall be made on the basis of eligibility and an entrance test to be conducted for the purpose. No candidate will be admitted on any ground unless he/she has appeared in the admission test and interview.
- Entrance test, to be conducted by the university as per the syllabus under 10 +2 scheme Successful candidates based on written test will be called for counseling(s) nominated by the university or the board During subsequent counseling (s) the seat will be allotted as per the merit of the candidate depending on the availability of seats on that particular day.
- Candidate who fails to attend the Medical Examination on the notified dates(s) will forfeit the claim for admission and placement in the waiting list except permitted by the competent authority under special circumstances.

- The name of the student(s) who remain(s) absent from classes for more than 15 days at a stretch after joining the said course without giving any notice will be governed as per the respective University rules.
- He /She has attained the age of 17 years as on 31st December of concerned year. He/she should furnish at the time of submission of application form, a certificate of Physical fitness from a registered medical practitioner that the candidate is physically fit to undergo Physiotherapy course.
- A candidate fulfilling above requirements will be provisionally admitted in the First Year of B.P.T Degree Programme, as per the rules of Admission Committee for Professional Medical Educational Courses of Haryana and/or Government of Haryana.

4.9.2 Admission to the Programme

Admission granted by the Central Admission Committee appointed by the State Government to any student shall be provisional till the Enrollment/ Registration/ Enlistment is made by the University, and in case of admission is granted on the basis of provisional eligibility certificate, the condition & instruction given by the University should be complied within the time limit fixed by the University, otherwise term kept and fees paid by such a student will be forfeited and fees will not be refundable in any conditions.

Re-admission after break of study: All re-admissions of candidates are subject to the approval of the Vice Chancellor of the University.

4.10 Examination

4.10.1 Eligibility criteria to appear in University Examination

A candidate must secure minimum 75% of attendance. A candidate is required to attend at least 75% of the total classes conducted in a year in all subjects prescribed for that year (separately), in theory and practical / clinical to become eligible to appear for the University examination. No relaxation, whatsoever, will be permissible to this rule under any ground including indisposition etc.

4.10.2 Assessment Methods

The performance of every student in each course will be evaluated as follows:

Internal evaluation based on continuous assessment, for 20% of the marks of the subject; University examination through written paper and/or practical examination for 80% of the marks of the subject.

English shall be the medium of instruction for all the subjects of study and for examination of the course.

4.10.3 Schedule of Examination

The scheme of examination for the B.P.T course shall be divided into 4 professional examinations; each examination will be held at the end of each respective Academic year.

There will be 1 internal examination (optional) after completion of 4 months of onset of Academic year. There will be 1 Internal/Preliminary exam (compulsory) before University exam. Internal evaluation is based on continuous assessment, for 20% of the marks of the subject. There will be University examination through written paper and/or practical examination for 80% of the marks of the subject at the end of every Academic year.

University has to conduct supplementary exam for failed students after 4 months and before 6 months from previous exam.

Components	**Continuous Internal Assessment (20%)**				**University Examination (80%)**
	Internal Examination	**Preliminary Examination**	**Attendance**	**Project/ Assignment/ Class test**	
Weightage (%)	**5**	**5**	**5**	**5**	**80**
Schedule	**4 months after onset of Academic Year**	**Before University exam**	**To be calculated at the end of AY**	**Continuous assessment (at least 4)**	**End of AY**

4.10.4 Scheme of Examination

Distribution of marks according to the courses/ subjects is given:

First Professional

Code	Subject	Theory Marks		Practical Marks		Total Marks
		External	Internal	External	Internal	
BPT101	Anatomy	80	20	80	20	200
BPT102	Physiology	80	20	80	20	200
BPT103	Biochemistry	80	20	-	-	100
BPT104	Electrotherapy-I	80	20	80	20	200
BPT105	Exercise therapy -I	80	20	80	20	200
BPT106	ENVIROMENTAL STUDIES	Internal Exam (Grading System) (100 Marks)				
Total		**400**	**100**	**320**	**80**	**900**

Second Professional

Code	Subject	Theory Marks		Practical Marks		Total Marks
		External	Internal	External	Internal	
BPT201	Pathology and Microbiology	80	20	-	-	100
BPT202	Pharmacology	80	20			100
BPT203	Electrotherapy-II	80	20	80	20	200
BPT204	Exercise therapy-II	80	20	80	20	200
BPT205	Biomechanics	80	20	80	20	200
BPT206	Sociology & Psychology	80	20			100
BPT207	Computer Application			80	20	100
Total		**480**	**120**	**320**	**80**	**1000**

Third Professional

Code	Subject	Theory Marks		Practical Marks		Total Marks
		External	Internal	External	Internal	
BPT301	General Medicine	80	20	80	20	200
BPT302	General Surgery	80	20	80	20	200
BPT303	Orthopedics	80	20	80	20	200
BPT304	Physiotherapy in Cardio Respiratory Conditions	80	20	80	20	200
BPT305	Physiotherapy in Orthopedic Conditions and Sports Conditions	80	20	80	20	200
Total		**400**	**100**	**400**	**100**	**1000**

Fourth Professional

Code	Subject	Theory Marks		Practical Marks		Total Marks
		External	Internal	External	Internal	
BPT401	Neurology	80	20	80	20	200
BPT402	Pediatrics	40	10	-	-	50
BPT403	Geriatrics	40	10	-	-	50
BPT404	OBS & GYNE, ENT, Ophthalmology	25+20+20 (65)	15	-	-	80
BPT405	Physiotherapy in Neurology	80	20	80	20	200
BPT406	Physiotherapy in General Medical and Surgical Conditions	80	20	80	20	200
BPT407	Rationale of Rehabilitation	80	20	80	20	200
BPT408	Physiotherapy Ethics and Law	40	10			50
BPT409	Research Methodology and Biostatistics	80	20			100
Total		**585**	**145**	**320**	**80**	**1130**

4.10.5 Promotion criteria

A candidate who has passed the first year BPT examination of this University shall be eligible to join 2nd year BPT class. However, a candidate who has failed in one or more subjects in the first year BPT examination may be allowed to attend the next higher class until he/she appears and qualifies the 1st year BPT examination. A candidate will not be allowed to appear in 2nd year BPT examination till he/she passes in all the subjects of 1st year BPT Examination as regular or ex-student.

A candidate who has passed the second year BPT examination of this University shall be eligible to join 3rd year BPT class. However, a candidate who has failed in one or more subjects in the second year BPT examination may be allowed to attend the next higher class until he/she appears and qualifies the 2nd year BPT examination. A candidate will not be allowed to appear in 3rd year BPT examination till he/she passes in all the subjects of 2nd year BPT Examination as regular or ex-student.

A candidate who has passed the Third year BPT examination of this University shall be eligible to join 4th year BPT class. However, a candidate who has failed in one or more subjects in the third year BPT examination may be allowed to attend the next higher class until he/she appears and qualifies the 3rd year BPT examination. A candidate will not be allowed to appear in 4th year BPT examination till he/she passes in all the subjects of 3rd year BPT Examination as regular or ex-student.

The reappear/fail students may be reassured if they so desire, next time for the purpose of improvement of internal assessment otherwise their previous score of assessment will be carried forward.

4.11 Dress Code

Professionalism with respect to dressing is encouraged throughout the course. It is each student's responsibility to have appropriate dressing during all class assignments and learning activities. Students are supposed to wear apron compulsorily during practical and clinical hours.

4.12 Migration/ Transfer of Candidates

The Vice Chancellor shall have the powers to place any migration/transfer he/she is fit for grant of permission for migration/transfer to candidates undergoing course of study in another University as prescribed by university.

5 Syllabi of Bachelor of Physiotherapy

BPT101	ANATOMY	Total Hours
Version 1.0		320
Pre-requisites/Exposure	-	
Co-requisites		

Course Objectives

1. Acquire the knowledge of structure of human body in general.
2. Understand the regional anatomy in detail
3. Anatomical changes right from embryonic period till old age
4. Understand histological features of various organs
5. Understand its application in medical science

Course Outcomes

Upon completion of this course the student will be able to

CO1. Identify the features of bones of the limbs, vertebral column, ribs and skull.

CO2. Identify the points of attachments of muscles of upper and lower limbs.

CO3. Interpret the anatomy of contents of trunk, thorax, abdomen and pelvis.

CO4. Summarize neuroanatomy, including blood supply to the brain, pyramidal and extrapyramidal pathways, cerebral cortex, cerebellum, pons, medulla, etc.

CO5. Compare the anatomical structures of soft parts of the upper and lower limb.

CO6. Identify the bones and joints of the body using an articulated skeleton.

CO7. Describe the surface landmarks of the body.

CO8. Perform surface marking of the liver, spleen, kidney, lungs etc.

CO9. Demonstrate the parts of the heart and demonstrate the flow of blood through it.

CO10. Demonstrate the parts and areas of the brain.

Catalog Description

The study of anatomy will include identification of all gross anatomical structures. Particulars emphasis will be placed on description of bones, joints, muscles, the brain, cardiopulmonary and nervous system, as these are related to the application of physiotherapy and occupational therapy in patients.

Course Content

UNIT-I General Anatomy 40 Hours

IA. Introduction

1. Define anatomy and mention its subdivisions.
2. Name regions, cavities and systems of the body.
3. Define anatomical positions and anatomical terms.

I B. Cell

1. Define a cell.
2. Mention the shape, size and parts of a cell.
3. Name and functions of cell organs. Name of cell bodies.
4. Define chromosomes, genes.
5. Review mitosis and meiosis, mention the main events, but stages are not necessary.

I C. Tissues,

1. Classify tissues.
2. Classify and mention the microscopic structure, types of tissues such as epithelial, connective, muscular and nervous tissues. Give examples for each type of tissue.

I D. Introduction To Bone

1. Define the skeleton.
2. Mention the subdivision of skeleton. Name the bones in each subdivision. Know the number of bones in each subdivision and total number of bones.
3. Classify the bones and give examples.
4. Enumerate the common surface feature of bones.
5. Define ossification. Explain the type of ossification and give examples.
6. Define ossification center. Explain the growth of long bone in length and width.

When regional anatomy is taught-

- Identify the name and correctly orientate the bone.
- Identify the surface, border and all other surface features.
- Mark and indicate the muscular and ligamentous attachment on the bones.

I E. Introduction To Joints (Anthology)

1. Define a joint or articulation.
2. Classify the joints and give example for each type of joint. Define each type of joint.
3. Mention the basic feature of a synovial joint.
4. Define the axis & movements possible in a synovial joint.
5. Define the range of movement and limiting factor.
6. Indicate the blood supply and nerve supply in general.
7. Define the stability of a joint.
8. Demonstrate common movements.

When regional anatomy is taught: -

- Mention the type, the articular surface, ligament, movement, axis of movement, chief muscles producing. The movement, limiting factors and nerve supply and blood supply of all individual

joints.

- Mention the factors for stability.
- Articulate the bones correctly.
- Indicate applied anatomy for all joints.

I F. Introduction To Muscles (Skeletal Muscle)

1. a. Define a skeletal muscle.

b. Define fasciae, tendon aponeurosis.

c. Classify the skeletal muscles by shapes etc. and give examples.

d. Define origin, insertion, muscle work (contraction), types of muscle work, range of muscle work, group action- agonist, antagonist, synergist and fixator, shunt and spurt muscle, type of levers with examples.

2. When the regional anatomy is taught:

a. Mention the position, origin, insertion, nerve supply and action of the skeletal muscles. (for the skeletal muscles of soft palate, pharynx and larynx: Position, action & nerve supply may be sufficient).

b. Indicate group of muscles by position and action, group action and nerve supply of group of muscles.

c. Indicate segment innervation of muscles.

d. Predict the result of paralysis of individual and group of muscles.

UNIT -II UPPER LIMB 50 Hours

II A. Pectoral region:

1. Outline the features of the pectoral region.
2. Name, identify and correctly orientate the sternum, clavicle, scapula and humerus
3. Outline the main features of the bones of shoulder girdle.
4. Identify the parts, borders and surfaces of sternum mention its other features.
5. Identify the ends, surfaces, curvatures and other features of clavicle.
6. Identify the borders, angles, surface, processe, fossa and other features of scapula.
7. Identify the ends, head, greater and lesser tuberosities and anatomical and surgical necks of humerus also, the capitellum, trochlea and radial, coronoid and olecranon fossa and epicondyle
8. Locate and identify the muscles of pectoral region and mention their origin, insertion, nerve supply and action.

II B. Scapular region:

1. Comprehend the main features of the muscles in the scapula region.
2. State the layer, arrangement, of the muscles of the back.
3. Name and identify the muscles of the scapular region. Mention their origin, insertion nerve supply and action.
4. Demonstrate the bony land mark of scapula, humerus and clavicle.

II C. Axilla

1. Mention, identify the boundaries and contents of axilla. Name the branches of axillary artery. Name and identify the cords and branches of brachial plexus and mention their root value.
2. Illustrate the formation of brachial plexus.

II D. Shoulder girdle:

1. Comprehend and apply the function, the main features of joints of the shoulder griddle.
2. Name the joints of shoulder girdle. Identify the articular surfaces and name ligaments and movements of sternoclavicular and acromioclavicular joints.
3. Mention the type of the joints.
4. Demonstrate and name the movement of scapula. Mention the chief muscles producing these movements.
5. Correlate movements of scapula.
6. Assign functional role of the articular disc and sterno clavicular joint and coraco-clavicular ligament.

II E. Shoulder joint:

1. Mention the type, articular surface and ligaments of the shoulder joint. .
2. Define and demonstrate the movements of shoulder joint.
3. Name and identify the chief muscles producing these movements.Analyze these movements and mention limiting factors.
4. Mention the blood supply and nerve supply of this joint.
5. Analyze the associate movement of scapula and movement of the shoulder joint.
6. Mention the limiting factors and factors for its stability indicate applied anatomy.

II F. Upper arm:

1. Name and identify the muscles at the front and back of upper arm.
2. Name and identify the ends, borders, surfaces and features of the humerus.
3. Identify the head anatomical neck, tuberosities, surgical neck, bicipital groove, condyle, capitulum, trochlea, epicondyles, radial, coronoid and olecranon fossa.
4. Mention the origin, insertion, nerve supply and action of muscles of the front and back of upper arm.
5. Indicate the course, relation and distribution of radial and musculo- cutaneous nerves.

II G. Elbow joint:

1. Mention the type, articular surface and ligaments of elbow joint.
2. Define and demonstrate the movement possible and name the chief muscles producing this movement.
3. Mention the factors for stability and limiting factors.
4. Indicate the applied anatomy.
5. Mention the applied anatomy.
6. Explain the carrying angle

II H. Forearm, wrist and hand:

1. Mention the bones of forearm; identify the ends, borders, surfaces and features of radius and ulna.
2. Identify the head, neck, tuberosity and styloid process of radius. Identify the coronoid process, olecranon process, trochlear notch, tuberosity, head and styloid process of ulna. Also, about the radial notch of ulna and ulnar notch of radius.
3. Name and identify the carpal bones, metacarpal bones and phalanges in an articulated hand.
4. Identify the muscles of front and back of the forearm.
5. Mention the position, insertion, nerve supply and action of these muscles.
6. Indicate the course, relations and distribution of median, ulnar and radial nerves.
7. Mention the type, articular surface and ligaments of radio ulnar joints. Define the movement of supination and pronation. Mention the axis and muscles producing these movements. Analyze these movements and apply its functional role in routine day to day actions.
8. Mention the position and distribution of ulnar and radial arteries and lunar, median and radial nerves.
9. Name and locate the carpal bones. Mention the type, articular surface and ligaments of wrist joint.
10. Define and demonstrate the movements and mention the muscles producing them.
11. Mention the blood supply and nerve supply.
12. Mention the visible tendons around the wrist and their synovial sheaths.
13. Predict the result of paralysis of muscles of the forearm.
14. Mention t he functional implication of prehension in the structure of hand.
15. Indicate the arrangement of tendons of the digits, retinacula, fibrous flexor sheaths, and synovial sheaths.
16. Evaluate the hinge type of interphalangeal joints, ellipsoid type of metacarpophalangeal joints and saddle type of carpometacarpal joint. Name and identify the small muscles of the hand. Mention their position, origin, insertion, nerve supply and action.
17. Mention the types of bones forming and ligaments of the joints of the hand. Define the movements and the muscles producing these movements. Predict the results of paralysis of the small muscles of hand.
18. Demonstrate the type of grip.

II I. Nerves of upper limb.

1. Comprehend and apply the knowledge of the position and distribution of blood vessels and lymph nodes.
2. Mention the root value of the nerves.
3. Identify the nerves and mentions the position, course, relations and distribution of nerves of upper limb.
4. Predict the result of injury to these nerves.

II J. Blood vessels of upper limb:

1. Comprehend and apply the knowledge of the position and distribution of blood vessels and lymph nodes.
2. Trace the main arteries and veins.
3. Indicate their position' and name the main branches of tributaries.

4. Name and locate the lymph nodes.

II K. Cutaneous nerves of upper limb:

1. Name the cutaneous nerves and illustrate the areas of their distribution.
2. lllustrate the dermatome.

UNIT-III LOWER LIMB 50 Hours

III A. General

1. Name, identification and orientation of hip bone, femur, tibia, fibula and patella.
2. Identify the component and features of hip bones identify the ends, borders, surfaces, head, neck, trochanters, condyles and epicondyles of femur and the features of the tibia and fibula.
3. Identify and mention the origin, insertion, nerve supply and action of the muscles in the front of thigh.
4. Mention the boundaries and contents of femoral triangle and sub-sartorial canal.
5. Indicate the position, course and distribution of femoral nerve.
6. Indicate the course and main branches of femoral artery and mention the blood supply of neck of femur.
7. Indicate the position of femoral vein.

III B. Medial side of thigh:

1. Name and identify the muscles of the medial side of thigh. Mention their origin, insertion, nerve supply and action.
2. Indicate the course, relations and distribution of obturator nerve.

III C. Back of thigh:

1. Identify and mention the position, origin, insertion, nerve supply and action of the hamstring muscles.
2. Indicate the position, course, relation and distribution of sciatic nerve.

III D. Gluteal region:

1. Identify and mention the position, origin, insertion, nerve supply and action of the muscles.
2. Name and mention the position and course of the nerves found there and name the arteries there.

III E. Hip joint:

1. Mention the type, articular surface and ligaments.
2. Define the movements and name the chief muscles producing the movements.
3. Mention the blood supply, nerve supply, factor for stability and limiting factors.
4. Applied anatomy.

III F. Knee joint:

1. Mention the type, articular, surfaces and ligaments.
2. Define the movements and name the chief muscles for the movements.
3. Analyze the movements.
4. Know the blood supply and nerve supply.
5. Indicate applied anatomy.
6. Define locking and unlocking of the joint.

III G. Popliteal fossa:

1. Indicate the boundaries and contents.
2. Mention the position and branches of tibial and common peroneal nerves.

III H. Front of leg and dorsum of foot:

1. Name and identify the tarsal bones, metatarsal bones and phalanges in an articulated foot.
2. Name and identify the muscles.
3. Mention the positions, origin, insertion, nerve supply and action of the muscles.
4. Position and distribution of deep peroneal nerve.
5. Indicate the position and attachment of extensor retinacula.
6. Mention and identify the feature of the tibia and fibula.

III I. Lateral side of leg

1. Name and identify the muscles.
2. Mention the position, origin, insertion, never supply and action of muscles.
3. State the position, course and distribution of superficial peroneal nerve.
4. State the position and attachment of peroneal retinacula.

III J. Back of leg and sole of foot

1. Name and identify the features of the bones of the foot.
2. Name and identify the muscles of back of leg.
3. Mention the position, arrangement, origin, insertion, nerve supply and action of the muscles.
4. State the position course and distribution of tibial artery.
5. State the position course and distribution of posterior tibial artery.
6. Mention the position, and attachment of flexor retinaculum.
7. Mention the arrangement, origin, insertion, nerve supply and action of muscles of the foot.
8. Indicate the type of formation and factors for the maintenance of the arch of foot.
9. Mention the type, articular surface, ligaments, movements chief muscles for the movement. Axis of movements and applied anatomy of tibiofibular joints, ankle joints, subtalar joints, M.P. joints, I.P. joints. .
10. Palpate and identify the tendons around the ankle and dorsum of foot.

III K. Nerves:

1. Indicate the position, formation and branches of lumbar and sacral plexuses.
2. Mention the root value of the nerves.
3. Mention the position, course, relation and distribution of nerves.

4. Predict the result of injury to the nerves.
5. Illustrate cutaneous innervation of dermatomes.

III L. Blood vessels:

1. Indicate the position of arteries and their main branches.
2. Indicate the position of veins and their main tributaries
3. Indicate the position of lymph nodes.

UNIT-IV NEUROANATOMY

95 Hours

IV A. Head and Neck

1. Musculo skeletal and neurovascular features:
2. Identify the anterior and posterior triangles of neck. Name the subdivision. List the contents.
3. State the main features of the skull and facial skeleton.
4. Identify the large skull bones and their parts.
5. Identify the cranial fossae and hypophyseal fossa.
6. Identify the internal and external auditory meatus, foramen magnum and stylomastoid foramen and name the main structures passing through them.
7. Identify the name the main muscles of the face. Mention their nerve supply and action.
8. Predict the result of paralysis to the facial muscles and sequel of injury to the facial nerve.
9. Map the cutaneous distribution of the three divisions of the trigeminal nerve on the face.
10. Identify the general feature of a typical cervical vertebra, atlas, axis and seventh cervical vertebra.
11. Identify the erector spinae, sternomastoid and scalene muscles, geriohyoid. Mention their attachments, actions and nerve supply.
12. Identify the phrenic, accessory and vagus nerves. Mention their distribution.
13. Identify the state the position distribution and root value of the nerves, of cervical and brachial plexuses.
14. Demonstrate the action of sternomastoid.
15. Mention the type, articular surfaces, ligaments, movements and muscles producing these movements, at the atlanto-occipital and atlanto- axial joints. Demonstrate these movements and the movements of the cervical part of vertebral column.
16. Identify the sub clavian, vertebral and carotid arteries. Mention the position and extent of these arteries.
17. Identify the components of the circle of willis, Mention the distribution of internal and external carotid and vertebral arteries. Predict the sequence of occlusion of these arteries.
18. Identify the internal jugular and subclavian veins. Mention their position, formation and termination.
19. State the basic organization of the autonomic nervous system.
20. State the sites of craniosacral and thoracolumbar outflow
21. Define the mode of the distribution of pre and post. Ganglionic efferent neurons in Sympathetic and parasympathetic nervous system.
22. Name the cranial nerves containing para sympathetic system in relation to their function.
23. Distinguish between sympathetic & parasympathetic system in relation to their function.

IV B. Nervous System:

1. Define the subdivisions of the nervous system, define central, peripheral and autonomic nervous systems and name their subdivisions:- Comprehend the position and form of the spinal cord, its structure and function interims of neuronal connections.
2. Indicate the position and extent of the spinal cord.
3. Illustrate the principal features shown in a transverse section of the spinal cord.
4. Specify the basic features of mono and multi synaptic spinal reflex pathway.
5. Illustrate the white and gray matter, and anterior, lateral and posterior columns of the spinal cord.
6. Mention the origin, termination and position of important ascending and descending tracts, site of crossing of fiber of these tracts and functions of each tract.
7. State the main consequences of spinal cord transaction and hemi section, and explain the rationale of cordotomy.
8. Indicate the blood supply and menings of spinal cord.
9. Name the subdivisions of the brain, identify and mention the external features of parts of the brain.
10. Mention the internal structure and basic features of parts of the brainstem, and name the nuclei and fiber tract with special emphasis of cranial nerve nuclei,
11. Identify and mention parts of the cerebellum.
12. Mention the external features and internal structure of the cerebellum and name its various afferent and efferent tracts and their termination.
13. Mention the features of the gross component of the cerebrum.
14. Mention & identify the location of gyri, sulci and cortical area.
15. State and identify – association, commissural and projection fibers.
16. Define and identify component of forebrain, including cerebral cortex, insula, olfactory bulb, olfactory tract, uncus, fornix, basal ganglia, thalamus, hypothalamus, internal capsule, corpus callosum etc.
17. Predict the result of damage to internal capsule.
18. Outline sensory and motor pathway and be able to trace these pathways
19. Name sensory and motor nerve endings with function.
20. Define pyramidal motor system and name its tracts
21. Define upper and lower motor neurons,
22. Name the parts and tracts of the extra pyramidal system and indicate the functions.
23. Outline the basic of structure of sensory organs: - Nose, tongue, eye, ear and skin.
24. Briefly outline the nature and basis of muscle tone.
25. Mention the anatomical pathway involved in the production and maintenance of muscle tone.
26. State the formation, circulation and drainage of CSF.
27. Locate & identify the ventricles.
28. Identify and name the meninges and space around and locate the cistern.
29. Define lumbar puncture and cisternal puncture.
30. State the features of the meninges.
31. Recognize the difference between extradural, subdural, sub-arachnoid hemorrhage.
32. Outline the arrangement of major blood vessels around the brain a spinal cord.

33. Mention the arteries forming the circle of Willis.
34. Name the branches of major arteries supplying the brain and spinal cord and mention the parts of brain they supply.
35. Predict the result of blockage or rupture of central deep branches.
36. Predict the result of occlusion of cerebral arteries.
37. Predict the result of occlusion of vertebral or basilar arteries.
38. Identify and mention the connection of dural venous sinuses.
39. Name and identify the parts of the limbic system and mention their function in emotion and behavior.
40. Mention the position and structure of the autonomic nervous system.
41. Mention the site of origin and termination of the preganglionic and postganglionic sympathetic and parasympathetic fibers.
42. Name and locate the sympathetic and parasympathetic ganglia.
43. Summarize the functional difference between the sympathetic and parasympathetic system.
44. Enumerate the cranial nerves in serial order.
45. Mention the nuclei of origin & termination and indicate the site of attachment to brain
46. Explain the general distribution of the cranial nerves and the course of the Vllth nerve.
47. Predict the result of injury to cranial nerves.
48. Anatomy of spinal cord review.
49. Name the group of spinal nerves.
50. Explain the formation and branches of the spinal nerves and distribution of anterior and posterior rami.
51. Locate & name the plexuses of nerves.
52. Indicate the course and distribution of branches of the plexuses & nerves.

IV C. Cranial Nerves:

1. Enumerate the cranial nerves in serial order.
2. Relate interpret the number to the name.
3. Indicate the nuclei of origin and of termination.
4. Mention the attachments of the cranial nerves in and at cranial exit.
5. State the sensory and motor distribution.
6. State the position and course of VII nerve.
7. Predict the sequel of lesion

IV D. Miscellaneous

1. Eye

i. State the position of the lacrimal apparatus, the functional, implication of structure of the eye and the lacrimal apparatus.
ii. Name and illustrate the' coats, their subdivisions, the refractive media, the chambers of the eye and the optic nerve.
iii. Mention the structure of retina and optic pathway.
iv. Has a basic understanding of the light and accommodation reflex (omitting pathway)
v. Mention the distribution of the three divisions of trigeminal nerve.

vi. Name and state the nerve supply and simple actions of the extra ocular muscles.
vii. Predict the result of lesions of 3rd, 4th and 6^{th} cranial nerves.

2. Nose:

i. Name the bony component of the nose.
ii. Mention the parts and boundaries of the nose.
iii. State the main features of the nasal cavity.
iv. Name and identify the paranasal air sinuses and locate their opening.

3. Ear:

i. State the basic structure of the organs of hearing and equilibrium.
ii. Mention the three subdivisions of the ear.
iii. Mention the nerve ending for hearing and equilibrium.

4. Mouth

i. State the main features of the mouth cavity tongue, palate salivary glands, teeth and gums.
ii. Mention the sensory and motor innervation of the tongue.
iii. Identify the salivary glands.
iv. Demonstrate movements of the tongue and palate.
v. Test and produce the swallowing (gag) reflex.
vi. Predict the sequence of lesions of the Vllth and Xllth cranial nerves.

5. Pharynx:

i. State the position and extent of the pharynx.
ii. State the three subdivisions and the features of each subdivision.
iii. Name the muscles of pharynx and their action.
iv. Mention the sensory and motor innervation of the pharynx.

6. Larynx and Trachea:

i. Identify the hyoid and state its parts
ii. Identify the larynx and name the laryngeal cartilages.
iii. State the boundaries of laryngeal inlet and glottis.
iv. Identify the vocal and vestibular folds.
v. State the movements of the laryngeal cartilages. Name the laryngeal muscles and mentions their attachments, action and nerve supply.
vi. Define the position, extent and gross structure of the trachea
vii. State the mechanics of phonation and speech, production of voice and speech.

7. Temporomandibular Joint:

i. State the type, articular surface, ligaments, possible movements, muscles performing the movements and nerve supply of the Temporomandibular joint.
ii. Palpate and identify the joint and its articular surfaces.

iii. Identify and name the muscles of mastication. Mention their action and nerve supply

UNIT-V Trunk, Thorax, Abdomen and Pelvis ` 40 Hours

V A. Vertebral column:

1. State the basic osteology of vertebral column.
2. Identify the parts of typical vertebra, identify and state the main features of typical vertebra of each group of vertebra Identify a typical vertebrae.
3. State the form, structure and movements of joints of vertebrae column. Mention the movements and the muscles producing them.
4. Identify the intervertebral disc and mention its parts.
5. State the formation and ligaments of the inter vertebral joints
6. Name and identify the curvatures of the vertebral column and indicate deformities.
7. State the contents of vertebral canal.

V B. Thorax:

1. State the main features of the bones and joints of thoracic cage. Mention the boundaries.
2. State the parts and features of sternum.
3. Define true, false and floating ribs. Mention the parts of features of typical ribs. Know the main features of typical ribs.
4. Mention the type and formation the joint between rib and vertebra, between costal cartilage and sternum and between costal cartilages.
5. Mention the type and formation of the joint between parts of sternum. Indicate the importance of sternal angle.
6. Analyze pump-handle and bucket handle movement of ribs.
7. Palpate bony land marks such as jugular notch, sternal angle, xiphisternum and spine of thoracic vertebral.
8. Define intercostal space and list the contents.
9. Mention the course and branches of typical inter costal nerve.
10. Name the muscles of thorax.
11. Mention the origin insertion, nerve supply and action of inter costal muscles and diaphragm.
12. Name the structures passing through the diaphragm and mention the orifices in the diaphragm.
13. Define the boundaries and subdivisions of the mediastinum and list the contents.
14. Identify the contents.
15. State the features of thoracic parts of sympathetic trunk.

V C. Abdomen:

1. Mention the main features of lumber vertebra, sacrum and coccyx.
2. Mention the formation and subdivisions of bony pelvis list the features of the female bony pelvis and their role.
3. Mention the type, articular surface, ligaments and movements of the joints of pelvis.

4. Define abdominal cavity.
5. List the layers of anterior abdominal wall. Name and mention the origin, insertion, nerve supply and action of the muscles and the features of these muscles.
6. Explain the formation of rectus sheath and list its contents.
7. Define inguinal canal and know its position, extent, formation and contents. Indicate its clinical importance. Define inguinal hernia.
8. Name and identify the muscles of posterior abdominal wall. Give their origin, insertion, and action. List the organ on the posterior abdominal wall. Name the blood vessels on the posterior wall.
9. Mention the position and formation of lumber plexus. Name its branches.
10. State the anatomy of lumber region. Understand the disposition of muscles of the layers. Mention the arrangement of lumber fascia, identify the muscles in lumbar region. Understand the lumbar routes to abdomen. Identify and mention the attachment and action of the large muscles of back. (At least ones ending capitals)
11. Distinguish abdominal cavity and peritoneal cavity.
12. Mention the features of lumber part of sympathetic trunk and other sympathetic ganglia.
13. Mention the branches and distribution of the abdominal aorta and iliac arteries.
14. State the inferior vena cava and iliac veins and mention their tributaries.

V D. Pelvis

1. State the main features of subdivision, boundaries, walls and floor of pelvis
2. Mention the features of the pubic symphysis and sacroiliac joints.
3. Distinguish and mention and major difference between the male and female pelvis.
4. Identify the muscles of the pelvic floor and mention their attachments, actions and nerve supply.
5. Mention the structure of the urogenital diaphragm.

UNIT-VI SYSTEMIC ANATOMY

45 Hours

VI A. Cardio-Vascular System.

1. Comprehend the external and' internal features of heart and their implications.
2. Mention position of heart.
3. Identify and name the chamber of the heart, surface and border of the heart.
4. Identify the venae cavae, pulmonary trunk and aorta.
5. Mention the internal features of the chambers of the heart.
6. State the basic features of the blood supply & nerve supply of the heart.
7. State the basis arrangement of the pericardium.
8. Identify the coronary artery and coronary sinus.
9. Name the parts of the conductive system of heart.
10. Mention the position and general distribution of major arteries and major veins, and name their main branches.
11. Name the types of arteries and veins; give examples and indicate a basic microscopic structure of type of blood vessels.

VI B. Lymphatic System

1. Comprehend the general and regional arrangements of the lymphatic system.
2. Name the lymphatic organ and mention their location.
3. Illustrate the basic structural features of lymphatic vessels, lymph nodes, thymus, spleen and tonsils.
4. Assign functional role to the lymphatic system.
5. State the position and immediate relations of spleen.

VI C. Respiratory System.

1. List the parts of the respiratory system.
2. Comprehend the functional anatomy of the parts of the respiratory system.
3. Mention the basic features of innervation of bronchi and lungs.
4. State the position, extent, and gross and microscopic structure of the parietal pleura.
5. Comprehend the arrangement of pleura, mention the parts, and position of the parietal pleura.
6. Name the recesses of pleura.
7. Identify the trachea and bronchi.
8. Identify the right lung and left lung.
9. Name the components of the hilum of lung.
10. Name the broncho pulmonary segments.
11. Illustrate the main features of the microscopic structure of lung.
12. Identify the borders and surfaces of the lung on the specimen.

VI D. Digestive System (NB: details are not required)

1. List the parts of the digestive system.
2. Mention the boundaries and features of the mouth.
3. Classify teeth.
4. Mention, position, extent, subdivision, communications, internal features and muscles of pharynx.
5. Name the tonsils and define fauces.
6. Identify internal features of the mouth and pharynx of the specimen.
7. State the position, course and extent of esophagus.
8. Identify esophagus of the specimen.
9. State the basic nerve supply.
10. Mention the position and gross structure of the stomach.
11. Identify the stomach and its borders, surfaces and subdivisions.
12. Enumerate the immediate relations of the stomach.
13. State the basic nerve supply of the stomach.
14. Name the subdivision of the intestine and mention their positions.
15. Mention the difference between small and large intestine.
16. Name the arteries arising from the abdominal aorta. Name the organs supplied by these branches.
17. Awareness of the name and position of the principal autonomic visceral nerve plexus in the abdomen and pelvis and the organs supplied by them.
18. Mention the position and gross features of the liver and biliary system.

19. Name the position and subdivision of the pancreas.
20. Name the major salivary gland.
21. Indicate their positions.
22. Mention the site of opening of their ducts.

VI E. Genito-Urinary system (Details are not required)

1. Comprehend the basic functional implication and the basic structure of the kidney and ureter.
2. Mention the position, size and shape of kidney,
3. Name the immediate relations of the kidney.
4. Indicate the cortex, medulla, pyramids, sinus, calyces, and pelvis of ureter in a macro section of the kidney.
5. Illustrate the structure of a nephron.
6. Identify the ureter and indicate the position of the ureter.
7. State the anatomy of the bladder and urethra.
8. Mention the position, shape and size and surface of the bladder.
9. Indicate the immediate relations of the bladder and position,
10. Mention the basic innervation of the bladder.
11. Name and identify the subdivisions of the male urethra.
12. Mention the position, extent and immediate relations of male urethra.
13. Locate and identify the female urethra.
14. Mention extent and immediate relations of the female urethra.
15. Name the sphincters of the urethra.
16. List and locate the parts of the male reproductive system, state the anatomy and functional considerations of the testis, male accessory organs of reproduction and external organs.
17. Name the constitute structures of the spermatic cord.
18. Mention the position of the inguinal canal.
19. Name the component structures and parts of the penis.
20. List and locate the parts of female reproductive system, state the anatomy and functional considerations of ovary, uterine tubes, uterus, vagina and female external genitalia.
21. Mention the basic feature of parts of the female external genitalia.
22. Enumerate the factors responsible for the maintenance of the position of the uterus and anatomy of its prolepses.
23. Mention the position, extent and gross structure of the female breast.
24. Name the common, internal and external iliac arteries.

VI F. Endocrine System

1. List the endocrine organs and mention their position.
2. Mention the hormones produced by each endocrine organ.

Text Books:

1. Chaurasia BD, “Human Anatomy” (4 Volumes), CBS Publishers.
2. Singh Inderbir, “Textbook of Anatomy”, Jaypee.

Reference Books:

1. Snell R, "Clinical Anatomy by Regions", Lippincott, Williams and Wilkins.
2. Gray's Anatomy Student Edition, Churchill Livingstone.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination

Examination Scheme

Components	Continuous Internal Assessment (20%)				Professional Examination (80%)
	Internal Examination	Preliminary Examination	Attendance	Project/ Assignment/ Class test	
Weightage (%)	5	5	5	5	80
Schedule	4 months after onset of Academic Year	Before University exam	To be calculated at the end of AY	Continuous assessment (at least 4)	End of AY

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between COs and POs		
	Course Outcomes (COs)	Mapped Program Outcomes
CO1	Identify the features of bones of the limbs, vertebral column, ribs and skull.	PO2
CO2	Identify the points of attachments of muscles of upper and lower limbs	PO2
CO3	Demonstrate the anatomy of contents of trunk, thorax, abdomen and pelvis.	PO2
CO4	Understand neuroanatomy, including blood supply to the brain, pyramidal and extrapyramidal pathways, cerebral cortex, cerebellum, pons, medulla, etc.	PO3
CO5	Understand the anatomical structures of soft parts of the upper and lower limb	PO3

CO6	Identify the bones and joints of the body using an articulated skeleton.	**PO3**
CO7	Identify the surface landmarks of the body.	**PO3**
CO8	Perform surface marking of the liver, spleen, kidney, lungs etc..	**PO3**
CO9	Demonstrate the parts of the heart and demonstrate the flow of blood through it.	**PO3**
CO10	Demonstrate the parts and areas of the brain.	**PO3**

		Physiotherapy Knowledge	**Multidisciplinary/ Medical knowledge**	**Clinical and Practical Skills**	**Utilisation of Modern Technology**	**Evidence Based Practice**	**Life Skills**	**Assessment and Management**	**Teamwork**	**Research and Entrepreneurial Skills**
Course Code	**Course Title**	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PSO 1**	**PSO 2**	**PSO 3**
BPT101	**ANATOMY**		3	3				2		

1= weakly mapped 2= moderately mapped 3= strongly mapped

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PSO1**	**PSO2**	**PSO3**
CO1		**3**						1	
CO2		**3**							
CO3		**3**						**1**	
CO4			**3**						
CO5			**3**					**1**	
CO6			**3**						

CO7			**3**				**2**		
CO8			**3**						
CO9			**3**						
CO10			**3**						

1= weakly mapped 2= moderately mapped 3= strongly mapped

Unit I	General Anatomy
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	● Common surface features of bones, ● The name and correctly orientate the bone. • Identify the surface, border and all other surface features. • Mark and indicate the muscular and ligamentous attachment on the bone. Demonstrate common movements
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit II	Upper limb
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	● Identify the parts, borders and surfaces of sternum mention its other features. ● Identify the ends, surfaces, curvatures and other features of clavicle. ● Identify the borders, angles, surface, processe, fossa and other features of scapula. ● Identify the ends, head, greater and lesser tuberosities and anatomical and surgical necksof humerus also, the capitellum, trochlea and radial, coronoid and olecranon fossa and epicondyle ● Locate and identify the muscles of pectoral region and mention their origin, insertion, nerve supply and action. ● Demonstrate the bony land mark of scapula, humerus and clavicle. ● Demonstrate the movement possible and name the chief muscles producing this movement.
Professional Ethics	
Gender	
Human Values	
Environment &	

Sustainability	
Unit III	Lower limb
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	• Applied Anatomy • Analyze the movements
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit IV	Neuroanatomy
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	• Demonstrate the action of sternomastoid
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit V	Trunk, Thorax, Abdomen and Pelvis
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	

Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	

BPT102	**PHYSIOLOGY**	Total Hours
Version 1.0		280
Pre-requisites/Exposure	-	
Co-requisites	-	

Course Objectives

1. Comprehensive understanding and visualization of the physiological processes of the body
2. Appreciation of the natural efficiency of the human body.
3. Learning the techniques used in the restoration of physical functions.

Course Outcomes

Upon completion of this course the student will be able to:

CO1. Summaries how physiology and function of all of the body's different organs and cells are integrated into a functional whole, the human body.

CO2. Interpret the basis of normal and abnormal human physiology with special emphasis on the functioning of the cardiovascular, musculoskeletal, respiratory, gastrointestinal, excretory and nervous systems.

CO3. Describe the basis of endocrine system along with male and female reproductive systems.

CO4. Demonstrate knowledge of the effect of physical stimuli on normal physiology especially physiological effects of exercise on different systems of the body

CO5. Perform detailed clinical examination of CVS (radial pulse, blood pressure, circulatory efficiency test), Respiratory system (auscultation, spirometer), Sensory and Motor system(cranial nerves, reflexes, Rinne's test & Weber's test), BMR.

CO6. Compare the way separate organs and systems are controlled so that all are coordinated and correlate this knowledge of physiology as an integral base for physiotherapy practice.

CO7. Demonstrate an understanding the physiology of the senses- vision, taste, audition, smell and the vestibular apparatus.

CO8. Use the knowledge of physiology of exercise to concepts of muscle structure and function.

CO9. Practically calculate blood cell count, Estimation of Hemoglobin determination of BT & CT, Blood grouping & ESR. W.B.C. count, RBC count & indices of Blood & DLC.

Catalog Description

This subject is designed to understand the principles of the study of human physiology. The student should be able to comprehensively understand and visualize the physiological processes of the body and appreciate the natural efficiency of the human body. The subject provides the basic knowledge required to understand the various disciplines of physiotherapy.

Course Content

UNIT -I General Physiology 15 Hours

- Cell Physiology,
- Cell structures, functions. and homeostasis.
- Cell membrane permeability and transport mechanisms.
- Bio electric potentials.

UNIT-II Blood 30 Hours

A. Composition and functions of blood plasma proteins.
B. Red blood cell-site of production, function.
C. Erythropoiesis and regulation, physiological and pathological variations.
D. Hemoglobin function, abnormal hemoglobin, hemolysis and jaundice. Leucocytes, functions and leucopoiesis Platelets -role ins haemostasis, coagulation of blood, anticoagulants and fibrinolytic system, bleeding disorders, thrombosis.
E. Inflammation, Lymphocytes and cellular immunity.
F. Blood groups and blood transfusion, Blood volume & methods of measurement.
   Practical: Demonstration of the blood cell count Estimation of Hemoglobin determination of BT & CT, Blood grouping & ESR. W.B.C. count, RBC count & indices of Blood & DLC.

UNIT-III Nerve Muscle Physiology 30 Hours

A. General introduction types of responses by living organism, essentials of a system to produce movements, structure of neuron neuromuscular junction and synapse.
B. Electrophysiology of nerve and muscle, generation, conduction and transmission of nerve impulse.
C. Classification of nerve fibers.
D. Properties of nerve fibers, strength duration curve, accommodation.
E. Structure and properties of different types of muscle.
F. Physiology of neuromuscular transmission, site and mode of action of blocking substances of neuromuscular transmission, excitation- contraction coupling and molecular basis of muscle contraction, mechanisms of muscle contraction, twitch summation, length tension relationships-isotonic and isometric contraction, factor affecting muscle tension, energetic of muscle contraction.
G. Degeneration and regeneration of nerves, lower motor neuron and its lesions, nutrition of muscle and effect of training, electromyography, path physiology paralysis, paresis, peripheral neuritis, defects of neuromuscular transmission.

   Practical: Demonstration of nerve stimulus, reflex action reflexes.

UNIT-IV Cardiovascular System 30 Hours

A. Properties of cardiac muscle, functional tissues, effects of ions on cardiac muscle, origin and spread of cardiac impulse, resting membrane potential, pace maker potential and action potential.
B. Electrocardiography

C. Cardiac cycle & pressure, volume changes, heart sounds, pulse arterial and venous relationship with cardiac cycle. Cardiac output determination, regulation, heart rate, its regulation
D. Hemodynamics.
E. Blood pressure, measurement, regulation short term, intermediate and long term, regulatory mechanisms, venous circulation flow, pressure and factors affecting venous circulation, central venous mechanism, venous circulation flow, pressure, factor affecting, central venous pressure, microcirculation, coronary circulation and pathophysiological considerations, regional circulation-pulmonary, cerebral, fetal, placental, shock, syncope, heart failure, hypertension and hypotension.
F. Physiology of exercise, the lymphatic system, interstitial fluid dynamics and edema.

Practical: Measurement of BP, Pulse, to note effect of exercise. Circulatory efficiency test. Auscultation of heart sounds.

UNIT-V Respiratory System 40 Hours

A. Introduction functional anatomy, functions respiratory and non respiratory.
B. Mechanics of respiration inspiration, expiration, intra alveolar and intra pleural pressures, pneumo thorax, pulmonary ventilation, airways resistance, compliance, work of breathing,
C. Lung volumes and capacities, gas law, partial pressures, gas tension, alveolar ventilation, composition of inspired alveolar and expired gases.
D. Dead space of Anatomical and physiological perfusion-ventilation relationship and diffusion capacities, oxygen Transport and oxygen dissociation curve, Carbon dioxide transport and factors affecting, control of respiration, organization of respiratory centers, neural regulation.
E. Control of respiration chemical apnoea, hypoxia, asphyxia, hyperpnoea, cheyne stokes breathing, hypercapnia, hypocapnia, respiratory failure, dyspnoea and cyanosis.

Practical: Determination of vital capacity. Determination of lung, volume & capacities by spirometry. Auscultation of breath sounds.

UNIT-VI Gastrointestinal System 20 Hours

A. Introduction, functional anatomy, mastication and swallowing, physiology of gastro-intestinal secretions in general, Functions and regulation of gastric, Pancreatic, intestinal and bile secretions, movement of alimentary canal, gastric emptying and intestinal movements.
B. Defecation, assessment of functions, gastric, pancreatic and intestinal juice, vomiting, peptic ulcer, dumping syndrome, diarrhea and constipation.

UNIT-VII Nervous System 45 Hours

A. General

1. Functional organization of nervous system, encephalization and role in homeostasis.
2. C.S.F.-Site and mechanism of formation, circulation, functions and blood brain barriers-clinical significance.
3. Synapse-properties, neurotransmitters, pre and post synaptic events.

B. Sensory

1. Receptors: definition, classification, transducer action, generator potentials, properties, stimulus and strength relationship, modality of sensations and classification of sensations.
2. Specific sensations, sensory and other ascending pathways, somesthetic sensations, proprioceptions and kinesthesia, path physiology of pain and headache.
3. Thalamus- organization, connections, role in sensory functions, motor co-ordinations, autonomic and emotional behavior, sleep consciousness and thalamic syndrome.
4. Cerebral cortex-sensory and motor organization, somatotopic representation, tactile localization and discrimination, stereognosis.

C. Motor

1. Functional organization of motor system. Reflex action, properties and their significance, stretch reflex, muscle spindle, role of gamma motor neuron, static and dynamic responses, polysynaptic reflexes. Reciprocal innervations, crossed extensor reflex, positive and negative supporting reaction, cortical motor areas, pyramidal and extra pyramidal systems.
2. Reticular formation, organization ascending and descending components.
3. Basal ganglia organization, circuits function and disorders, role of bioamines.
4. Regulation of tone and posture -postural reflexes spinal decerebrate, thalamic and decorticate preparations.
5. Cerebellum - Functional anatomy, functions and pathology of sensory-motor mechanisms spinal cord lesions transaction, hemi-section, upper motor neuron lesion, posterior column defects.
6. Hypothalamus -Functional anatomy, connection and functions, role in homeostasis, limbic system - Components role in visceral, somatic and endocrinal activities, preservation of self and species, and psychosomatic implications.

D. Higher Nervous Function

1. Condition reflex, properties, neural basis, relation to learning memory and habit formations, Learning and memory higher intellectual functions, Communication and speech and disorders.
2. Electroencephalogram- neurophysiologic basis, relation to sleep and wakefulness and clinical applications.
3. Eye-functional anatomy, intra-ocular fluid pressure and clinical significance of vision, schematic eye, accommodation, errors of refraction and aberrations. Photoreceptor mechanisms, theories of vision, dark and light adaptations and color vision, visual pathways, central mechanism of vision & visual reflexes, field of vision, lesions of optic pathways.
4. Ear- Central functional anatomy, sound wave characteristics, transmission of sound attenuation reflex, physiology of internal ear, organ of corti, analysis of pitch and loudness, cochlear micro phonics, auditory pathways, central mechanisms of hearing, auditory cortex, hearing defects, vestibular apparatus, clinical significance nystagmus, motion sickness, physiology- taste and smell.

E. Autonomic nervous system.

1. Sympathetic and parasympathetic
2. transmission at ganglia and postganglionic terminals and autonomic reflexes.

Practical- Reflexes superficial & deep demonstration, Examination of sensory system, motor system, cranial nerve. Rinne's test & Weber's test for hearing.

UNIT-VIII Kidney and Body Fluids 20 Hours

1. Introduction, functional anatomy and functions in general including non excretory function
2. Glomelular functions, filtration and its regulation, function of renal tubule, reabsorption, secretions, renal clearance, transport mechanism, role of kidney in fluid balance electrolytes and non electrolytes ph and osmolarity, physiology of micturition, renal function tests, body fluid distribution, volume and regulation, path physiology of kidney-renal failure, artificial kidney diuretics.

UNIT-IX Endocrine System and Reproductive System 30 Hours

A. Endocrinology

1. Introduction, Hormone-definition.
2. Method of study.
3. Role of endocrine system in homeostasis, hypothalamic hypophyseal axis, target tissue-negative and positive feed -back control system, Influence of external environmental on the endocrine system. physiology of pituitary gland, adenohypophysis, neurohypophysis, physiology of thyroid gland, thyroid function tests, physiology of adrenal gland, adrenal cortex function and function, tests, Adrenal medullary hormone, functions parathyroid, regulation, Hypo and, Hyperactive parathyroid states, Pancreas-insulin, glycogen, somatostatin (physiological aspects) pineal gland, Thymus, localhormones prostaglandin

Practical- Demonstration of BMR.

B. Reproduction

1. Introduction, an overview of preservation of species as against preservation of self, puberty, sex drive, menopause, cyclic activities in females, spermatogenesis, ovulation, fertilization, implantation, pregnancy, lactation, parental behavior.
2. Reproduction in males, testes structure, spermatogenesis, seminal fluid, ejaculation. Testicular hormones- functions and regulation, hyper and hypoactive states of male gonad.
3. Ovarian function-structure, cogenesis follicular growth, ovulation, function of corpus luteum, Female sex hormone, function and regulation, menstrual cycle, neurohormonal basis, hypothalamic hypophyseal, gonadal axis, changes accessory organs, effect on behavior.
4. Fertilization, implantation, functions of placenta. Physiology of pregnancy and parturition, changes in reproductive organs and different systems of the body.
5. Physiology of' lactation, mammogenesis, galactopoietic, secretion and ejection of milk, lactation, amenorrhea, fetal and placental circulation.

Practical- Demonstration of BMR.

UNIT-X Miscellaneous 20 Hours

A. Skin: Structure, blood circulation, functions, temperature regulation-physical.
B. Environmental Physiology: Altitude, space and underwater physiology.
C. Applied physiology:
1. Effects of heat and cold (localized and generalized)
2. Effects of electrical stimulation on skin, muscle and nerves, effect of mechanical pressure.
3. Effect of local and general exercise, compensation and training in nervous system.
4. Effects of various sensory proprioceptive stimuli etc.

Textbooks:

1. Jain AK, "Textbook of Physiology", Avichal.
2. Sembulingam K, "Essentials of Medical Physiology", Jaypee.

Reference Book:

1. Guyton, Hall, "Text book of Medical Physiology", Elsevier.
2. Barrett, Barman. "Ganong's Review of Medical Physiology", Lange.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination

Examination Scheme

Components	Continuous Internal Assessment (20%)				Professional Examination (80%)
	Internal Examination	Preliminary Examination	Attendance	Project/ Assignment/ Class test	
Weightage (%)	5	5	5	5	80
Schedule	4 months after onset of Academic Year	Before University exam	To be calculated at the end of AY	Continuous assessment (at least 4)	End of AY

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between COs and Pos		
	Course Outcomes (COs)	Mapped Program Outcomes
CO1	Understand the basis of normal human physiology with special emphasis on the functioning of the cardiovascular and musculoskeletal systems.	PO2
CO2	Understand the basis of normal and abnormal human physiology with special emphasis on the functioning of the cardiovascular, musculoskeletal, respiratory, gastrointestinal, excretory and nervous systems.	PO2

CO3	Understand the basis of endocrine system along with male and female reproductive systems.	**PO2**
CO4	Demonstrate knowledge of the effect of physical stimuli on normal physiology especially physiological effects of exercise on different systems of the body	**PO2**
CO5	Perform detailed clinical examination of CVS (radial pulse, blood pressure, circulatory efficiency test), Respiratory system (auscultation, spirometer), Sensory and Motor system(cranial nerves, reflexes, Rinne's test & Weber's test), BMR.	**PO3**
CO6	Understand the way separate organs and systems are controlled so that all are coordinated and correlate this knowledge of physiology as an integral base for physiotherapy practice.	**PO2**
CO7	Demonstrate an understanding the physiology of the senses-vision, taste, audition, smell and the vestibular apparatus.	**PO2**
CO8	Apply the knowledge of physiology of exercise to concepts of muscle structure and function	**PO3**
CO9	Practically calculate blood cell count, Estimation of Hemoglobin determination of BT & CT, Blood grouping & ESR. W.B.C. count, RBC count & indices of Blood & DLC.	**PO3**

		Physiotherapy Knowledge	**Multidisciplinary/ Medical knowledge**	**Clinical and Practical Skills**	**Utilisation of Modern Technology**	**Evidence Based Practice**	**Life Skills**	**Assessment and Management**	**Teamwork**	**Research and Entrepreneurial Skills**
Course Code	**Course Title**	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PSO 1**	**PSO 2**	**PSO 3**
BPT102	**HUMAN PHYSIOLOGY – I**		**3**	**3**					**2**	

1= weakly mapped 2= moderately mapped 3= strongly mapped

CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO 2	PSO3
CO1	-	-	**3**	-	-	-	-	**2**	-
CO2	-	-		-	-	-	-		-
CO3	-	-		-	-	-	-		-
CO4	-	-		-	-	-	-		-
CO5	-	-	**3**	-	-	-	-		-
CO6	-	-		-	-	-	-		-
CO7	-	-		-	-	-	-	**2**	-
CO8	-	-	**3**	-	-	-	-	**2**	-
CO9	-	-	**3**	-	-	-	-	**3**	-

1= weakly mapped 2= moderately mapped 3= strongly mapped

Unit I	**General Physiology**
Local	
Regional	
National	
Global	● Cell structures, functions. and homeostasis. ● Cell membrane permeability and transport mechanisms. ● Bio electric potentials.
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit II	Blood
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	Blood groups and blood transfusion, Blood volume & methods of measurement.
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit III	**Nerve Muscle Physiology**
Local	
Regional	Electrophysiology of nerve and muscle, generation, conduction and transmission of nerve impulse.
National	
Global	General introduction types of responses by living organism, essentials of a system to produce movements, structure of neuron neuromuscular junction and synapse.

Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit IV	**Cardiovascular System**
Local	Physiology of exercise
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	Electrocardiography Blood Pressure Measurement and Regulations
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	
Unit V	**Respiratory System**
Local	apnea, hypoxia, asphyxia, hyperpnea, Cheyne stokes breathing, hypercapnia, hypocapnia, respiratory failure, dyspnea and cyanosis
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	Lung volumes and capacities

Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	
Unit VI	**Gastrointestinal System**
Local	Defecation, assessment of functions, gastric, pancreatic and intestinal juice, vomiting, peptic ulcer, dumping syndrome, diarrhea and constipation.
Regional	Introduction, functional anatomy, mastication and swallowing, physiology of gastro-intestinal secretions in general, Functions and regulation of gastric, Pancreatic, intestinal and bile secretions, movement of alimentary canal, gastric emptying and intestinal movements.
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
Unit VII	**Nervous System**
Local	Patho-physiology of pain and headache
Regional	Functional organization of motor system. Reflex action, properties and their significance, stretch reflex, muscle spindle, role of gamma motor neuron, static and dynamic responses, polysynaptic reflexes.
National	
Global	C.S.F.-Site and mechanism of formation, circulation, functions and

	blood brain barriers-clinical significance.
Employability	
Entrepreneurship	
Skill Development	Electroencephalogram- neurophysiologic basis, relation to sleep and wakefulness and clinical applications.
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	
POE/4th IR	
Unit VIII	**Kidney and Body Fluids**
Local	
Regional	Glomelular functions, filtration and its regulation, function of renal tubule, reabsorption, secretions, renal clearance, transport mechanism, role of kidney in fluid balance electrolytes
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	
Unit IX	**Endocrine System and Reproductive System**
Local	

Regional	
National	
Global	Reproduction in males, testes structure, spermatogenesis, seminal fluid, ejaculation. Testicular hormones- functions and regulation, hyper and hypoactive states of male gonad. Ovarian function-structure, cogenesis follicular growth, ovulation, function of corpus luteum, Female sex hormone, function and regulation, menstrual cycle, neurohormonal basis, hypothalamic hypophyseal, gonadal axis, changes accessory organs, effect on behavior.
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	

BPT103	**BIOCHEMISTRY**	Total Hours
Version 1.0		120
Pre-requisites/Exposure		
Co-requisites		

Course Objectives: The course aims to provide students with an advanced integrated knowledge and understanding of core topics, with general principles set in particular contexts.

Course Outcomes:

Upon completion of this course the student will be able to:
CO1. Be acquainted with important biomolecules of human diet and their physiological implications.
CO2. Understand the components of a balanced diet and, the role of vitamins and their deficiency manifestations.
CO3. Summarize the enzymes, hormones and their functions.
CO4. Interpret the importance of water and electrolytes and their role in buffer system of body.
CO5. Describe the biochemical basis of muscular contraction.
CO6. Describe the normal levels of blood and urine constituents used in clinical biochemistry.

Catalog Description

This subject is designed to impart fundamental knowledge food chemistry with respect to their pharmacokinetic aspects. It also helps in understanding fundamental of digestive system with their applications in various illnesses. The subject provides the basic knowledge required understanding the various types of food and their associated disorders.

Course Content:

UNIT-I Structural and Functional Biochemistry 20 Hours

A. Biophysics: Concepts of pH and Buffers, Acid -base equilibrium, Osmotic pressure and its physiological applications.
B. Cell & Sub Cellular Organelles: Structure & function of Cell & Sub-cellular organelles Biochemical characteristics of living matter, Physiochemical Phenomena & their significance (Osmosis Diffusion, Donnam Membrane equilibrium), Structure organization of plasma membrane & transport system.
C. Structure and functions of DNA, RNA, Nucleosides, Nucleotide, Genetic code Biologically important Nucleotides.

UNIT-II Nutrition 15 Hours

A. Nutritional aspects of carbohydrate, fat and protein,
B. Balance diet,
C. Metabolism in exercise and injury,
D. Diet of chronically ill and terminally ill patients.

UNIT III Nutrient Chemistry and Metabolism 30 Hours

A. Carbohydrates: Definition, Functions, Sources, Classifications, Monosaccharides, Disaccharides, Polysaccharides, Mucopoly saccharides and its importance. Carbohydrate metabolic pathways such as Glycolysis, Gluconeogenesis, TCA cycle, HMP shunt pathway, Glucuronic acid pathway & Glycogen metabolism with their physiological importance, Interconversion of different sugars, Metabolic integration, Regulation of blood Glucose level, DM.
B. Lipids: Definition Functions, Sources, Classifications, Simple lipids, Compound lipids, Derived lipids, Saturated and unsaturated fatty acids. Essential fatty acids & their importance, Blood lipids and their implications, Cholesterol and its importance. Fatty acid oxidation, Fatty acid synthesis,

Metabolism ofcholestero~ Ketone bodies, Atherosclerosis and Obesity. liver & lipo tropic factors.

C. Protein: Definition, Sources, Functions, Classification, Simple protein, Conjugated proteins and derived proteins, Properties and reactions of proteins. Transamination, Transmethylation, Deamination, Fate of ammonia, Urea synthesis and synthesis of creatinine, Inborn errors of metabolism.
D. Vitamins and minerals: Classification, Fat soluble vitamins 'A' 'D' 'E' 'K " Water soluble vitamins -B Complex and Vitamin 'C'. Daily requirement, Physiological functions, and diseases of vitamins deficiency. Iron, Calcium, Phosphorous, Trace elements Metabolism.
E. Water and Electrolytes: Fluid compartments, Daily intake and output, Dehydration, Sodium and Potassium Metabolism.

UNIT IV Enzymes and Hormones 15 Hours

A. Classification & Mechanism of action, factors affecting enzyme activity,
B. Enzyme kinetic, Enzyme inhibition,
C. Coenzymes,Allosteric enzymes,
D. Diagnostic significance of enzymes & isoenzymes.

UNIT V Biochemistry of tissues 15 Hours

A. Connective Tissue: Mucopolysaccharides, Connective tissue proteins, formation of collagen, Glycoproteins, Chemistry and Metabolism of bone and teeth, Metabolism of skin.
B. Nerve Tissue: Composition, Metabolism, Chemical mediators of nerve activities
C. Muscle Tisue: Structure Metabolism of muscles, Muscle contraction

UNIT-VI Biological Oxidation & Bioenergetics. 15 Hours

A. Concepts of free energy change,
B. Exergonic & Endergonic reactions, Biological oxidation, Electron Transport chain, Oxidative phosphorylation,
C. Inhibitors & uncouplers of electron transport chain & Oxidative phosphorylation.

UNIT-VII Investigations 10 Hours

A. Interpretation of common clinical biochemical investigations. Sugar, Urea, Creatinine, Protein, Bilirubin, Uric acid, Cholesterol.
B. Isotopes and their role in diagnosis and treatment of diseases.

Text book:

Murray, "Harper's Biochemistry", Lange Medical Books.

Reference books:

Vasudevan D, "Text Book of Biochemistry for Medical students", Jaypee.
"Harper's Illustrated Biochemistry", Lange.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination

Examination Scheme:

Components	Continuous Internal Assessment (20%)				Professional Examination (80%)
	Internal Examination	Preliminary Examination	Attendance	Project/ Assignment / Class test	
Weightage (%)	5	5	5	5	80
Schedule	4 months after onset of Academic Year	Before University exam	To be calculated at the end of AY	Continuous assessment (at least 4)	End of AY

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between COs and POs		
	Course Outcomes (COs)	Mapped Program Outcomes
CO1	Be acquainted with important biomolecules of human diet and their physiological implications.	PO2
CO2	Understand the components of a balanced diet and, the role of vitamins and their deficiency manifestations.	PO2
CO3	Know about important enzymes, hormones and their functions.	PO2

CO4	Know the importance of water and electrolytes and their role in buffer system of body.	**PO2**
CO5	Understand the biochemical basis of muscular contraction.	**PO2**
CO6	Learn the normal levels of blood and urine constituents used in clinical biochemistry.	**PO2**

		Physiotherapy Knowledge	**Multidisciplinary/ Medical knowledge**	**Clinical and Practical Skills**	**Utilisation of Modern Technology**	**Evidence Based Practice**	**Life Skills**	**Assessment and Management**	**Teamwork**	**Research and Entrepreneurial Skills**
Course Code	**Course Title**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PSO 1**	**PSO 2**	**PSO 3**
BPT103	**BIOCHEMISTRY**		**3**					**1**		

1= weakly mapped 2= moderately mapped 3= strongly mapped

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PSO1**	**PSO2**	**PSO3**
CO1	-	**3**	-	-	-	-	-	**2**	-
CO2	-	**3**	-	-	-	-	-	-	-
CO3	-	**3**	-	-	-	-	-	-	-
CO4	-	**3**	-	-	-	-	-	-	-
CO5	-	**3**	-	-	-	-	-	**2**	-
CO6	-	**3**	-	-	-	-	-	-	-

1= weakly mapped 2= moderately mapped 3= strongly mapped

Unit I	**Structural and Functional Biochemistry**
Local	
Regional	
National	
Global	Structure and functions of DNA, RNA, Nucleosides, Nucleotide, Genetic code Biologically important Nucleotides.
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit II	**Nutrition**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	Nutritional aspects of carbohydrate, fat and protein, Balance diet
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit III	**Nutrient Chemistry and Metabolism**
Local	
Regional	
National	
Global	Nutrient chemistry of carbohydrate, protein, vitamin, lipids
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	

Environment & Sustainability	
Unit IV	**Enzymes and Hormones**
Local	
Regional	
National	
Global	Diagnostic significance of enzymes & isoenzymes
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	
Unit V	**Biochemistry of tissues**
Local	
Regional	Connective Tissue: Mucopolysaccharides, Connective tissue proteins, formation of collagen, Glycoproteins, Chemistry and Metabolism of bone and teeth, Metabolism of skin. Nerve Tissue: Composition, Metabolism, Chemical mediators of nerve activities Muscle Tisue: Structure Metabolism of muscles, Muscle contraction
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	

NEP 2020	
POE/4th IR	
Unit VI	**Biological Oxidation & Bioenergetics**
Local	
Regional	
National	
Global	Exergonic & Endergonic reactions, Biological oxidation, Electron Transport chain, Oxidative phosphorylation,
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	
Unit VI	**Investigations**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	Interpretation of common clinical biochemical investigations. Sugar, Urea, Creatinine, Protein, Bilirubin, Uric acid, Cholesterol
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	

BPT104	ELECTROTHERAPY-I	Total Hours
Version 1.0		200
Pre-requisites/Exposure		
Co-requisites	ELECTROTHERAPY-I LAB	

Course Objectives

1. Principles, Techniques, Effects, Indication, Contra-Indication and application of electrotherapy modalities.
2. Choice of modality according to the condition.
3. Understanding of basic physics principles of electrotherapy
4. Evidence based practice and application.

Course Outcomes

On completion of this course, the students will be able to-
CO1. Summarize the theory behind use of low frequency currents for diagnosis and treatment.
CO2. Use modalities after understanding the indications and contra-indications to electrotherapy.
CO3. Explain the working of TENS, Superficial heat modalities, hydrotherapy and cryotherapy.
CO4. Explain and demonstrate principles of nerve-muscle physiology with electrical stimulation.
CO5. Locate and stimulate different motor points of muscles region wise, including the upper & lower limb, trunk.
CO6. Apply different low frequency currents plot SD curves, and treat patient using Faradic foot bath, Faradism under pressure and Iontophoresis.
CO7. Apply superficial heat region wise for various conditions.
CO8. Apply TENS on various regions of the body according to the condition.

Catalog Description

In this course the student will learn the Principles, Techniques, Effects, Indication, Contra-Indication and the dosage parameter for various indications of electro therapeutic modalities in the restoration of physical function.

Course Content

UNIT-I 30 Hours

A. Electromegnatic Spectrum: production and its properties, dual nature, Laws governing radiation, depth of penetration, mode of heat & energy transfer.

B. Electric energy

1. Electricity and its Units.
2. Electron theory.
3. Static and current electricity.

4. Conduction of electricity, Conductors, Insulators, Potential difference& factors affecting it.
5. Resistance & Intensity.
6. Ohm's Law- Its application to AC & DC currents and uses of Ohm's law in Physiotherapy.
7. Polar and Chemical effects of electric currents examples in Physiotherapy.
8. Ionization: theory of Ionization, techniques of medical ionization and surgical ionization, uses of ionization in Physiotherapy.
9. EMF: Production of an E.M.F. by chemical actions, examples and uses in physiotherapy.
10. Joule law & production of heat by Joule's law its implication in Physiotherapy.
11. Electrical supply in Physiotherapy Department: Brief outline of main supply of electric current. Precautions - safety devices, earthing, fuses etc.
12. Dangers of DC/AC: Short circuits, electric shocks. safety, precautions and First aid & initial management of electric shocks. Electrical and chemical burns their prevention & management.

C. Magnetism:

1. Definition, Properties of Magnets, Magnetic effects, Molecular theory of Magnetism.
2. Magnetic fields& magnetic forces, Magnetic effects of an electric field.
3. Electromagnetic induction and its uses in Physiotherapy department.

UNIT-II **30 Hours**

A. Condensers: Types, construction and working principles, Uses in Physiotherapy department.
B. Milliammeter: Construction,Working,Uses in physiotherapy.
C. Voltmeter: Construction, Working and uses in physiotherapy.
D. Transformer: Definition, Types, Principle, Construction, Eddy current, Working, Uses in Physiotherapy.
E. Chokes: Principle, Construction and working, Uses in Physiotherapy.
F. Electric valves or thermonic valves: Types: Diode, Triode, Double anode diode. Principle of thermonic valves. Construction and working of different valves and their uses in Physiotherapy.
G. Metal oxide rectifier:Definition, Construction, Working, Uses in physiotherapy.
H. Display devices & indicators used in Physiotherapy- analogue & digital.
I. Potentiometer: Construction and working principles.
J. Fuse: Construction, working and application in Physiotherapy department.

UNIT -III **20 Hours**

A. Review of neuro muscular physiology including effects of the body.
B. Physiological responses to heat gain or loss on various tissues of the body
C. Physical principles of electro - magnetic radiation.
D. Physics of sound including characteristics and propagation.

UNIT –IV **36 Hours**

A. Define heat and temperature (in brief).
B. Physical effects of heat- (in brief).
C. Sources of therapeutic heating and its physiological effects.

D. Paraffin wax bath: composition, Physiological & therapeutical effects, methods of applications, mode of heat transfer, depth of penetration, indications, Contraindications, precautions, operational skills of equipment & patient preparation.
E. Moist heat: types of moist heat therapy, Physiological & therapeutical effects, methods of applications, mode of heat transfer, depth of penetration, indications, Contraindications, precautions, operational skills of equipment & patient preparation.
F. Electrical heating pads & Fluidotherapy: components, application methods, Physiological & therapeutical effects, precautions, operational skills of equipment & patient preparation.

UNIT -V **20 Hours**

A. Therapeutic cold (cryotherapy) source, biophysical effects types therapeutic effects, indications contraindications precaution application techniques and patient preparation.
B. Therapeutic mechanical pressure (Intermittent compression therapy)-principal, biophysical Effects, types therapeutic effects indications contraindication precautions operational Skill and patient preparation.

Electrotherapy -I (Practical) **64 Hours**

1. To study the basic operation of electric supply to the equipment & safety devices.
2. To experience sensory and motor stimulation of nerves and muscles by various types of low frequency current on self.
3. To locate and stimulate different motor points region wise, including the upper & lower limbs and face.
4. Therapeutic application of different low frequency currents faradic foot bath, faradism under pressure, faradism under tension, ionotophoresis.
5. To study the reactions of degeneration of nerves, to plot strength duration curves.
6. To find chronaxie and Rheobase.
7. To study a hydro collator unit, its operating and therapeutic application of Hot packs region wise.
8. To study a paraffin wax bath unit, its operation and different methods of application - region wise
9. To study a TENS Stimulator, its operation and application -region wise.
10. To study various forms of therapeutic cold application region wise include ice cold pack Vapor coolant sprays, etc.
11. To study intermittent pneumatic therapy unit, its operation and different methods of Application-region

Text Books:

1. Low & Reed, “Electrotherapy Explained”, Butterworth Heinemann.
2. Forster and Palastanga, “Clayton’s Electrotherapy”, CBS.

Reference Books:

1. Kahn J, “Principles and Practice of Electrotherapy”.
2. Nelson & Currier, “Clinical Electro Therapy”.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination

Examination Scheme:

Components	Continuous Internal Assessment (20%)				Professional Examination (80%)
	Internal Examination	Preliminary Examination	Attendance	Project/ Assignment / Class test	
Weightage (%)	5	5	5	5	80
Schedule	4 months after onset of Academic Year	Before University exam	To be calculated at the end of AY	Continuous assessment (at least 4)	End of AY

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between COs and POs		
	Course Outcomes (COs)	Mapped Program Outcomes
CO1	Understand the theory behind use of low frequency currents for diagnosis and treatment.	PO1
CO2	Apply modalities after understanding the indications and contra-indications to electrotherapy.	PO3
CO3	Understand the working of TENS, Superficial heat modalities, hydrotherapy and cryotherapy	PO1
CO4	Explain and demonstrate principles of nerve-muscle physiology with electrical stimulation.	PO1
CO5	Locate and stimulate different motor points of muscles region wise, including the upper & lower limb, trunk.	PO3
CO6	Apply different low frequency currents plot SD curves, and treat patient using Faradic foot bath, Faradism under pressure and Iontophoresis.	PO3
CO7	Apply superficial heat region wise for various conditions.	PO3
CO8	Apply TENS on various regions of the body according to the condition.	PO3

		Physiotherapy Knowledge	Multidisciplinary / Medical knowledge	Clinical and Practical Skills	Utilisation of Modern Technology	Evidence Based Practice	Life Skills	Assessment and Management	Teamwork	Research and Entrepreneurial Skills
Course Code	**Course Title**	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PSO 1**	**PSO 2**	**PSO 3**
BPT104	**ELECTROTHERAPY-I**	**3**		**3**				**2**		**1**

1= weakly mapped 2= moderately mapped 3= strongly mapped

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PSO1**	**PSO2**
CO1	**3**							
CO2			**3**					**2**
CO3	**3**							
CO4	**3**						**1**	
CO5			**3**				**1**	
CO6			**3**					**2**
CO7			**3**					**2**
CO8			**3**					**2**

1= weakly mapped 2= moderately mapped 3= strongly mapped

Unit I	
Local	
Regional	
National	
Global	Electricity, resistance, Magnetism, EMF

Employability	
Entrepreneurship	
Skill Development	Dangers of DC/AC: Short circuits, electric shocks. safety, precautions and First aid & initial management of electric shocks. Electrical and chemical burns their prevention & management.
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit II	
Local	Display devices & indicators used in Physiotherapy- analogue & digital. Potentiometer: Construction and working principles. Fuse: Construction, working and application in Physiotherapy department.
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit III	
Local	
Regional	
National	
Global	Physiological responses to heat gain or loss on various tissues of the body
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment &	

Sustainability	
Unit IV	
Local	● Paraffin wax bath: composition, Physiological & therapeutical effects, methods of applications, mode of heat transfer, depth of penetration, indications, Contraindications, precautions, operational skills of equipment & patient preparation. ● Moist heat: types of moist heat therapy, Physiological & therapeutical effects, methods of applications, mode of heat transfer, depth of penetration, indications, Contraindications, precautions, operational skills of equipment & patient preparation. ● Electrical heating pads & Fluidotherapy: components, application methods, Physiological & therapeutical effects, precautions, operational skills of equipment & patient preparation.
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	
Unit V	
Local	● Therapeutic cold (cryotherapy) source, biophysical effects types therapeutic effects, indications contraindications precaution application techniques and patient preparation. ● Therapeutic mechanical pressure (Intermittent compression therapy)-principal, biophysical Effects, types therapeutic effects indications contraindication precautions operational Skill and patient preparation.
Regional	
National	
Global	
Employability	

Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	

BPT105	**EXERCISE THERAPY-I**	**Total Hours**
Version 1.0		200
Pre-requisites/Exposure		
Co-requisites		

Course Objectives

1. To assess and examine a patient using evidence-based tests and outcome measures.
2. Learn and be able to teach methods of relaxation.
3. Perform goniometry and muscle testing to aid in assessment and evaluation.
4. To apply principles of exercise therapy in designing exercise protocols.
5. Learn Indications and contractions of various types of exercise therapy
6. Demonstrate the different techniques and describe their effects.

Course Outcomes

On completion of this course, the students will be able to

CO1. Understand the theoretical basis for tests for assessment of patient- functional tests, MMT, anthropometric measurements, speed, endurance and power tests, etc.
CO2. Identify the different techniques of relaxation and be able to ascertain the importance of relaxation and stress management.
CO3. Apply active movement, Passive movement, Active assisted movement, Resisted movement.
CO4. Describe the principles of measurement of Joint Range of Motion through Goniometry.
CO5. Determine the physiological effects of the different techniques of massage and be able to prescribe the correct method according to the condition.
CO6. Develop a free exercise programme, for general population as well as patient specific.
CO7. Demonstrate the various relaxation techniques that help a person to relax; to attain a state of increased calm.
CO8. Perform tests for assessment of patient- functional tests, MMT, anthropometric measurements, speed, endurance and power tests, goniometry, etc.
CO9. Demonstrate the different techniques of massage and be able to prescribe the correct method according to the condition.
CO10. Develop evidence-based practice pertaining to exercise therapy.

Catalog Description

In this course the student will learn the principles, technique and effects of exercise as a therapeutic modality in the restoration of physical function.

Course Content

UNIT –I **40 Hours**

A. Basic Mechanics

Define the following terms and describe the principles involved with suitable examples.

1. Force: Composition of force, parallelogram of forces.
2. Equilibrium: Stable, unstable, neutral.
3. Gravity: Center of gravity, line of gravity.
4. Levers: 1st order, 2nd order, 3rd order, their examples in the human body and their practical applications in physiotherapy, forces applied to the body levers.
5. Pulleys: Fixes, movable.
6. Springs: Series, parallel.
7. Tension.
8. Elasticity: Hook's law.
9. Axis: sagittal, frontal, transverse, vertical.
10. Planes: Sagittal, frontal, horizontal.
11. Definition of speed, velocity, work, energy, power, acceleration, momentum, friction and Inertia.

B. Introduction

1. Introduction to exercise therapy, principles, technique and general areas of its application, assessment & its importance.
2. Description of fundamental starting position and derived position including joint positions, muscle work, stability, effects and uses.
3. Introduction to movements including analysis of joint motion, muscle work and Neuro muscular co- ordination.
4. Classification of movements - Describe the types, technique of application, indication, contraindications, effects and uses of the following:

a) Active movement.
b) Passive movement.
c) Active assisted movement.
d) Resisted movement.

C. Suspension Therapy

To study the principles, techniques of application, indication, contraindication, precaution, effects and uses of suspension therapy.

D. PELVIC TILT

Describe the following:

1. Normal pelvic tilt, alteration from normal, anterior tilt (forward), posterior tilt (backward), lateral tilt.
2. Muscles responsible for alteration and pelvic rotation.
3. Identification of normal pelvic tilt, pelvic rotation and altered tilt and their corrective measures.

SECTION -II **28**

Hours

Manual Muscle Testing:

A. Principles and application techniques of manual muscle testing.
B. Testing position, procedure and grading of muscles of the upper limb, lower limb and trunk etc.

SECTION -III **28**

Hours

Goniometry and its types:

A. Principle techniques and application of Goniometry.
B. Testing position, procedure and measurement of R.O.M. of the joints of upper limbs, lower limbs and trunk.

SECTION –IV **20**

Hours

Soft Tissue Manipulation (Therapeutic massage)

A. History, various types of soft tissue manipulation techniques.
B. Physiological effects of soft tissue manipulation on the following systems of the body circulatory, Nervous, Musculoskeletal, Excretory, Respiratory & Integumentary system and metabolism.
C. Classify, define and describe:- effleurage, stroking, kneading, Petrissage, deep friction, vibration and shaking etc.
D. Preparation of patient: effects, uses, indication and contraindications of the above manipulation.

SECTION – V **20**

Hours

A. Relaxation

1. Describe relaxation, muscle fatigue, muscle spasm and tension (mental & physical).
2. Factors contributing to fatigue & tension.
3. Techniques of relaxation (local and general).
4. Effects, uses & clinical application.
5. Indication and contraindication.

B. Therapeutic Gymnasium

1. Setup of gymnasium & its importance.

2. Various equipment in the gymnasium.
3. Operation skills effects & uses of each equipment.

Practical: 64 Hours

1. To practice all the soft tissue manipulative technique region wise - upper limb, lower limb, neck, back and face.
2. To practice to measurement of ROM of joints- upper limb, lower limb. and trunk. .
3. To practice the grading of muscle strength region wise- upper limb, lower limb and trunk
4. To study -the position of joints, muscle work and stability of various fundamental and derived positions.
5. To study the different types of muscle contraction, muscle work, group action of muscles and co-coordinated movements.
6. To practice the various type of suspension therapy and its application on various parts of body - region wise.
7. To study & practice local and general relaxation techniques.
8. To study the structure & function along with application of various equipment in gymnasium.

Textbooks:

1. Kisner, Colby, "Therapeutic Exercise", F.A. Davis.
2. Norkin C, "Measurement of Joint Motion- A Guide to Goniometry", Jaypee Publications.
3. Hollis M, "Practical Exercise Therapy", Blackwell Sciences Publication.

Reference Book:

1. Casser MP, "Handbook of Clinical Massage", Elsevier Publication.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination

Examination Scheme

Components	Continuous Internal Assessment (20%)				Professional Examination (80%)
	Internal Examination	Preliminary Examination	Attendance	Project/ Assignment / Class test	
Weightage (%)	5	5	5	5	80
Schedule	4 months after onset of Academic Year	Before University exam	To be calculated at the end of AY	Continuous assessment (at least 4)	End of AY

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between COs and POs		
	Course Outcomes (COs)	**Mapped Program Outcomes**
CO1	Understand the theoretical basis for tests for assessment of patient- functional tests, MMT, anthropometric measurements, speed, endurance and power tests, etc.	**PO1**
CO2	Study the different techniques of relaxation and be able to ascertain the importance of relaxation and stress management.	**PO1**
CO3	Perform Active movement, Passive movement, Active assisted movement, Resisted movement.	**PO3**
CO4	Learn the principles of measurement of joint Range of Motion through Goniometry.	**PO3**
CO5	Understand the physiological effects of the different techniques of massage and be able to prescribe the correct method according to the condition.	**PO1**
CO6	Be able to develop a free exercise programme, for general population as well as patient specific.	**PO3**
CO7	Demonstrate the various relaxation techniques that help a person to relax; to attain a state of increased calm.	**PO3**
CO8	Perform tests for assessment of patient- functional tests, MMT, anthropometric measurements, speed, endurance and power tests, goniometry, etc.	**PO3**
CO9	Demonstrate the different techniques of massage and be able to prescribe the correct method according to the condition	**PO3**
CO10	Promoting evidence based practice pertaining to exercise therapy.	**PO5**

		Physiotherapy Knowledge	Multidisciplinary/ Medical knowledge	Clinical and Practical Skills	Utilisation of Modern Technology	Evidence Based Practice	Life Skills	Assessment and Management	Teamwork	Research and Entrepreneurial Skills
Course Code	**Course Title**	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PSO 1**	**PSO 2**	**PSO 3**
BPT105	**EXERCISE THERAPY-I**	**3**		**3**		**2**	**1**	**2**		**1**

1= weakly mapped 2= moderately mapped 3. Strongly mapped

CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	**3**	-						**2**	-
CO2	**3**	-						-	-
CO3	-	-	**3**	-	-	-	-	-	-
CO4	-	-	**3**	-	-	-	**3**	-	-
CO5	**3**	-	-	-	-	-	-	-	-
CO6	-	-	**3**	-	-	-	**-**	**2**	
CO7	-	-	**3**	-	-	-	**-**	**2**	-
CO8	-	-	**3**	-	-	-	**3**		-
CO9	-	-	**3**	-	-	-	**-**	**2**	-
CO10	-	-	-	-	**2**	-	-	-	**3**

1= weakly mapped 2= moderately mapped 3. Strongly mapped

Unit I	**Introduction**
Local	Introduction to exercise therapy, principles, technique and general areas of its application, assessment & its importance
Regional	
National	
Global	Force: Composition of force, parallelogram of forces. Equilibrium: Stable, unstable, neutral. Gravity: Center of gravity, line of gravity. Levers: 1st order, 2nd order, 3rd order, their examples in the human body and their practical applications in physiotherapy, forces applied to the body levers. Pulleys: Fixes, movable. Springs: Series, parallel. Tension. Elasticity
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	

Gender	
Human Values	
Environment & Sustainability	
Unit II	**Manual Muscle Testing**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	Principles and application techniques of manual muscle testing
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit III	**Goniometry and its types**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	Principle techniques and application of Goniometry
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit IV	**Soft Tissue Manipulation (Therapeutic massage)**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	Preparation of patient: effects, uses, indication and contraindications

	of manipulation.
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	
Unit V	**Relaxation**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	Techniques of relaxation (local and general). Operation skills effects & uses of each equipment of therapeutic gymnasium.
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	

BPT106	**ENVIRONMENTAL SCIENCES**	**Total Hours**
Version 1.0		**50**
Pre-requisites/Exposure	-	
Co-requisites	-	

Course Objectives:

1. Create the awareness about environmental problems among learners.
2. Impart basic knowledge about the environment and its allied problems.
3. Develop an attitude of concern for the environment.

4. Motivate learner to participate in environment protection and environment improvement.

Course Outcomes:

Upon completion of this course the student should be able to do

CO1. Know multidisciplinary nature of Environmental studies, its scope and importance.
CO2. Understand and explain the various natural resources, Ecosystems, Environmental Pollutions and their control measures.
CO3. Understand various social issues, like Global warming, Acid rain, Climate change and disaster management.
CO4. Identify the various Environmental problems and their possible solutions.
CO5. Analyze various social issues and their possible solutions.
CO6. Discuss and analyze the problems related to different types of Pollution and their control measures.

Catalog description:

This course aims to help the students to acquire skills to help the concerned individuals in identifying and solving environmental problems and strive to attain harmony with Nature.

Course Contents:

UNIT-I Introduction to Environmental Studies 2 Hours

A. Multidisciplinary nature of Environmental Studies;
B. Scope and importance; Concept of sustainability and sustainable development.

UNIT-II Ecosystems 6 Hours

What is ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: food chains, food webs and ecological succession. Case studies of the following ecosystems:

A. Forest ecosystem
B. Grassland ecosystem
C. Desert ecosystem
D. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT-III Natural Resources: Renewable and Non-renewable resources 8 Hours

A. Land resources and landuse change; Land degradation, soil erosion and desertification.
B. Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations.
C. Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international and inter-state).
D. Energy Resources: Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs, case studies.

UNIT-IV Biodiversity and Conservation 8 Hours

A. Levels of biological diversity: Genetic, species and ecosystem diversity, Biogeographical zones of India; Biodiversity patterns and global biodiversity hot spots
B. India as a mega-biodiversity nation; Endangered and endemic species of India.
C. Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.
D. Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.

UNIT-V Environmental Pollution 8 Hours

A. Environmental Pollution: types, causes, effects and controls; Air, water, soil and noise pollution.
B. Nuclear hazards and human health risks.
C. Solid waste management: Control measures of urban and industrial waste.
D. Pollution case studies.

UNIT-VI Environmental Policies and Practices 7 Hours

A. Climate change, global warming, ozone layer depletion, and acid rain and impacts on human communities and agriculture.
B. Environmental Laws, Environmental Protection Act, Air (prevention and Control of Pollution) Act; Water (prevention and Control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act; International Agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD).
C. Nature Reserves, tribal populations and rights, and human wildlife conflicts in Indian context.

UNIT-VII Human Communities and the Environment 6 Hours

A. Human population growth: Impacts on environment, human health and welfare.
B. Resettlement and rehabilitation of project affected areas; case studies.
C. Disaster management: floods, earthquake, cyclones and landslides.
D. Environmental movements: Chipko, Silent valley, Bishnois of Rajasthan.
E. Environmental Ethics: Role of Indian and other religions and cultures in environmental conservation.
F. Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi).

UNIT-VIII: Field Work 5 Hours

A. Visit to an area to document environmental assets: river/forest/flora/fauna, etc.
B. Visit to a local polluted site- Urban/ rural/ Industrial/Agricultural.
C. Study of common plants, insects, birds and basic principles of identification.
D. Study of simple ecosystems- pond, river, Delhi Ridge, etc.

The Environment course of 50 lectures will be conducted in the second semester and the examination shall be conducted at the end of the second semester.

Credit System: The course will be awarded 4 credits.
Exam Pattern: In case of awarding the marks, the question paper should carry 100 marks. The structure of the question paper being:
Part-A, Short answer pattern - 25 marks
Part-B, Essay type with inbuilt choice - 50 marks
Part-C, Field Work - 25 marks

Text book:

1. Y.K. Sing, Environmental Science, New Age International Pvt, Publishers, Bangalore
2. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.

Reference books/Sites:

1. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380 013, India,
2. Clark R.S., Marine Pollution, Clanderson Press Oxford

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination

Examination Scheme:

Components	**Continuous Internal Assessment (20%)**				**Professional Examination (80%)**
	Internal Examination	**Preliminary Examination**	**Attendance**	**Project/ Assignment/ Class test**	
Weightage (%)	**5**	**5**	**5**	**5**	**80**
Schedule	**4 months after onset of Academic Year**	**Before University exam**	**To be calculated at the end of AY**	**Continuous assessment (at least 4)**	**End of AY**

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between COs and POs		
	Course Outcomes (COs)	**Mapped Program Outcomes**
CO1	Know multidisciplinary nature of Environmental studies, its scope and importance.	**PO6**
CO2	Understand and explain the various natural resources, Ecosystems, Environmental Pollutions and their control	**PO6**

	measures.	
CO3	Understand various Social issues, like Global warming, Acid rain, Climate change and disaster management.	**PO2**
CO4	Identify the various Environmental problems and their possible solutions	**PO6**
CO5	Analyze various social issues and their possible solutions	**PO3**
CO6	Discuss and analyze the problems related to different types of Pollution and their control measures.	**PO6**

		Physiotherapy Knowledge	Multidisciplinary / Medical knowledge	Clinical and Practical Skills	Utilisation of Modern Technology	Evidence Based Practice	Life Skills	Assessment and Management	Teamwork	Research and Entrepreneurial Skills
Course Code	**Course Title**	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PSO 1**	**PSO 2**	**PSO 3**
BPT106	**ENVIRONMENTAL SCIENCES**		**2**	**2**			**3**		**3**	

1= weakly mapped 2= moderately mapped 3= strongly mapped

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PSO1**	**PSO2**	**PSO3**
CO1	-	-	-	-	-	**3**	-	-	-
CO2	-	-	-	-	-	**3**	-	-	-
CO3	-	**2**	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	-		-
CO5	-	-	**2**	-	-	-	-	**2**	-
CO6	-	-	-	-	-	**3**	-	**2**	-

1= weakly mapped 2= moderately mapped 3= strongly mapped

Unit I	**Introduction to Environmental Studies**
Local	
Regional	
National	
Global	Multidisciplinary nature of Environmental Studies;
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit II	**Ecosystems**
Local	
Regional	
National	
Global	Structure and function of ecosystem; Energy flow in an ecosystem: food chains, food webs and ecological succession
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit III	**Natural Resources: Renewable and Non-renewable resources**
Local	
Regional	
National	
Global	Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international and inter-state). Energy Resources: Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs, case studies.
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	

Gender	
Human Values	
Environment & Sustainability	
Unit IV	**Biodiversity and Conservation**
Local	
Regional	
National	India as a mega-biodiversity nation; Endangered and endemic species of India.
Global	Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	
Unit V	**Environmental Pollution**
Local	
Regional	
National	
Global	Nuclear hazards and human health risks. Pollution case studies.
Employability	
Entrepreneurship	
Skill Development	Solid waste management: Control measures of urban and industrial waste.
Professional Ethics	
Gender	

Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	
Unit VI	**Environmental Policies and Practices**
Local	
Regional	
National	Nature Reserves, tribal populations and rights, and human wildlife conflicts in Indian context.
Global	Environmental Laws, Environmental Protection Act, Air (prevention and Control of Pollution) Act; Water (prevention and Control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act; International Agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD).
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	
Unit VII	**Human Communities and the Environment**
Local	
Regional	
National	● Environmental movements: Chipko, Silent valley, Bishnois of Rajasthan. ● Environmental Ethics: Role of Indian and other religions and cultures in environmental conservation. ● Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi).

Global	● Human population growth: Impacts on environment, human health and welfare. ● Resettlement and rehabilitation of project affected areas; case studies. ● Disaster management: floods, earthquake, cyclones and landslides.
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	
Unit VIII	**Field Work**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	Study of common plants, insects, birds and basic principles of identification. Study of simple ecosystems- pond, river, Delhi Ridge, etc
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	

SECOND YEAR

BPT201	PATHOLOGY AND MICROBIOLOGY	**Total Hours**
Version 1.0		**120**
Pre-requisites/Exposure	ANATOMY, PHYSIOLOGY	
Co-requisites		

Course Objective:

At the end of the course, the student will be able to

1. Acquire the knowledge of concepts of cell injury and changes Produced thereby in different tissues and organs; Capacity of the body in healing Process.
2. Recall the Etio-pathological effects and the Clinico-pathological Correlation of common infection and non-infectious diseases and the microbiological causative agents
3. Correlate normal and altered morphology of different organ systems in different diseases needed for understanding disease process and their clinical significance (with special emphasis on neuro-musculoskeletal and cardio-respiratory system).
4. Acquire knowledge of common immunological disorders and their resultant effects on the human body.
5. Understand in brief, about the Hematological diseases and their resultant effects on the human body.
6. Only brief descriptions of the following topics are necessary so that the student get a general idea of the fundamental aspects of the topics elaborate descriptions are to be avoided)

Course Outcomes

On completion of this course, the students will be able to

CO1. Summarize the fundamental cellular and tissues responses to pathologic stimuli and build on the knowledge of physiology to ascertain the body's response to injury or disease
CO2. Comprehend the inflammatory response and repair process and correlate multi-system effects of diseases and appreciate the interdependence and linkage of the body systems in brief
CO3. Describe genetic and growth disorders, nutritional disorders, growth disturbances and neoplasia.
CO4. Determine systemic pathology and its relevance as a base for understanding medical conditions.
CO5. Define bacteriology, virology, mycology and comprehend the basis of infections and understand the routes of infection and spread of micro-organisms
CO6. Explain the basic principles of immunology and have an understanding about the applied aspects of microbiology

Course Description

This course follows the basic courses in anatomy and physiology, and compliments the course in general medicine and surgery being taught concurrently. The course intends to explain briefly the

disease processes and microorganisms causing the disease, infection control and systems interaction.

Unit I General Pathology, inflammation and repair (14 hours)

a) Cell injury- causes, mechanisms with special reference to Physical, Chemical and toxic injury and ionizing radiation.
b) Reversible cell injury (degenerations)-types, morphology-cellular swelling, fatty change.
c) Intracellular accumulations -hyaline change and mucoid change.
d) Irreversible cell injury, types of necrosis, apoptosis, Gangrene: types and etiopathogenesis,
e) Pathological calcification-dystrophic and metastasis, pathogenesis and morphology
f) Extra- cellular accumulation-amyloidosis.
g) Pigments and pigmentations
h) Acute inflammations features; causes, vascular & cellular events,
i) morphologic variations.
j) Inflammatory cell & mediators,
k) Chronic inflammation: - causes, types, non-specific & granulomatous with examples.
l) Wound healing by primary & secondary intention factors promoting & delaying healing process, healing at various sites including bones, nerve & muscle.
m) Regeneration &repair.

Unit II Immunopathology- (Basic concepts) (2 hours)

a) Immune system: - organization, cell- Antibodies- Regulations of immune responses.
b) Hyper-sensitivity.
c) Secondary immune deficiency including HIV.
d) Organ transplantation.

Unit III Circulatory disturbances and diseases of blood (10 hours)

a) Edema- pathogenesis, Types, transudate, exudates.
b) Chronic venous congestion- lung, liver and spleen.
c) Thrombosis- formation fate and effects.
d) Embolism- types clinical effects
e) Infarction- types, common sites.
f) Shocks- Pathogenesis, Types, morphologic changes
g) Red cell disorders, anemia, polycythemia.
h) Non-Neoplastic disorders and neoplastic proliferation of white cell.
i) Bleeding Disorders: - DIC, Thrombocytopenia, coagulation Disorders.

Unit IV Growth Disturbance and deficiency disorders (6 hours)

a. Atrophy- malformation, agenesis, dysplasia.
b. Neoplasia- classification, histogenesis, biologic behavior, differences between benign & malignant tumors.
c. Malignant neoplasm- grades, stages, local invasion &distal spread.
d. Carcinogenesis- environmental carcinogensis
i)Chemical, viruses, radiations.
ii) Physical.
iii) occupational,

iv) Heredity and miscellaneous factors.

e. Precancerous lesions & carcinoma in situ.

f. Tumor & host interactions- systemic effects- metastasis or spread of tumors especially affecting bones, spinal cord leading to paraplegia etc.

g. Deficiency disorders of Vitamin A, B, C and D.

Unit V Special Pathology (20 hours)

a. Cardiovascular system: - Atherosclerosis, Ischemic heart disease- (Myocardial infarctions) –Pathogenesis, pathology, hypertension, congestive cardiac Failure, Rheumatic heart diseases and Peripheral vascular diseases.

b. Respiratory System: - COPD, pneumonia (lobar, broncho & viral), Tuberculosis: - primary and secondary, morphologic types, pleuritis, Complications, lung collapses & atelectasis.

c. Neuropathology:- reaction of nervous tissue to injury infection- & Ischemia pyogenic tuberculous and viral meningitis, cerebro-vascular diseases, Atherosclerosis, thrombosis, embolism, aneurysm, hypoxia infarction & hemorrhage, effects of Hypotension on CNS, Coma, polio myelitis, leprosy, demyelination diseases, parkinsonism, Cerebral palsy, metachromatic, leucodystrophy, dementia, Hemiplegia and paraplegia, pathogenesis & pathology of Wilson's disease, space occupying lesions (in brief), peripheral nerve injury.

b. Muscle diseases: - muscular dystrophy, hypertrophy, pseudo hypertrophy, atrophy, poliomyelitis, myositis, ossificans, necrosis, regeneration, myotonia.

c. Neuro-muscular junction: - myasthenia gravis, myasthenic syndromes.

d. Bone & joints: - Fracture healing, osteomyelitis, rickets, osteomalacia, bone tumors, osteoporosis, spondylosis, PID, hemarthrosis, gout, T.B. Arthritis, degenerative and inflammatory Arthritis, rheumatoid arthritis, Ankylosis spondylitis, tenosynovitis.

e. Urinary: - Commonly encountered in paralytic bladder, common urinary tract, infections (brief), urinary calculi.

f. Gastrointestinal system: - Gastric duodenal ulcer, enteric fever, tuberculosis enteritis, gastritis (related to consumption of NSAID)

g. Endocrine: - Hyperthyroidism, diabetes.

h. Hepatic diseases: - Cirrhosis and emphasis on systemic effects of portal hypertension.

i. Skin: - melanin pigment disorders, vitiligo, psoriasis, bacterial infection, fungal infections, cutaneous tuberculosis, scleroderma, SLE, leprosy, alopecia.

Unit VI Clinical pathology and Brief Medical Genetics (Including demonstrations) **(4 hours)**

Anemias, total leucocyte count, differential leucocyte count, eosinophilia, ESR, C P K, Muscle skin & nerve biopsy, Microscopic appearance of muscle necrosis & fatty infiltrations, Laboratory Investigation in liver &renal failure.

Unit VII General and Systemic bacteriology (24 hours)

a) Introductions and background: Importance of medical microbiology in diagnosis & prevention of infectious diseases, Contributions of Antony van leeuwenhock, Louis Pasteur, Robert koch, Fleming, Jenner etc.
b) Definition: Medical microbiology which includes the Bacteriology, Virology, Mycology, Parasitology and Immunology, infection, pathogen, common salsymbiosis, Host vector, contagious disease, infections disease, Epidemic, endemic, pandemic & Zoonosis, normal flora of the human body.Source, mode of infection, route of infection and endogenous and exogenous infections, reservoirs of infection.
c) Morphology of Bacteria: Bacterial cell, morphological classifications, method of studying of bacteria, staining methods and their principles especially gram and ziehl nelson staining, their importance in presumptive diagnosis.
d) Physiology of bacteria: Nutritional requirements, growth curve, culture media: -definition, classifications and application.
e) Identification of bacteria: Specimen collection, transportation and processing of specimens for microbiology, diagnosis which include smear examination culture methods, biochemical reactions, serological tests and animal pathogenicity.
f) Sterilization and disinfection: Definition of sterilization disinfection asepsis antisepsis, discussion of physical methods of sterilization which includes principles and their application details on working and efficacy testing of autoclave hot air oven inspissator and koch' s steamer modes of action of chemical
g) Gram positive cocci: Staphylococcus / Streptococcus/ Pneumococcus: morphology, pathogenesis, laboratory diagnosis.
h) Gram negative cocci: Neisseria-morphology, pathogenesis laboratory diagnosis
i) Gram positive bacilli: C. diphtheria:-Morphology, pathogenesis, laboratory diagnosis, treatment, prevention and control ;Mycobacterium tuberculosis: Classification, morphology, growth on L.J medium, Pathogenesis, laboratory diagnosis, briefly mention National T.B control Programme ; Atypical mycobacterium: Pathogenesis, laboratory diagnosis of HIV and Mycobacterium; M. Leprae: classification morphology pathogenesis, laboratory diagnosis.
j) C I. welchii, C.l. Tetani: Classification, morphology, pathogenesis, laboratory diagnosis, prevention and control
k) Entero bacteriaece: General characters classification, (briefly mention about E coli Klebisiella, proteus and shigella)
l) Salmonella: Morphology, pathogenesis, laboratory diagnosis, prevention and control.
m) Vibrio: Morphology pathogenesis, laboratory diagnosis of V. cholera
n) Spirochetes: Morphology, pathogenesis, laboratory diagnosis, T. pallidum, Bacteriology of Air, mention briefly Water, milk and food

Unit VIII Mycology, Virology and Parasitology (24 hours)

a) General mycology: Characterization of fungi, morphological and clinical classification of fungi.
b) Superficial mycosis: mention briefly.
c) Subcutaneous mycosis: Mycetoma- pathogenesis and lab diagnosis.

d) Systemic mycosis: Candida Cryptococcus- morphology pathogenesis lab diagnosis with cultural characteristic
e) Opportunistic fungal: Aspergillosis Infection
f) General virology morphology, multiplication, classification of viruses, bacteriophase. Laboratory diagnosis of viral infections collection of Samples Transport Cultivation and method of diagnosis
g) Herpes virus: Morphology, classification & pathogenesis.
h) Hepatitis viruses: Hepatitis-B, C: Morphology, laboratory diagnosis, prophylaxis in detail, (Mention briefly about the other hepatitis viruses)
i) HIV/AIDS, Morphology, pathogenesis, lab diagnosis, universal precautions, specific precaution and Prophylaxis for Retroviruses
j) Introduction to parasitology Parasite: nature, classification, explanation of Terminology, emerging parasitic infections.
k) Malaria: Malaria parasities (Morphology, life cycle, pathogenesis, laboratory diagnosis).
l) Miscellaneous: Toxoplasma, pathogenic protozoa (brief)
m) Cestodes: Taenia saginata and solium Echinococcus granulosus: life cycle, morphology, pathogenesis, laboratory diagnosis
n) Tissue nematodes morphology, life cycle, pathogenesis, laboratory diagnosis, briefly mention about T. Spiralis.

Unit IX: Immunology (10 hours)

a) Introduction - Definition of immunity, types of immunity, factors influencing mechanism of innate immunity, active and passive immunity, local immunity and herd immunity.
b) Antigens - Definition, types, antigen, determinants properties of antigen
c) Antibodies - Definition, nature, structure, classes, physical and biological properties of immunoglobulin.
d) Serological Reactions -Definition of titer sensitivity and specificity, mention about principles types and application of Precipitation gel, diffusion glutination, complement Fixation, ELISA, RIA, immune, fluorescence, neutralization and opsonization.
e) Lymph Structure of primary and secondary lymphoid organs, Function of immune system, mention about cells of immune system, lymphocytes, T-cells, null cells, antigen presenting cells (APC).
f) Immune response- Humeral CMI
g) Complement- Definition components biological functions.
h) Hypersensitivity -Definition, classification, difference between immediate and delayed reactions, mechanism and manifestation of anaphylaxis, types and tests for anaphylaxis.
i) Vaccination - National immunization programme. nature of vaccines rationale and dosage.

Unit X: Applied Microbiology (6 hours)

a. Upper respiratory tract infections (sore throat) and their laboratory diagnosis.
b. Lower respiratory tract infections and their laboratory diagnosis.
c. Infection of central nervous system and their laboratory diagnosis
d. Wound infection and pyogenic infections
e. Bone and joint infections and their laboratory diagnosis.
f. Hospital infections role of laboratory in cross infections control policies.

Text Books

1. Ananthanarayan & Paniker, “Textbook of Microbiology”, Universal Press.
2. Mohan H, “Textbook of Pathology”, Jaypee Brothers.

Reference Books/Materials

1. Baveja CP & Baveja V. Textbook of Microbiology for Physiotherapy. Arya Pub
2. Robbins & Cotran, “Pathologic Basis of Disease”, Elsevier.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination
Examination Scheme:

Components	Continuous Internal assessment				Professional Examination (80%)
	Internal examination	Preliminary examination	Attendance	Project/Assignment/class test	
Weightage (%)	5	5	5	5	80
Schedule	4 months after onset of Academic Year	Before University exam	To be calculated at the end of AY	Continuous assessment (at least 4)	End of AY

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between COs and POs		
	Course Outcomes (COs)	**Mapped Program Outcomes**
CO1	Understand the fundamental cellular and tissues responses to pathologic stimuli and build on the knowledge of physiology to ascertain the body’s response to injury or disease	**PO2**
CO2	Comprehend the inflammatory response and repair process and correlate multi-system effects of diseases and appreciate the interdependence and linkage of the body systems in brief	**PO1**
CO3	Have an overview of genetic and growth disorders, nutritional disorders, growth disturbances and neoplasia.	**PO2**
CO4	Overview systemic pathology and its relevance as a base for understanding medical conditions	**PO2**
CO5	Learn bacteriology, virology, mycology and comprehend the basis of infections and understand the routes of infection and spread of micro-organisms	**PO4**
CO6	Know the basic principles of immunology and have an understanding about the applied aspects of microbiology	**PO2**

		Physiotherapy Knowledge	Multidisciplinary / Medical knowledge	Clinical and Practical Skills	Utilisation of Modern Technology	Evidence Based Practice	Life Skills
Course code	**Course Title**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**
BPT201	**PATHOLOGY AND MICROBIOLOGY**	**2**	**3**		**1**		

1= weakly mapped 2= moderately mapped 3= strongly mapped

CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	-	**3**	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-
CO3	-	**3**	-	-	-	-	-	-	-
CO4	-	**3**	-	-	-	-	-	-	-
CO5	-	-	-	**1**	-	-	-	-	-
CO6	-	**3**	-	-	-	-	-	**2**	-

1= weakly mapped 2= moderately mapped 3= strongly mapped

Unit I	**General Pathology, inflammation and repair**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	

Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit II	**Immunopathology**
Local	c) Secondary immune deficiency including HIV.
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit III	**Circulatory disturbances and diseases of blood**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit IV	**Growth Disturbance and deficiency disorders**
Local	
Regional	g. Deficiency disorders of Vitamin A, B, C and D.
National	d. Carcinogenesis- environmental carcinogensis i)Chemical, viruses, radiations. ii) Physical. iii) occupational, iv) Heredity and miscellaneous factors.

Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit V	**Special Pathology**
Local	**Special Pathology**
Regional	**Special Pathology**
National	**Special Pathology**
Global	**Special Pathology**
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit VI	**Clinical pathology and Brief Medical Genetics**
Local	Anaemia
Regional	Anaemia
National	Anaemia
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit VII	**General and Systemic bacteriology**
Local	prevention of infectious diseases, Endemic
Regional	prevention of infectious diseases, Epidemic
National	prevention of infectious diseases, pandemic
Global	
Employability	
Entrepreneurship	

Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit VIII	**Mycology, Virology and Parasitology**
Local	
Regional	
National	
Global	universal precautions for AIDS
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit IX	**Immunology**
Local	
Regional	
National	National immunization programme
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit X	**Applied Microbiology**
Local	Hospital infections role of laboratory in cross infections control policies.
Regional	Hospital infections role of laboratory in cross infections control policies.
National	Hospital infections role of laboratory in cross infections control policies.
Global	Hospital infections role of laboratory in cross infections control policies.
Employability	
Entrepreneurship	
Skill Development	

Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	

BPT202	PHARMACOLOGY	**Total Hours**
Version 1.0		**80**
Pre-requisites/Exposure	ANATOMY, PHYSIOLOGY	
Co-requisites	PATHOLOGY, MICROBIOLOGY	

Course Objectives

1. This course introduces the student to basic pharmacology of common drugs used, their importance in the overall treatment including Physiotherapy.
2. The student after completing the course will be able to understand the general principles of drug action and the handling of drugs by the body.
3. The student will be aware of the contribution of both drug and physiotherapy factors in the outcome of treatment.

Course Outcomes

On completion of this course, the students will be able to

CO1. Summarize basic principles of pharmacology and its recent advances.
CO2. Understand the basic pharmacology of common drugs used, their importance in the overall treatment including Physiotherapy.
CO3. Describe the general principles of drug action and the handling of drugs by the body.
CO4. Determine the contribution of both drug and physiotherapy factors in the outcome of treatment.
CO5. Relate multidisciplinary approach to helping a patient deal with diseases, disorders and pain.
CO6. Collate the knowledge gained through the study of physiology, pathology, and microbiology as a base for comprehension of mechanism of action of drugs.

Course Description

This course imparts information regarding drugs used for the treatment and management of various ailments. The subject is designed to provide in depth knowledge about the mechanism of action of various drugs, their side effects, and dose in which they should be taken to prevent the disease progression.

Unit I General Pharmacology (11 Hours)

a. Definition division of pharmacology, dosage, forms, drug nomenclature.

b. Routes of administration, advantages & disadvantages of commonly used routes of administration.
c. Factors affecting dose of a drug, bioavailability and other important pharmacokinetic parameters.
d. Various mechanism of action of a drug.
e. Adverse drug reaction include drug.
f. Adverse drug reaction including drug allergy idiosyncrasy.
g. Drug interactions synergism antagonism etc.

Unit II Autonomic Nervous system (6 Hours)

a. Sympathomimetic drug, therapeutic uses of adrenaline etc.
b. Beta adrenergic blockers & alpha-adrenergic blockers.
c. Parasympathomimetic drug, their therapeutic uses and uses and adverse effects and treatment of myasthenia gravis.
d. Atropine, Atropine substitute & treatment of organ phosphorus poisoning.

Unit III Peripheral Nervous System & Autocoids (7 Hours)

a. Skeletal muscle relaxants.
b. Centrally acting muscle relaxants.
c. Local anesthetics.
d. Anti-histaminic (HI blockers).

Unit IV Central nervous system (10 Hours)

a. Pre-Anesthetic medication & G.A. and steps of anesthesia.
b. Analgesics – NASID's Opioids.etc.
c. Anti - Parkinsonian drug & Treatment of neurodegenerative disorders.
d. Sedative & hypnotics &Treatment of Insomnia.
e. Antiepileptic drug & Treatment of epileptics.
f. Ethyl alcohol drug of addiction treatment of Methyl alcohol poisoning
g. Drug used in common psychiatric disorders.

Unit V Endocrine System (8 Hours)

a. Antidiabetes drug Treatment of Diabetes mellitus & Diabetic ketoacidosis.
b. Glucocorticoids.
c. Anabolic steroids.
d. Ca++Metabolism, Treatment of osteoporosis etc.

Unit VI GIT (8 Hours)

a. Laxative & purgative and treatment of constipation.
b. Anti diarrhoeal drugs & treatment of diarrhoea.
c. Drug for gastric and peptic ulcer.
d. Antiemetics & misc. Drugs digestants etc.

Unit VII Chemotherapy (14 Hours)

a. Penicillin's & Sulphonamides.
b. Broad spectrum Antibiotics.

c. Aminoglycosides & Treatment of urinary tract infection.
d. Macrolides & Misc. AMA.
e. Quinolones.
f. Anti TB, HIV, AIDS drugs & Treatment of AIDS.
g. Anti-leprosy drug & treatment of anaerobic infections.
h. Anti-cancer drugs.
i. Treatment of amoebiasis, helminthic infection.
j. Antifungal druges.
k. Anti septics & disinfectants.

Unit VIII CVS & Blood (8 Hours)

a. Anti-hypertensive & Treatment of hypertension etc.
b. Antianginal druge & Treatment of MI.
c. Drugs used in shock, Treatment of anaphylactic shock and Hemorrhagic shock etc.
d. Iron - deficiency anaemia and other anaemias.

Unit IX Miscellaneous Topic (8 Hours)

a. Drug acting on skin e.g. Lotions liniments ointments.
b. Vitamin deficiency.
c. Heavy metal antagonists & general principles of treatment of poisoning.
d. Immuno stimulants and Immunosuppressant.
e. Antitussives & Bronchial asthma drugs.
f. Drugs banned in sports & Athletes.
g. Vaccines & sera, Immunization schedule.

Textbooks

1. Tripathi KD, "Essentials of Medical Pharmacology", Jaypee Publications.
2. Udaykumar P, "Textbook of Pharmacology for Physiotherapy", Jaypee Publications.
3. KK Sharma, "Principles of Pharmacology"

Reference Books/Materials

1. Rang HP, Dale MM et al, "Pharmacology", Churchill Livingstone.
2. Panda UN, "Handbook of Pharmacology", AITBS Publication.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination

Examination Scheme:

Components	Continuous Internal assessment				Professional Examination (80%)
	Internal examination	Preliminary examination	Attendance	Project/Assignment/class test	
Weightage (%)	5	5	5	5	80
Schedule	4 months after onset of Academic Year	Before University exam	To be calculated at the end of AY	Continuous assessment (at least 4)	End of AY

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between COs and POs		
	Course Outcomes (COs)	**Mapped Program Outcomes**
CO1	Possess a relevant knowledge in basic principles of pharmacology and its recent advances	**PO2**
CO2	Understand the basic pharmacology of common drugs used, their importance in the overall treatment including Physiotherapy	**PO1**
CO3	Understand the general principles of drug action and the handling of drugs by the body.	**PO2**
CO4	Understand the contribution of both drug and physiotherapy factors in the outcome of treatment.	**PO1**
CO5	Appreciate the multidisciplinary approach to helping a patient deal with diseases, disorders and pain.	**PO6**
CO6	Collate the knowledge gained through the study of physiology, pathology, and microbiology as a base for comprehension of mechanism of action of drugs.	**PO2**

		Physiotherapy Knowledge	**Multidisciplinary / Medical knowledge**	**Clinical and Practical Skills**	**Utilization of Modern Technology**	**Evidence Based Practice**	**Life Skills**
Course Code	**Course Title**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**
BPT202	**Pharmacology**	**1**	**3**				**1**

1= weakly mapped 2= moderately mapped 3= strongly mapped

CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	-	**3**	**3**	-	-	-	-	**2**	-
CO2	**1**		-	-	-	-	**1**	-	**3**
CO3	-	**3**	-	-	-	-	-	-	-
CO4	**1**	-	-	-	-	-	-	**2**	-
CO5	-	-	-	-	-	-	-		-
CO6	-	**3**	-	-	-	-	-	**2**	-

1= weakly mapped 2= moderately mapped 3= strongly mapped

Unit I	**General Pharmacology**
Local	Adverse drug reaction include drug.
Regional	Adverse drug reaction include drug.
National	Adverse drug reaction include drug.
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit II	**Autonomic Nervous system**
Local	organ phosphorus poisoning
Regional	organ phosphorus poisoning
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	

Human Values	
Environment & Sustainability	
Unit III	**Peripheral Nervous System & Autocoids**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit IV	**Central nervous system**
Local	Sedative & hypnotics, Methyl alcohol poisoning
Regional	Sedative & hypnotics, Methyl alcohol poisoning
National	Sedative & hypnotics
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit V	**Endocrine System**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	

Gender	
Human Values	
Environment & Sustainability	
Unit VI	GIT
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit VII	**Chemotherapy**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit VIII	**CVS & Blood**
Local	Iron - deficiency anaemia and other anaemias.
Regional	Iron - deficiency anaemia and other anaemias.
National	Iron - deficiency anaemia and other anaemias.
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit IX	**Miscellaneous Topic**

Local	Vitamin deficiency
Regional	Vitamin deficiency.
National	Drugs banned in sports & Athletes.
Global	Drugs banned in sports & Athletes.
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	

BPT203	**ELECTROTHERAPY-II**	Total Hours
Version 1.0		200
Pre-requisites/Exposure	ELECTROTHERAPY-I	
Co-requisites		

Course Objectives

1. Learn the Principles, Techniques, Effects, Indication, Contra-Indication and the dosage parameter for various indications of electro therapeutic modalities in the restoration of physical function.
2. List the indications, contra indications, dosages of electrotherapy modalities, demonstrates the different techniques, and describe their effects on various conditions.
3. Practical Laboratory work for all the topics discussed in theory.
4. Demonstrate the use of electrotherapy modalities applying the principles of electrotherapy with proper techniques, choice of dosage parameters and safety precautions

Course Outcomes

Upon completion of this course the student should be able to

CO1. Summarize the production, physiological and therapeutic effect of various modalities techniques of application, indications, contraindications, precautions, operational skills and patient preparation, like IFT, LASER.
CO2. Understand the basic physics and various electrical currents (Medium / High frequency currents).
CO3. Compare therapeutic and physiological effect of cold and heat therapy.
CO4. Describe the contraindication, precaution of different modalities according to the different conditions.

CO5. Modify the treatment according to their better results.
CO6. Describe principle & basic techniques of E.M.G. and N.C.V.
CO7. Perform patient evaluation – receiving the patient and positioning the patient for treatment using electrotherapy, check the equipment.
CO8. Use therapeutic ultrasound for different regions-various methods of application.
CO9. Demonstrate treatment techniques using SWD, IRR and IFT.
CO10. Complete Calculate dosage and demonstrate technique of application of UVR and LASER

Course Description

This subject is designed to understand the principles and effects of various modalities techniques of application, indications, contraindications, precautions, operational skills and patient preparation, It helps in understanding the mechanism of basic concepts used in electrotherapy and their application & requirement according to the condition The subject provides the basic knowledge required to understand the various disciplines of physiotherapy. Lab work is complimentary to the theoretical discussions in electrotherapy. Hands on practice allow the explain and demonstrate the use of electrotherapy modalities applying the principles of electrotherapy with proper techniques, choice of dosage parameters and safety precautions. This is helpful for developing an insight on the subject.

Unit I High frequency currents (15 hours)

High frequency currents (SWD and MWD)-production, biophysical effects, types, Therapeutic effects, techniques of application, indication, contraindications, precautions, Operational skills and patient preparation, dosiometry, prescription writing of SWD & MWD.

Unit II Medium frequency currents (15 hours)

Medium frequency currents (interferential therapy)- conceptual framework of medium frequency current therapy, production, biophysical effects, types, therapeutic effects, Techniques of application, indication, contraindication, precautions, operational skill and patient preparation, prescription writing for IFT.

Unit III Ultrasound (20 hours)

High frequency sound waves (ultrasound)-production, biophysical effects, types, Therapeutic effects, techniques of application, indication, contraindications, precautions, operational skill and patient preparation, Dosiometry, prescription writing for therapeutical Ultra sound.

Unit IV Electrodiagnosis and Biofeedback (10 hours)

a) Electro- diagnosis - Instrumentation, definition & basic techniques of E.M.G. and. NCV.
b) Bio- feedback - Instrumentation, principles, therapeutic effects, indications, contraindication, limitations, precautions, operational skill and patient preparation.

Unit V Actinotherapy (25 hours)

a) Infra-red rays: Wavelength, frequency, types & sources of IRR generation, techniques of irradiation, physiological and therapeutic effects, indications, contraindications, depth of penetration, precautions, operational skills of equipments and patient preparation.
b) Ultraviolet rays (UVR) : Wavelength, frequency, types & sources of IRR generation, techniques of irradiation, depth Of penetration , physiological and therapeutic effects, indications, contraindications, precautions, operational skills of equipments and patient preparation, dosimetry of UVR.
c) LASER: Therapeutic Light physiotherapy (LASER), Definition, historical background, physical principles, biophysical effects, types, production, physiological Effects, therapeutic effects, techniques of application, Indications, contraindications, precautions, operational skill and patient preparation, dosiometry & prescription writing of LASER.

Unit VI Direct & Low Frequency currents (36 hours)

a. Introduction of direct, alternating & modified currents.
b. Production of direct current -: Physiological and therapeutic effects of constant current, anodal and cathodal, Galvanism, Ionization and their application in various conditions.
c. Iontophoresis –Physical principles, principles of clinical application, different ions and their physiological and therapeutical effects indication, contraindication, precaution, operational skill of equipment and patient preparation.
d. Modified direct current – types of modifications of direct current, Production of interrupted and surged current, various pulses, duration and frequency and their specific effects on nerve and muscle tissue.
e. Modified direct current - Physiological and therapeutic effects, of different variations of modified current principles of clinical application, indications, contra indications, precautions, operational skill of equipment & patient preparation. Stimulations of different muscles and nerves.
f. Faradic Current: wave form, production, physiological and therapeutical effects of classical faradic current.
g. Faradism under pressure.
h. Faradism under tension.
i. Transcutaneous Electrical Nerve Stimulations (TENS): -
    i. Type of low frequency, pulse widths, frequencies & intensities used as TENS application.
    ii. Theories of pain relief by TENS.
    iii. Types of TENS and respective physiological and therapeutical effects, indications.
    iv. Principle of clinical application effects & uses, indications, contraindications, precautions, operational skills of equipment & patient preparation.

Unit VII Electric stimulator (Electrical Reactions and Electro - diagnostic tests) (15 hours)

a) Electrical stimuli and normal behavior of nerve and Muscle tissue.
b) Type of lesion and development of reaction of degeneration.
c) Difference between Faradic – long duration Intermittent direct current response
d) S.D. Curve and its application.
e) Chronaxie, Rheobase & Pulse ratio.

Electrotherapy-Il (Practical) (64 hours)

1. To study a short-wave diathermy unit, its operation and different methods of application-region wise.
2. To study a microwave diathermy unit its operation and different methods of application region Wise.
3. To study an ultrasound unit its operational and different methods of application-region wise.
4. To study a Interferential therapy unit its operation and different methods of application region wise
5. To observe various electro- myography (EMG) procedures.
6. To observe various electro - neurography (ENG/ NCV) Procedures.
7. To study a bio feedback unit, its operation and different methods of application-region wise.
8. To study LASER unit its operation and different methods of application region wise.
9. To study the different types of Ultraviolet units, their operation, and assessment of test dose and application of U.V.R. - region wise.
10. To study the various types of Infrared lamps and their application to body region wise.

Textbooks:

1. Low & Reed, "Electrotherapy Explained", Butterworth Heinemann.
2. Forster and Palastanga, "Clayton's Electrotherapy", CBS.

Reference Books:

1. Kahn J, "Principles and Practice of Electrotherapy".
2. Nelson & Currier, "Clinical Electro Therapy".

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination

Examination Scheme:

Components	Continuous Internal assessment				Professional Examination (80%)
	Internal examination	Preliminary examination	Attendance	Project/Assignment/class test	
Weightage (%)	5	5	5	5	80
Schedule	4 months after onset of Academic Year	Before University exam	To be calculated at the end of AY	Continuous assessment (at least 4)	End of AY

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between COs and POs

	Course Outcomes (COs)	Mapped Program Outcomes
CO1	Know the production, physiological and therapeutic effect of various modalities techniques of application, indications, contraindications, precautions, operational skills and patient preparation, like IFT, LASER.	**PO1**
CO2	Understand the basic physics and various electrical currents (Medium / High frequency currents).	**PO4**
CO3	Know the different therapeutic and physiological effect of cold and heat therapy	**PO3**
CO4	Describe the contraindication, precaution of different modalities according to the different conditions.	**PO1**
CO5	Think critically to modify the treatment according to their better results.	**PO5**
CO6	Know the principle & basic techniques of E.M.G. and N.C.V.	**PO1**
CO7	Perform patient evaluation – receiving the patient and positioning the patient for treatment using electrotherapy, check the equipment.	**PO3**
CO8	Apply therapeutic ultrasound for different regions-various methods of application.	**PO3**
CO9	Demonstrate treatment techniques using SWD, IRR and IFT.	**PO4**
CO10	Calculate dosage and demonstrate technique of application of UVR and LASER.	**PO5**

		Physiotherapy Knowledge	**Multidisciplinary / Medical knowledge**	**Clinical and Practical Skills**	**Utilisation of Modern Technology**	**Evidence Based Practice**	**Life Skills**	**Assessment and Management**	**Teamwork**	**Research and Entrepreneurial Skills**
Course Code	**Course Title**	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PSO 1**	**PSO 2**	**PSO 3**
BPT203	**ELECTROTHERAPY-II**	**3**		**3**	**3**	**3**		**3**		**2**

1=Addressed to small extent 2= Addressed significantly 3=Major part of course

CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	**2**	-
CO2	-	-		**3**	-	-	-	-	-
CO3	-	-	**3**	-	-	-	-	**2**	-
CO4	**3**	-	-	-	-	-	-	-	-
CO5	-	-	-	-	**3**	-	-	-	-
CO6	**3**	-	-	-	-	-	**3**	-	-
CO7	-	-	**3**	-	-	-	-	**2**	-
CO8	-	-	**3**	-	-	-	**3**		-
CO9	-	-	-	**3**	-	-	-		-
CO10	-	-	-		**3**	-	-	**2**	-

1=Addressed to small extent 2= Addressed significantly 3=Major part of course

Unit I	**High frequency currents**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit II	**Medium frequency currents**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	

Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit III	**Ultrasound**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit IV	**Electrodiagnosis and Biofeedback**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit V	**Actinotherapy**
Local	
Regional	
National	
Global	
Employability	

Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit VI	**Direct & Low Frequency currents**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit VII	**Electric stimulator (Electrical Reactions and Electro - diagnostic tests)**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	

BPT204	**EXERCISE THERAPY-II**	**Total Hours**
Version 1.0		200
Pre-requisites/Exposure	EXERCISE THERAPY-I	
Co-requisites	EXERCISE THERAPY-II LAB	

Course Objectives

1. Understand the principles and effects of exercise as a therapeutic modality.
2. Learn the techniques in the restoration of physical functions.
3. Practical Laboratory work for all the topics discussed in theory.
4. Evaluate and apply judiciously the different methods of exercise therapy techniques on the patients

Course Outcomes

Upon completion of this course the student will be able to

CO1. Comprehend the normal disposition, inter-relationships, gross, functional and applied anatomy of the musculoskeletal system, locomotion, posture, gait and various organs in the body.
CO2. Understand the concepts of Proprioceptive Neuromuscular Facilitation and apply these principles according to the condition.
CO3. Understand the principles of suspension therapy and its application.
CO4. Learn and practice different techniques of mobilization and strengthening.
CO5. Perform thorough assessment of posture.
CO6. Determine the requirement for manual therapy and be able to decide the technique recommended depending on the case.
CO7. Demonstrate the PNF techniques, Frenkel's exercises, mat exercises, strengthening exercises and joint mobilization techniques.
CO8. Compare abnormalities of motor, sensory, neuromotor, co-ordination, vital capacity, limb length & higher functions and train for using walking aids
CO9. Demonstrate techniques of progressive strengthening exercise of muscles and groups, postural correction exercises, balance exercises and group exercises.
CO10. Determine the Assessment and evaluation of posture and gait
CO11. Demonstrate various traction techniques including manual mechanical & electrical procedures.
CO12. Able to plan & practice exercise programs for normal person of various age group

Course Description

This subject is designed to understand the principles and effects of exercise therapeutically. It helps in understanding the mechanism of basic concepts used in exercise therapy and their application & requirement according to the condition. The subject provides the basic knowledge required to understand the various disciplines of physiotherapy. Lab work is complimentary to the theoretical discussions in exercise therapy. Hands on practice allow the explain and demonstrate the different methods of exercise therapy techniques on the patients. This is helpful for developing an insight on the subject.

Unit I Therapeutic exercises (28 hours)

a. Principal classification techniques physiological & therapeutic effects indications & contraindications of therapeutic exercises.
b. Assessment & evaluation of a patient (region wise) to plan a therapeutic exercise program.
c. Joint mobility etiogenesis of joint stiffness general techniques of mobilization, effects, indications, contraindication & precautions.

d. Muscle insufficiency - etiogenesis of muscle insufficiency (strength tone power, endurance & volume), general techniques of strengthening effects indication, contraindications & precautions.
e. Neuromuscular incoordination-review normal neuromuscular coordination, etiogenesis of neuromuscular in co-ordination &general therapeutic techniques effects indications, Contraindication& precautions.
f. Functional re-education- general therapeutic techniques to re-educate ADL function.

Unit II Posture, balance and gait (45 hours)

a. Normal posture-overview of the mechanism of normal posture.
b. Abnormal posture -assessment types etiogenesis management including therapeutic Exercise.
c. Static and dynamic balance- assessment & management including therapeutic exercise.
d. Gait-overview of normal gait &its components.
e. Gait-deviations-assessment, types, etiogenesis, management including therapeutic exercise.
f. Types of walking aid indications effects & various training techniques.

Unit III Hydrotherapy (16 hours)

a. Basic principles of fluid mechanic as they relate to hydrotherapy.
b. Physiological & therapeutic effects of hydrotherapy including joint mobility, muscle strengthening & wound care etc.
c. Types of hydrotherapy equipment, indications, contraindications, operations skill & patient preparation.

Unit IV Motor learning and Motor control (15 hours)

a. Introduction to motor learning
    i. Classification of motor skills.
    ii. Measurement of motor performance.
b. Introduction of motor control
    i. Theories of motor control.
    ii. Application.
c. Learning Environment
    i. Learning of skill.

ii. Instruction & augmented feedback.

iii. Practice condition.

Unit V Special techniques (32 hours)

a. Introduction to special mobilization & manipulation techniques effects indication & contraindications.

b. Conceptual framework, principle of proprioceptive neuromuscular facilitation (PNF) techniques including indication therapeutic effects and precautions.

c. Principles of traction physiological & therapeutic effects classification types indications contraindications techniques of application operational skill & precautions.

d. Review normal breathing mechanism, types, techniques, indication, contraindications, Therapeutic effects & precautions of breathing exercise.

e. Group theory –types, advantages & disadvantages.

f. Exercise for the normal person -importance and effects of exercise to maintain optimal health & its role in the prevention of diseases Types advantages, disadvantages, indications, contraindications & precautions for all age group.

g. Introduction to yoga - conceptual framework various asanas the body mind relationship effects & precautions.

Exercise therapy -II (practical) (64 hours)

Maximum Marks: 80

1. To practice assessment & evaluative procedures including motor, sensory, neuromotor, co-ordination, vital capacity, limb length & higher functions.
2. To study & practice the various techniques of progressive strengthening exercise of muscles
3. To study & practice the various techniques of progressive strengthening exercise of muscles region wise.
4. To study & practice the use of various ambulation aids in gait training.
5. To assess & evaluate ADL's and practice various training techniques.
6. To study practice mat exercise.
7. To assess & evaluate normal & abnormal posture & practice various corrective techniques.
8. To assess & evaluate equilibrium balance & practice various techniques to improve balance.

9. To study the structure & functions of hydrotherapy equipment & their application.
10. To study & practice various traction techniques including manual mechanical & electrical procedures.
11. To study & practice various group exercise therapies.
12. To practice & experience effects of basic yoga asanas.
13. To study plan & practice exercise programs for normal person of various age group.

Textbooks:

1. Kisner, Colby, "Therapeutic Exercise", F.A. Davis.
2. Norkin C, "Measurement of Joint Motion- A Guide to Goniometry", Jaypee Publications.
3. Hollis M, "Practical Exercise Therapy", Blackwell Sciences Publication.

Reference Book:

1. Casser MP, "Handbook of Clinical Massage", Elsevier Publication.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination

Examination Scheme:

Components	Continuous Internal assessment				Professional Examination (80%)
	Internal examination	Preliminary examination	Attendance	Project/Assignment/class test	
Weightage (%)	5	5	5	5	80
Schedule	4 months after onset of Academic Year	Before University exam	To be calculated at the end of AY	Continuous assessment (at least 4)	End of AY

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between COs and Pos		
	Course Outcomes (COs)	**Mapped Program Outcomes**
CO1	Comprehend the normal disposition, inter-relationships, gross, functional and applied anatomy of the musculoskeletal system, locomotion, posture, gait and various organs in the body	**PO1**
CO2	Understand the concepts of Proprioceptive Neuromuscular Facilitation and apply these principles according to the condition.	**PO1**
CO3	Understand the principles of suspension therapy and its application	**PO1**

CO4	Learn and practice different techniques of mobilization and strengthening.	**PO3**
CO5	Perform thorough assessment of posture.	**PO3**
CO6	Determine the requirement for manual therapy and be able to decide the technique recommended depending on the case.	**PO5**
CO7	Demonstrate the PNF techniques, Frenkel's exercises, mat exercises, strengthening exercises and joint mobilization techniques.	**PO3**
CO8	Assess for abnormalities of motor, sensory, neuromotor, co-ordination, vital capacity, limb length & higher functions and train for using walking aids	**PO1**
CO9	Demonstrate techniques of progressive strengthening exercise of muscles and groups, postural correction exercises, balance exercises and group exercises	**PO3**
CO10	Assess and evaluate posture, balance and gait	**PO3**
CO11	Demonstrate various traction techniques including manual mechanical & electrical procedures	**PO5**
CO12	Able to plan & practice exercise programs for normal person of various age group	**PO1**

		Physiotherapy Knowledge	**Multidisciplinary/ Medical knowledge**	**Clinical and Practical Skills**	**Utilisation of Modern Technology**	**Evidence Based Practice**	**Life Skills**	**Assessment and Management**	**Teamwork**	**Research and Entrepreneurial Skills**
Course Code	**Course Title**	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PSO 1**	**PSO 2**	**PSO 3**
BPT204	**EXERCISE THERAPY-II**	**3**		**3**		**2**		**3**		**2**

1= weakly mapped 2= moderately mapped 3= strongly mapped

CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	**3**	-	-	-	-	-	-	**2**	-
CO2	**3**	-	-	-	-	-	**3**	-	-
CO3	**3**	-	-	-	-	-	**3**	-	-
CO4	-	-	**3**	-	-	-	**3**	-	-
CO5	-	-	**3**	-	-	-		**2**	-
CO6	-	-		-	**2**	-	-	**2**	-
CO7	-	-	**3**	-	-	-	-	**2**	-
CO8	**3**	-	-	-	-	-	**3**	-	-
CO9	-	-	**3**	-	-	-	-	**3**	-
CO10	-	-	**3**	-	-	-	**3**	-	-
CO11	-	-	-	-	**2**	-	-	**2**	-
CO12	**1**	-	-	-	-	-	-	**3**	-

1= weakly mapped 2= moderately mapped 3= strongly mapped

Unit I	**Therapeutic exercises**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit II	**Posture, balance and gait**
Local	Types of walking aid
Regional	

National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit III	**Hydrotherapy**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit IV	**Motor learning and Motor control**
Local	Learning environment
Regional	Learning environment
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit IV	**Special techniques**
Local	

Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	

BPT205	**BIOMECHANICS**	**Total Hours**
Version 1.0		120
Pre-requisites/Exposure	**ANATOMY**	
Co-requisites	-	

Course Objectives

1. To be able to visualize normal and abnormal kinematics of the upper limb, vertebral column and thorax.
2. To differentiate between normal and abnormal movement patterns.
3. Understand the forces associated with movement.
4. To assess movement dysfunction based on biomechanical knowledge.

Course Outcomes

On completion of this course, the students will be able to

CO1. Understand principles of mechanics, force and gravity, equilibrium, laws of motion, types of levers and concept of pulleys
CO2. Understand concepts of muscle and joint structure, function and biomechanics
CO3. Understand the structure, function and normal biomechanics of the upper limb, lower limb and vertebral column.
CO4.Understand the concept of normal posture and gait and have thorough knowledge of assessment to appreciate any abnormality.
CO5. Recognize variations and abnormal biomechanics in the movements of the upper limb and extrapolate knowledge of normal biomechanics to diagnose and evaluate movement dysfunction.
CO6. Enhance powers of observation to aid in assessment and utilize the concepts of biomechanical analysis in management of patients.

Course Description

This course introduces and reinforces kinetics and kinematics, fundamental to the knowledge of joint and muscle function. After the completion of this course, students will be able to understand the mechanism of movement of the body in relation to the forces acting on it, and the application of this knowledge in physiotherapy. This Course Supplements the Knowledge of anatomy and enables the student to have a better understanding of the principles of biomechanics and their application in musculoskeletal and dysfunction.

Unit I Mechanics (15 hours)

a) Describe Types of Motion planes of motion direction of motion and quantity of motion.
b) Define forces force vectors components of forces.
c) Describe gravity segmental centers of gravity centers of gravity line of gravity of the human body stability and centers of gravity relocation of the centers of gravity.
d) Describe reaction forces Newton law of reaction.
e) Describe equilibrium - law of inertia and establishing equilibrium of an object.
f) Describe objects in motion law of acceleration joint distraction in a linear force system and force of friction.
g) Describe concurrent force system: composition of forces muscle action lines total muscle force vector divergent muscle pulls anatomic pulleys.
h) Describe parallel force systems: First class levers second class levers- Third class levers - Torque- Mechanical Advantage.
i) Define moment arm. Moment arm of a muscle force. Moment arm of gravity and Anatomic pulleys.
j) Describe equilibrium of a lever.

Describe the following

a) Three types of motion.
b) The plane in which a given joint motion occurs, and the axis around which the motion occurs.
c) The location of the center of gravity of a solid object, the location of the center of gravity of the human body.
d) The action line of single muscle.
e) The name, point of application direction, and magnitude of any inter force, given its reaction force.
f) A liner force system, a concurrent force system, a parallel force system.
g) The relationship between torque, moment arm and rotator force component.
h) The methods of determining torque for the same given set of forces.
i) How anatomic pulleys may change action line, moment arm, arid torque passing through them.
j) In general terms, the point in the joint range of motion at which a muscle acting over the joint is bio mechanically most efficient.

k) How external forces can be manipulated to maximize torque.
l) Friction, its relationship to contacting surfaces and to the applied forces.

Determine the following

a) The identity (name) of diagrammed forces on an object.
b) The new center of gravity of an object when segments are rearranged, give the original centers of gravity.
c) The resultant vector in p linear force system, concurrent off system, and Parallel force system.
d) If a given object is in linear and rotational equilibrium.
e) The magnitude and direction of acceleration of an object not in equilibrium.
f) Which forces are joint distraction force and which are joint compression forces what are the equilibrium force for each.
g) The magnitude and direction of friction in a given problem.
h) The class of term in a given problem.

Compare the following

a) Mechanical advantage in second and third class level.
b) Work done by muscle in a second and third class level.
c) Stability of an object in two given situations in which location of the center of gravity and the base of support of the object.

Draw the following

a) The action line of muscle.
b) The rotary force component, the translatory force component and the moment arm for a given force on a lever.

Unit II Joint Structure and Function (7 hours)

a) Describe the basic principles of joint design and a human joint.
b) Describe the tissue present in human joints: including dense fibrous tissue, bone, cartilage and connective tissue.
c) Classify joints – synarthrosis, Amphiarthrosis, Diarthrosis, classification of synovial joints.
d) Describe joint function, kinematics chains, range of motion.
e) Describe the general effects of injury and disease.

Recall the following

a) The elementary principles of joint design.
b) The three main classifications of joints.
c) The five features common to all diarthrodial joints.
d) Types of materials used in human joint construction.
e) Properties of connective tissue.

Identify the following

a) The axis of motion for any given motion at a specific joint (Knee, Hip, metacarpophalangeal).

b) The plane of motion for any given motion at a specific joint, shoulder, interphalangeal, wrist.
c) The degree of freedom at any given joint.
d) The distinguishing features of a diarthrodial joint.
e) The structure that contributes to joint stability.

Compare the following

a) A synarthrosis with a amphiarthrosis on the basis of methods, materials and function.
b) A synarthrosis with a diarthrosis on the basis of methods, materials and function.
c) Closed kinematics chain with an open kinematics chain
d) Dense fibrous tissue with bone.
e) Hyaline cartilage with fibrocartilage.

Unit III Muscle structure and function (7 hours)

a) Describe mobility and stability functions of muscles.
b) Describe elements of muscle structure Composition of a muscle fiber, the motor unit, types of muscle fibers, muscle fiber size, arrangement and number, Muscle tension, length- tendon relationship.
c) Describe types of muscle contraction, speed and angular velocity. Applied load, voluntary control, Torque & isokinetic exercise.
d) Summaries factors affecting muscle tension.
e) Classify muscles- spurt and shunt muscles, tonic and phasic Muscles.
f) Factors affecting muscle function: Type of joint and location of muscle attachment, number of joints, passive insufficiency, sensory receptors.

Describe the following

a) Ordering of the myofibrils in sarcomere.
b) An alpha motor neuron.
c) The connective tissue in a muscle.
d) How tension develops in muscle.
e) Isokinetic exercise.

Define the following

a) Active and passive insufficiency.
b) Active and passive tension.
c) Concentric, eccentric and isometric contractions.
d) Reserve action.
e) Agonists, antagonists and synergists.

Recall the following

a) Factors affecting muscle tension.
b) Characteristics of different fiber types.
c) Characteristics of motor units.
d) Factor affecting angular velocity.

Differentiate the following

a) A spurt from a shunt muscle.
b) A phase from a tonic muscle.
c) Agonists form an antagonist.
d) Active from passive insufficiency.
e) Concentric from eccentric contraction.

Compare the following

a) Tension development in eccentric versus concentric contractions.
b) The angular velocity of isometric versus concentric & isokinetic contractions.
c) Isokinetic exercise with concentric exercise.

Unit IV The Vertebral Column (16 hours)

a) Articulations, Ligaments and muscles, typical vertebral intervertebral disc.
b) Describe factors affecting stability and mobility.
c) Regional structure and function of cervical, dorsal, lumber and sacral vertebrae.
d) Describe the muscle of the vertebral column- Flexors, Extensors, Rotators and Lateral flexors.
e) Describe the effects of injury and development deficits.

Describe the following

a) The curves of the vertebral column using appropriate terminology.
b) The articulations of the vertebral column.
c) The major ligaments of toe vertebral column.
d) The structural components of typical and atypical vertebrae.
e) The inter vertebral disc.
f) Regional characteristics of vertebral structure.
g) Motions of the vertebral column.
h) Lumbar - pelvic rhythm.
i) Rotation of the vertebrae in each region.
j) Movements of the ribs, during rotation.

Identify the following

a) Structure that provide stability for the column.
b) Muscles of the vertebral column and the specific functions of each.
c) Ligaments that limit specific motions (i.e. flexion, extension, lateral flexion, rotation).
d) Forces acting on the vertebral column during specific motions.

Explain the following

a) The relationship between the intervertebral and facet joints during motion of the vertebral column.
b) The role of the intervertebral disc in stability and mobility.

c) The effects of forces acting on the structural components during motion and at rest.

Analyse the following

a) The effect of disease process injury or other defects in the vertebrae.
b) The effects of an increased lumbo sacral angle on the pelvis and lumbar vertebral column.

Unit V Upper limb biomechanics (33 hours)

A. The shoulder complex:

a) Describe the structural components of the shoulder complex including the articulating surfaces, capsular attachments and ligaments and movements of the following joints:
    a. Sternoclavicular.
    b. Acromioclavicular.
    c. Scapulothoracic.
    d. Gleno humeral.
b) Describe the function of shoulder complex including dynamic stability of the gleno humeral joint, gleno humeral Rhythm, scapulo thoracic and gleno humeral contributions.
c) Describe the muscles of elevation (Deltoid, Supraspinatus, Infraspinatus, Teres minor, Subscapularis, Upper Trapezius, lower Trapezius, Serratus anterior, and Middle Trapezius & Rhomboids).
d) Describe the muscles of depression, Lattisssimus dorsi Pectoralis, Teres Major, rhomboids

Describe the following

a) The articular surfaces of the joints of the complex.
b) The function of the ligaments of each joint.
c) Accessory joint structures and the function of each.
d) Motions and ranges available at each joint and movement articular surfaces within the joint.
e) The normal mechanism of dynamic stability of the gleno humeral joint, utilizing principles of biomechanics.
f) The normal mechanism of gleno humeral stability in the dependent arm.
g) Scapulo humeral rhythm, including contributions of each joint.
h) The extent of dependent of independent function of each joint in scapulo humeral rhythm.
i) How restriction in the range of elevation of the arm may occur.
j) One muscular force couple at a given joint and its function.
k) The effect of given muscular deficit may have on shoulder complex function.

Compare the following

a) The advantages and disadvantages of coracoacromial arch.
b) The structural stability of the three joints, including the tendency toward degenerative changes and derangement.
c) Draw the action lines of muscles of the shoulder complex and the moment arm for each, and resolve each into components.

B. The Elbow complex

a) Describe the structure of the humeroulnar and humeroradial joints including articulating surfaces, joints capsule, ligaments & Muscles.
b) Describe the function of the humeroulnar and humeroradial, all joints including the axis of motion, range of motion, muscle action.
c) Describe the structure of the superior and inferior radioulnar joints.
d) Describe the function of the superior and inferior radioulnar joints.
e) Describe the mobility and stability of the elbow complex its relationship to hand and wrist.
f) Describe the effects of injury and the resistance to longitudinal compression forces, to distraction forces & to medial lateral forces.

Describe the following

a) All the articulating surfaces associated with each of the following joints, humeroulnar, humeroradial, superior and inferior radioulnar.
b) The ligaments, associated with all the joints of the elbow complex.

Identify the following

a) Axes of motion for supination & pronation and flexion & extension.
b) The degrees of freedom associated with each of the joints of the elbow complex.
c) Factors limiting the range of motion in flexion and extension.
d) Factors that create the carrying angle.
e) Factors limiting motion in supination and pronation.

Compare the following

a) The translatory and rotary components of the brachio radial is and brachialis at all points in the range of motion.
b) The moment arms of the flexors at any point in the range of motion.
c) Muscle activity of the extensions in a closed kinematic chain with activity in an open the role of pronater teres with the role of pronator quadratus.
d) The role of biceps with that of brachialis.
e) The resistance to compressive forces.
f) The features of a classic tennis elbow with the features of cubital tunnel syndrome.
g) The role of and structure of the annular ligament with the role and structure of the articular disc.

C. The wrist and hand complex

a) Describe the wrist complex including radiocarpal joint, metacarpal joint and the ligaments of the wrist complex.
b) Describe the function of the radiocarpal and midcarpal joints including the movements and muscles involved.
c) Describe the hand complex including: Structure of fingers (Carpometacarpal, Metacarpophalangeal and interphalangeal joints of fingers, ligaments, range of motion).

d) Describe the finger musculature including extrinsic & MCP, PIP and DIP joint function and intrinsic muscles.
e) Describe the structure of the Carpometacarpal, MCP and IP joints of thumb.
f) Describe the structure including the extrinsic & intrinsic thumb muscles.
g) Describe prehension, power, cylindrical, spherical & hook grips.
h) Describe precision handling, pad to pad, tip to tip and pad to side, prehension and functional position of wrist and hand.

Describe the following

a) The articular surfaces of the joints of the wrist and hand complexes.
b) The ligaments of the joints of the wrist and hand, including the function of each.
c) Accessory joint structures found in the wrist and hand complex, including the function of each.
d) Type of movements and types of motion of the radiocarpal joint, the midcarpal joint, and the total complex.
e) The sequence of joint activity occurring from full wrist flexion to extension including the role of the scaphoid, the sequence of joint activity in radial and ulnar deviation from neutral.
f) The role of wrist musculature in producing wrist motion.
g) Motions and ranges available to joints of the hand complex.
h) The gliding mechanism of the extrinsic finger flexors.
i) The structure of the extensor mechanism, including the muscles and ligaments that compose it.
j) How M.C.P. extension occurs, including the muscles that produce and control it.
k) How flexion and extension of the PIP joint occur, including the muscular and ligamentous forces that produce and control these motions.
l) How flexion and extension of DIP joints occur, including the muscular and ligamentous forces that produce and control these motions.
m) The role of the wrist in optimizing length - tension in. the extrinsic hand muscles.
n) The activity of reposition, including the muscles that perform it.
o) The functional position of the wrist and hand.

Differentiate between

a) The role of the interossei and lumbrical muscles at the MCP and IP joints.
b) The muscles used in cylindrical grip to those active in spherical grip, hook grip, and lateral, prehension.
c) The muscles that are active in pad to pad tip to tip and pad to side prehension.

Compare

a) The activity of muscles of the thumb (in opposition of the thumb to the index finger) with the activity of those active in opposition to the little finger.
b) The characteristics of power grip with those of precision handling.
c) The most easily disrupted form of precision handling that may be used some on without any active hand musculature: what are the prerequisites; for each.

Unit VI LOWER LIMB BIOMECHANICS (32 hours)

A. The hip complex

a) Describe the general features of the hip joint including the articulating surfaces on the pelvis & the femur, angulations, angle of inclination, angle of torsion, Internal architecture of femur and pelvis, joint capsule, ligaments & muscles (Flexors, Extensors- one joint extensors, two extensors, Adductors, Medial Rotators and lateral Rotators).
b) Describe the function of hip- Rotation, between pelvis, lumber spine and hip, Pelvis motion, anterior posterior pelvic tilting, lumbar pelvic rhythm, lateral pelvic tilting, pelvic rotation.
c) Summarize the pelvic motions in the static erect posture.
d) Describe femoral motion.
e) Describe hip stability in erect bilateral stance, sagital plane equilibrium and unilateral stance.
f) Describe reduction of forces with weight shifting and using a cane and deviations form normal in muscular weakness & bony abnormalities.

Describe the following

a) The articulating surfaces of the pelvis and femur.
b) The structure and function of the trabecular systems of the pelvic and femur.
c) The structure and function of ligaments of the hip joint.
d) The angle of inclination and the angle of torsion.
e) The planes and axes of the following pelvic motions and the accompanying motions at the lumber spine and hip joints, pelvic rotation and anterior, posterior and lateral tilting of the pelvis.
f) The muscle activity that produces tilting and rotation of the pelvis.
g) Motions of the femur on the pelvis including planes and axes of rotation.
h) The structure and function of all the muscles associated with the hip joints.
i) The forces that act on the head of femur.
j) The position of greatest stability at the hjp.

Explain the following

a) How sagittal and frontal plane equilibrium are maintained in erect bilateral stance.
b) How frontal plane equilibrium is achieved in unilateral stance.
c) How force acting on the femoral head may be reduced.
d) How the functions of the two joint muscles at the hip are affected by changes in the position of the knee and hip.
e) The functional and structural relationship- among the hip, knee pelvis and lumbar spine.

Compare the following

a) Forces acting on the femoral head in erect bilateral stance with the forces acting on the head in erect unilateral stance.

b) Coxa valga with coax vara on the basis of hip stability and mobility.
c) The motions that occur at the hip, pelvis and lumbar spine during forward trunk bending with the motion that occur during anterior and posterior tilting on the pelvis in the erect standing position.
d) Ante version with retroversion on the basis of hip stability and mobility.
e) The structure and function of the following muscles- Flexors and Extensors, abductors and abductors, lateral and medical fracture.

B. The knee complex

a) Describe the structure of the tibiofemoral joint, articulating surfaces on femur and tibia, the menisci, joint capsule and bursa, ligaments and other supporting structures, anterior- posterior and ligaments and medio- lateral stability, muscle structure, knee flexors. & extensors, axes of knee complex: Mechanical axis, Anatomic axis and axis of motion.
b) Describe the function of the tibiofemoral joint: range of motion, flexion and extension, rotation, abduction and adduction, locking and unlocking. Function of menisci and muscle function.
c) Describe the structure of the patellofemoral joint.
d) Describe the function of the patellofemoral joint.
e) Describe the effects of injury and disease in the tibiofemoral and patellofemoral joints.

Describe the following

a) The articulating surfaces of tibiofemoral and patellofemoral joints.
b) The joint capsule.
c) The anatomic and mechanical axes of knee.
d) Motion of the femoral condyles during flexion and extension in a closed kinematics chain.
e) Motion of the tibia in flexion & extension in an open kinematics chain.

Draw

a) The Q angle when an illustration of the lower extremity.
b) Moment arm of the quadriceps at the following degree of knee flexion: 90 deg., 130 deg., 30 deg., 10 deg.
c) The action lines of vastus lateralis and the vastus medialis oblique.

Locate

a) The origin and insertion of all the muscles at the knee.
b) The burses surrounding the knee.
c) The attachment of the ligaments of the medial compartments.

Identify

a) Structures that contribute to the medial stability of the knee including dynamic and static stabilizers.
b) Structures that contributes, to the lateral stability of the knee including dynamic and static stabilizers.

c) Structures that contributes to the posterior stability of the knee including dynamic and static stabilizers.
d) Structures that contributes to the anterior stability of the knee including dynamic and static stabilizers.
e) Structures that contributes to the rotary stability of the knee.
f) The normal forces that are acting on the knee.

Compare

a) The knee and the elbow joint on the basis of similarities/ dissimilarities in structure and function.
b) The lateral with the medical meniscus on the basis of structure and function.
c) The forces on the patella femoral joint in full flexion with full extension.
d) The action of quadriceps in an open kinematics chain with that in a closed kinematics chain.
e) The effectiveness on the hamstrings as knee flexors in each of the following hip positions: hyperextension, ten degrees of flexion and full flexion (open kinematics chain).
f) The effectiveness of the rectus femoris as a knee extensor at sixty degree of knee flexion with its effectiveness at ten degrees of knee flexion.

Explain

a) The function of the menisci.
b) How a tear of the medial collateral ligament may affect joint function.
c) The functions of the suprapatellar, gastrocnemius, infrapatellar and prepatellar bursae.
d) Why the semi flexed position of the knee is the least painful position.
e) Why the knee may be more susceptible to injury than the hip joint

C. Ankle- foot complex

Describe the structure, ligaments, axis and function of the following: ankle joint, tibiofibular joints, subtalar joints, talocalcaneonavicular joints, transverse tarsal joint, tarsometatarsal joint, plantar arches, Metatarsophalangeal joints, interphalangeal joints.

Define the terminology unique to the ankle foot complex, including inversion-eversion, pronation-supination, dorsiflexion, plantar flexion and adduction and abduction.

Describe

a) The compound articulations of the ankle subtalar, talocalcaneonavicular, transverse tarsal and tarsometatarsal joints.
b) The role of the tibiofibular joints and supporting ligaments.
c) The degrees of freedom and range of motion available at the joint of the ankle and the foot.
d) The significant ligaments that support the ankle, subtalar and transverse tarsal joints.
e) The triplane nature of ankle joint motion.
f) The articular movements that occur in the weight- bearing subtatar joint during inversion - eversion.

g) The relationship between tibial rotation and subtalar/ talocalcaneonavicular inversion-eversion.
h) The relationship between hind foot inversion-eversion and mobility stability of the transverse tarsal joint.
i) The function of the tarsometatarsal joints, including when motion at these joints is called upon.
j) Supination- pronation of the forefoot at the tarsometatarsal joints.
k) Distribution of weight within the foot.
l) The structure and function of the plantar arches including the primary supporting structure.
m) When muscles supplement arch support, including those muscles that specifically contribute.
n) The effects of toe extension on the plantar arches.
o) The general function of the extrinsic muscles of ankle & foot.
p) The general function of the intrinsic muscle of foot.

Unit VII Posture (5 hours)

a) Describe the effects of gravity and indicate the location of the gravity line in the sagittal plane in optimal posture.
b) Analyze- posture with respect to the optimal alignment of joints in the antero- posterior and lateral views.

Describe

a) The position of hip knee and ankle joints in optimal erect posture.
b) The position of body gravity line in optimal erect posture, using appropriate points of reference.
c) The effect of gravitational moments of body segments in optimal erect posture.
d) The gravitational moments acting around the vertebral column, pelvis, hip, knee and ankle in optimal erect posture.
e) Muscles, ligamentous structures that counterbalance gravitational moments in optimal erect posture.
f) The following postural deviations: pesplanus, halluxvalgus, pes cavus, idiopathic scoliosis, kyphosis and lordosis.
g) The effects of the above postural deviations on body structures i.e. ligaments, joints and muscles.

Determine

a) How changes in the location of the body' gravity line will effect gravitational moments acting around specified joints axes.
b) How changes in the alignment of body segments will affect. Either the magnitude or the deviation of the gravitational moments.
c) How changes in the alignment of body segments will affect supporting structures such as ligaments, joint capsules, muscles, joint surfaces.

Unit VIII Gait (5 hours)

Define

a) The stance, swing and double support phases of gait.
b) The subdivisions of the stance and swing phases of gait.
c) The time and distance parameters of gait.

Describe

a) Joint motion at the hip, knee and ankle for one extremity during a gait cycle.
b) The location of line of gravity in relation to the hip knee and ankle during the stance phases of gait.
c) The gravitational moments of force acting at hip, knee and ankle during the stance phase.

Explain

a) Muscle activity at the hip, knee and ankle throughout the gait cycle, including why and when a particular muscle is active and type of contraction required.
b) The role each of the determinates of gaits.
c) The muscle activity that occurs in the upper extremity and trunk.

Compare

a) Motion of upper extremities and trunk with motion of pelvis and lower extremities. .
b) The traditional gait terminology with the new terminology.
c) Normal gait with a gait in which there is a weakness of the hip extensors and abductions.
d) Normal gait with a gait in which there is unequal leg lengths.

Text Books

1. Norkin C, “Joint Structure and Function”, Jaypee Publication.

Reference Books/Materials

1. Brunstrom, “Clinical Kinesiology”, Jaypee Publication.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination

Examination Scheme

Components	Continuous Internal assessment				Professional Examination (80%)
	Internal examination	Preliminary examination	Attendance	Project/Assignment/class test	
Weightage (%)	5	5	5	5	80
Schedule	4 months	Before	To be	Continuous assessment	End of AY

	after onset of Academic Year	University exam	calculated at the end of AY	(at least 4)	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between COs and POs		
	Course Outcomes (COs)	**Mapped Program Outcomes**
CO1	Understand principles of mechanics, force and gravity, equilibrium, laws of motion, types of levers and concept of pulleys	**PO1**
CO2	Understand concepts of muscle and joint structure, function and biomechanics	**PO1**
CO3	Understand the structure, function and normal biomechanics of the upper limb, lower limb and vertebral column.	**PO1**
CO4	Understand the concept of normal posture and gait and have thorough knowledge of assessment to appreciate any abnormality.	**PO4**
CO5	Recognize variations and abnormal biomechanics in the movements of the upper limb and extrapolate knowledge of normal biomechanics to diagnose and evaluate movement dysfunction.	**PO3**
CO6	Enhance powers of observation to aid in assessment and utilize the concepts of biomechanical analysis in management of patients.	**PO3**

		Physiotherapy Knowledge	**Multidisciplinary/ Medical knowledge**	**Clinical and Practical Skills**	**Utilisation of Modern Technology**	**Evidence Based Practice**	**Life Skills**	**Assessment and Management**	**Teamwork**	**Research and Entrepreneurial Skills**

Course Code	Course Title	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PSO 1	PSO 2	PSO 3
BPT205	BIOMECHANICS AND KINESIOLOGY-I	**3**		**2**	**3**			**3**		

1= weakly mapped 2= moderately mapped 3= strongly mapped

CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	**3**	-	-	-	-	-	-	**2**	-
CO2	**3**	-	-	-	-	-	-	-	-
CO3	**3**	-	-	-	-	-	-	-	-
CO4	-	-	-	**3**	-	-	-	-	-
CO5	-	-	**2**	-	-	-	**3**	-	-
CO6	-	-	**2**	-	-	-	-	-	-

1= weakly mapped 2= moderately mapped 3= strongly mapped

BPT205	**BIOMECHANICS**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	

BPT206	SOCIOLOGY &PSYCHOLOGY	Total hours
Version 1.0		**200**
Pre-requisites/Exposure	-	
Co-requisites	-	

Course Objective

1. Provide a basic insight into the main features of sociology and health, socialization and different institutions of society.
2. Teach culture, caste and social problems of the disabled.
3. Gain knowledge about Human Psychology.
4. Helps to study the of various behavioral patterns of individuals, theories of development, normal and abnormal aspects of motor, social, emotional and language development, communication and interaction skills appropriate to various age groups
5. Focus on the important and relevant topics related to psychological aspects in healthcare.

Course Outcomes

Upon completion of this course the student will be able to:

CO1. Summaries and apply knowledge of sociology in physiotherapy practice.
CO2. Understand the role of the family and community in socialization.
CO3. Explain the scientific methods used in sociology.
CO4. Interpret the importance and functions of social groups.
CO5. Observe and analyse the social evils prevalent in society and be able to empathise with the vulnerable population in society.
CO6. Understand the role of medical social worker.
CO1. Appreciate the importance of study of psychology for a physiotherapist.
CO2. Understanding of the history of psychology and its various applications.
CO3. Differentiate the stages of development and the role of heredity and environment through the life cycle.
CO4. Differentiate between sensation, attention and perception.
CO5. Analyze the different areas of applied psychology and the basics of psychotherapy.
CO6. Relate the emotions and recommend strategies for management of stress.

Catalog Description

This subject is designed to introduce students the basic sociology and psychology. It involves study of concepts, principles and social processes, social institutions in relation to the individual, family and community and the various social factors affecting the family in rural and urban communities in India. In addition, the student learns about various behavioral patterns of individuals, theories of development, normal and abnormal aspects of motor, social, emotional and language development, communication and interaction skills appropriate to various age groups. This would be helpful in integrating physiotherapy basics which will be utilised in profession in accordance with societal norms and culture in addition to understanding their patients during assessment and while planning appropriate treatment methods. The student will have basic knowledge on legal responsibility and professional culture.

Unit I Introduction to psychology and sociology (16 hours)

a. Definition of sociology, sociology as a science of society, uses of the study of sociology, application of knowledge of sociology in physiotherapy and occupational therapy.

b. Social factors affecting health status, social consciousness and perception of illness, social consciousness and meaning of illness, decision making in taking treatment.
Institution of health of the people.

c. Definition of psychology, in relation to following schools method and branches. Structuralism, functionalism, behaviorism, psychoanalysis, Gestalt Psychology. Intersection, observation, inventory and experimental method. General, child, social, abnormal, industrial, clinical, counseling, educational.

Unit II Social groups, Family and Community (18 hours)

a. Concept of social group, influence of formal and informal groups on health and sickness, the role of primary groups and secondary groups in the hospitals and rehabilitation setting.

b. Influence of family on human personality, discussion of changes in the function of a family, influence of family on the individual's health family and nutrition, the effect of sickness on family, and psychosomatic disease.

c. Concept of community, role of rural and urban communities in public health, role of community in determining beliefs, practices and home remedies in treatment.

Unit III Caste and Culture (12 hours)

a. Components of culture, impact of culture on human, behavior, culture meaning of sickness, response & choice of treatment (role of culture as social consciousness in molding the perception of reality) culture induced symptoms and disease, sub-culture of medical workers.

b. Feature of modern caste system and its trends.

Unit IV Socialization, social change and control (12 hours)

a. Meaning of socialization influences of social factor on personality socialization in hospitals, socialization in rehabilitation of patients.
b. Meaning of social change, factors of social change, human adoption and social change, social change and stress, social change and deviance, social change and health programmers, the role of social planning in the improvement of health and in rehabilitation.
c. Meaning of social control, role of norms, folkways, customs, morals, religion, law and other means of social control in the regulation of human behavior, social deviance and disease.

Unit V Social problems of the disabled (18 hours)

Consequences of the following social problems in relation to sickness and disability remedies to prevent these problems:

a) Population explosion
b) Poverty and unemployment ~
c) Beggary
d) Juvenile delinquency
e) Prostitution
f) Alcoholism
g) Problems of women in employment.
h) Social Security: Social security and social legislation in relation to the disabled.
i) Social Worker: The role of medical social worker.

Unit VI Development and growth behavior, Heredity and Environment (30 hours)

a. Infancy, childhood, adolescence, adulthood, middle age, old age.

b. Twins relative importance of heredity an environment, their role in relation to physical characteristics, intelligence and personality, nature- nature controversy.

Unit VII Intelligence and personality (22 hours)

a. Definition, IQ, Mental age, list of various intelligence tests- WAIS, WISC, and Bhatia's performance test, Raven's Progressive Metrics test.
b. Definitions: List of components: physical characteristics character, abilities temperament, interest and attitudes.
c. Discuss briefly the role of heredity, nervous system, physical characteristics, abilities, family and culture of personality development.
d. Basic concept of Freud: Unconscious, conscious, id ego and superego, list and define the oral, anal and phallic stages of personality department list and define the stages as proposed by Erickson, 4concept of learning as proposed by Dollard and Miller, drive cue, response and reinforcement.
e. Personality assessment: Interview, standardized, non-standardized, exhaustive, and stress interviews, Hst and define inventories BAI, CPI and MMPI, projective test. Rorschach, TAT and sentence completion test.
f. Personality styles: Different personality styles of patients.
g. Defense Mechanisms of the Ego: Denial, rationalization, projection, reaction formation, identification, repression, emotional insulation, undoing, interjection, acting depersonalization.
h. Frustration: Definition, sources, solution, conflict, Approach, Avoidance and approach- avoidance solutions.

Unit VIII Thinking, learning, motivation and emotions (24 hours)

a. Definition, concepts creativity, steps in creative thinking, list the traits of creative people, delusions.

b. List the laws of learning as proposed by Thorndike, type of learning: Briefly describe, classical conditions, operant conditioning, insight observation and Traila and error type list the effective ways

to learn: Massed Vs. spaced, whole vs. part, Recitation Vs reading serial Vs. International learning, role of language.
c. Definition, motive, drive, incentive and reinforcement, basic information about primary needs: hunger thirst, sleep elimination activity, air avoidance of pain, attitude to sex. Psychological needs: Information, security, self-esteem, competence, love and hope.
d. Definition: differentiate from feelings, psychological changes of gland, heredity and emotion, nature and control anger, fear and anxiety.

Unit IX Health psychology (40 hours)

a) Psychological reactions of a patient: Psychological reactions of a patient during admission and treatment anxiety, shock denial, suspicion, questioning, loneliness, regression, shame, guilt, rejection, fear withdrawal, depression, egocentricity, concern about small matters, narrowed interests, emotional over reactions, perpetual changes, confusion disorientation, hallucination, delusion, illusions anger, hostility, lose of hope.
b) Reaction to loss: Reactions to loss, death and bereavement shock and disbelief, development of awareness, restitution, resolution, stages of acceptance as proposed by Kubler - Ross.
c) Stress: Physiological and psychological relation to health and sickness: psychosomatic, professional stress burnout.
d) Communications: Type verbal, non-verbal, element in communication, barriers to good communication, developing effective communication, specific communication techniques.
e) Counseling: Definition, Aim differentiates from guidance, principles in counseling and personality qualities of counselors.
f) Compliance: Nature, factors, contributing to non - compliance, improving, compliance.
g) Emotional Needs: Emotional needs and psychological factors in relation to unconscious patients, handicapped patients, bed - ridden patients, chronic pain, spinal cord, injury, paralysis, cerebral palsy, burns, amputations, disfigurement, head injury, degenerative disorders, parkinsonism. Leprosy, incontinence and mental illness.
h) Geriatric psychology: Specific psychological, reactions and needs of geriatric patients.
i) Pediatric psychology: Specific psychological reactions and needs of pediatric patients.
j) Behavior Modifications: Application of various conditioning and learning principles to modify patient behaviors.
k) Substance abuse: Psychological aspects of substance abuse: smoking, alcoholism and drug addiction.
l) Sensation, Attention and perception: List of senses: Vision, Hearing, Olfactory, Gustatory and cutaneous sensation, movement equilibrium and visceral sense. Define attention - and list factors that determine attention: nature of stimulus intensity, color, change, extensity, repetition, movement size, curiosity, primary motives. Define perception and list the principles of perception: Figure ground, constancy, similarity, proximity, closure continuity values and interests, past experience, context, needs moods, religion, sex and age, perceived susceptibility perceived seriousness, perceived benefits and socio-economic status. Define illusion and hallucination. List visual, auditory, cutaneous, gustatory and olfactory hallucination.

Unit X Democratic ‘and Authoritarian Leadership (8 hours)

Qualities of leadership: physical factors intelligence, self -confidence, sociability, will and dominance. Define attitude. Change of attitude by: Additional information, change in group

affiliation, enforced modification by law and procedures that affect personality. (Psychotherapy, counseling and religious conversion).

Text Book:

1. Morgan et al, "Introduction to Psychology", Tata McGraw Hill.
2. Malhotra V, "Handbook of Medical Sociology", Jaypee.
3. Khanna P, "Sociology for Physiotherapists", AITBS Publishers.

Reference Books:

1. Feldman RH, "Understanding Psychology", Tata McGraw Hill
2. Atkinson, "Dictionary of Psychology".
3. Horton, Hunt, "Sociology", McGraw Hill.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination

Examination Scheme:

Components	Continuous Internal assessment				Professional Examination (80%)
	Internal examination	Preliminary examination	Attendance	Project/Assignment/class test	
Weightage (%)	5	5	5	5	80
Schedule	4 months after onset of Academic Year	Before University exam	To be calculated at the end of AY	Continuous assessment (at least 4)	End of AY

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between COs and POs		
	Course Outcomes (COs)	**Mapped Program Outcomes**
CO1	Apply knowledge of sociology in physiotherapy practice.	**PO6**
CO2	Understand the role of the family and community in socialization.	**PO2**
CO3	Be familiar with the scientific methods used in sociology.	**PO2**
CO4	Understand the importance and functions of social groups.	**PO2**
CO5	Observe and analyse the social evils prevalent in society and be able to empathise with the vulnerable population in society.	**PO2**
CO6	Understand the role of medical social worker.	**PO2**

		Physiotherapy Knowledge	**Multidisciplinary/ Medical knowledge**	**Clinical and Practical Skills**	**Utilisation of Modern Technology**	**Evidence Based Practice**	**Life Skills**	**Assessment and Management**	**Teamwork**	**Research and Entrepreneurial Skills**
Course Code	**Course Title**	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PSO 1**	**PSO 2**	**PSO 3**
BPT206	**SOCIOLOGY**		**3**				**2**		**2**	

1= weakly mapped 2= moderately mapped 3= strongly mapped

CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	**2**	-	**2**	-
CO2	-	**3**	-	-	-	-	-	-	-
CO3	-	**3**	-	-	-	-	-	-	-
CO4	-	**3**	-	-	-	-	-	-	-
CO5	-	**3**	-	-	-	-	-	-	-
CO6	-	**3**	-	-	-	-	**2**	-	-
CO7	-	-	-	-	-	**2**	-	**2**	-
CO8	-	**3**	-	-	-	-	-	-	-
CO9	-	**3**	-	-	-	-	-	-	-
CO10	-	**3**	-	-	-	-	-	**2**	-
CO11	-	**3**	-	-	-	-	-	-	-
CO12	-	**3**	-	-	-	-	-	-	-

1= weakly mapped 2= moderately mapped 3= strongly mapped

Unit I	**Introduction to psychology and sociology**
Local	
Regional	sociology as a science of society
National	Social factors affecting health status, social consciousness and perception of illness, social consciousness and meaning of illness, decision making in taking treatment. Institution of health of the people.
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment &	

Sustainability	
Unit II	**Give Heading of the Unit here (if applicable)**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit III	**Give Heading of the Unit here (if applicable)**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit IV	**Give Heading of the Unit here (if applicable)**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	

Environment & Sustainability	
Unit V	**Give Heading of the Unit here (if applicable)**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit VI	**Give Heading of the Unit here (if applicable)**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit VII	**Give Heading of the Unit here (if applicable)**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	

Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit VIII	**Give Heading of the Unit here (if applicable)**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit IX	**Give Heading of the Unit here (if applicable)**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit X	**Give Heading of the Unit here (if applicable)**
Local	
Regional	
National	

Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	

BPT207	**COMPUTER APPLICATION**	**Total hours**
Version 1.0		**80**
Pre-requisites/Exposure	**-**	
Co-requisites	-	

Course Objectives:

1. To leverage the technical skills of a student
2. To introduce computer applications in a simple language to all undergraduate students.

Course Outcomes:

Upon completion of this course the student should be able to do

CO1. Understand basic concepts and terminology of information technology.
CO2. Have a basic understanding of personal computers and their operations.
CO3. Understand the operational skill of common computer applications.
CO4. Have basic knowledge and skills of multimedia utility and web surfing for literature

Catalog description

The main objective is to introduce IT in a simple language to all undergraduate students, regardless of their specialization. It will help them to pursue specialized programs leading to technical and professional careers and certifications in the IT industry. The focus of the subject is on introducing skills relating to IT basics, computer applications, programming, interactive media, Internet basics, etc.

Course contents

a) To study the various components of a personal computer.

b) To have working Knowledge of hardware and software.

c) To practice the operational skill of common computer application including works processing & spread sheet software.

d) To have a basic knowledge of utility of multi- media.

e) To learn skills of web surfing-For literature, research relevance to the field of medicine.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination

Examination Scheme:

Components	Continuous Internal assessment				Professional Examination (80%)
	Internal examination	Preliminary examination	Attendance	Project/Assignment/class test	
Weightage (%)	5	5	5	5	80
Schedule	4 months after onset of Academic Year	Before University exam	To be calculated at the end of AY	Continuous assessment (at least 4)	End of AY

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between COs and POs		
	Course Outcomes (COs)	**Mapped Program Outcomes**
CO1	Understand basic concepts and terminology of information technology.	**PO2**
CO2	Have a basic understanding of personal computers and their operations.	**PO6**
CO3	Understand the operational skill of common computer applications.	**PO4**
CO4	Have basic knowledge and skills of multimedia utility and web surfing for literature.	**PO4**

		Physiotherapy Knowledge	Multidisciplinary / Medical knowledge	Clinical and Practical Skills	Utilisation of Modern Technology	Evidence Based Practice	Life Skills	Assessment and Management	Team work	Research and Entrepreneurial Skills
Course Code	**Course Title**	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PSO 1**	**PSO 2**	**PSO3**
BPT207	**COMPUTER APPLICATION**		**2**		**3**		**2**			**3**

1= weakly mapped 2= moderately mapped 3= strongly mapped

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PSO1**	**PSO2**	**PSO3**
CO1	-	**2**	-	-	-	-	-	**2**	-
CO2	-	-	-	-	-	**2**	-	**2**	-
CO3	-	-	-	**3**	-	-	-	-	-
CO4	-	-	-	**3**	-	-	-	-	**3**

1= weakly mapped 2= moderately mapped 3= strongly mapped

BPT 207	**Computer Application**
Local	
Regional	
National	
Global	To have working Knowledge of hardware and software. To have a basic knowledge of utility of multi- media. To learn skills of web surfing-For literature, research relevance to the field of medicine.
Employability	
Entrepreneurship	
Skill Development	

Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	

Course Objectives

The objective of this course is that after 200 hours of lectures, demonstrations, in addition to clinics the student will be able to demonstrate a general understanding of the diseases that therapists would encounter in their practice. They should have a brief idea of the etiology and pathology, what the patient's symptoms and the resultant functional disability. This would help the candidates to understand the limitation imposed by the diseases on any therapy that may be prescribed.

Course Outcomes

On completion of this course, the students will be able to

CO1. Interpret and identify features of various systemic conditions.
CO2. Classify and differentiate in etiology and pathology various systemic conditions.
CO3. Determine clinical features, and treatment methods of systemic illnesses.
CO4. Describe clinical features, and treatment methods of systemic illnesses.

BPT 301	GENERAL MEDICINE	Total Hours
Version 1.0		200
Pre-requisites/Exposure	PATHOLOGY	
Co-requisites	GENERAL SURGERY	

CO5. Determine Etiology, pathology of various psychiatric disorders.
CO6. Describe Clinical features and treatment methods of various psychiatric disorders.

Catalog Description

This course enables the student to list the etiology, pathology, clinical features and treatment methods for various medical, pediatric and psychiatric conditions.

Course Content

UNIT I Infection diseases 16 Hours

- Tuberculosis
- Tetanus
- Typhoid fever
- Bacillary dysentery
- Amoebiasis,
- HIV Infection and AIDS
- Measles & Nosocomial infection

UNIT II Metabolic & deficiency disease 10 Hours

- Diabetes mellitus
- Obesity
- Vitamin deficiency disease.

UNIT III Diseases of respiratory system 18 Hours

- Anatomy & Physiology aspects
- Asthma
- Bronchitis
- Collapse
- Bronchiectasis
- Pneumonia
- Lung abscess
- Empyema
- COPD (Chronic bronchitis & Emphysema)

UNIT IV CVS (Applied, clinical Anatomy and physiological aspect) 34 Hours

- Hypertension
- Congestive Heart Failure
- Rheumatic fever, infective endocarditis. Pericarditis
- Valaular heart diseases (mitral stenosis, mitral regurgitation, aortic stenosis, aortic regurgitation).
- Congenial heart disease (Atrial Septal Defect, Ventricular Septal Defect, Patent Ductus Arteriosus, tetra logy of Failot)
- Eisenmenger syndrome
- Ischemic heart diseases
- Myocardial infarction
- Deep vein thrombosis
- Pulmonary embolism

UNIT V Hematology 24 Hours

- Anemia (Iron deficiency anemia, Megalobiastic anemia, Hemolytic anemia & Aplastic anemic).
- Thrombocytopenia (idiopathic thrombocytopenia, Purura).
- Leukemia (Acute Lymphoid Leukemia, Chronic Hyeloid Leukemia, Chronic Lymphoid Leukemia, Acute Hyeloid Leukemia).
- Hemophilia
- Lymphadenopathy
- Spenomegaly

UNIT VI Gastrointestinal System 24 Hours

- Peptic Ulcer
- Hematemesis
- Dyspepsia
- Diarrhea
- Mal-absorption syndrome
- Diseases of liver
- Jaundice
- Viral hepatitis
- Cirrhosis of liver

- Ascites

Unit VII Diseases of Kidney 15 Hours

- Post streptococcal glomerulonephritis
- Nephritic syndrome
- Urinary tract infection
- Urinary calculi
- Chronic renal failure.

UNIT VIII Endocrinology 15 Hours

- Hypothyroidism
- Hyperthyroidism
- Addison's diseases
- Cushing's syndrome
- Gigantism

UNIT IX Dermatology 20 Hours

- Structure and function of normal skin Primary and Secondary lesion Pediculosis.
- Fungal infection: Dermatophytosis, Pitysiasis vesicular, Candidacies.
- Bacterial infection of the skin: impetigo & boil.
- Viral infections: Herpes. Eczema, Dermatitis & allergies.
- Acne, Alopecia, Vitiligo, Ieukoderma. Psoriasis.
- Leprosy.
- Sexual Transmitted diseases & venereal Diseases- Syphilis, Gonorrhea, HIV.

UNIT X PSYCHIATRY 24 Hours

- Introduction: Definition: sign & symptoms, types of mental disorders psychosomatic complication.
- Disorders: Psychosis, schizophrenia, delusional disorders, acute and transient psychotic disorders.
- Affective disorders: depression, disorders, mania, bipolar affective disorders.
- Anxiety disorders: Agoraphobia, panic disorder, Generalized anxiety disorders.
- Dissociative disorders: somatoform disorders, OCD.
- Organic conditions- dementia, delirium, traumatic.
- Special therapies: Psychotherapy – psychoanalysis, narco, synerhesis, hypnosis, psychodrama. Group therapy. Shock therapy.
- Surgery in psychiatric conditions.

Text Books

1. Innes Alastair J, 2015, Davidson's Essentials of Medicine, 2nd Edition, Elsevier Health-UK

Reference Books/Materials

1. Golwalla F Aspi, 2017, Medicine for students, 25th Edition, Jaypee Brothers Medical Publishers.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination

Examination Scheme:

Components	Continuous Internal Assessment (20%)				Professional Examination (80%)
	Internal Examination	Preliminary Examination	Attendance	Project/ Assignment/ Class test	
Weightage (%)	5	5	5	5	80
Schedule	4 months after onset of Academic Year	Before University exam	To be calculated at the end of AY	Continuous assessment (at least 4)	End of AY

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between COs and POs		
	Course Outcomes (COs)	Mapped Program Outcomes
CO1	Interpret and identify features of various systemic conditions.	PO2
CO2	Classify and differentiate in etiology and pathology various systemic conditions.	PO3
CO3	Determine clinical features, and treatment methods of systemic illnesses.	PO2
CO4	Describe clinical features, and treatment methods of systemic illnesses.	PO3
CO5	Determine Etiology, pathology of various psychiatric disorders.	PO2
CO6	Describe Clinical features and treatment methods of various psychiatric disorders.	PO3

		Physiotherapy Knowledge	Multidisciplinary/ Medical knowledge	Clinical and Practical Skills	Utilisation of Modern Technology	Evidence Based Practice	Life Skills	Assessment and Management	Teamwork	Research and Entrepreneurial Skills
Course Code	**Course Title**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PSO1**	**PSO2**	**PSO3**
BPT 301	**GENERAL MEDICINE**		**3**	**2**				**2**		

1= weakly mapped 2= moderately mapped 3= strongly mapped

CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	-	**3**	**1**	-	-	**2**	**3**	**2**	1
CO2	-	**3**	-	-	-	-	**2**	**3**	1
CO3	-	**3**	-	-	-	-	**3**	**2**	1
CO4	-	**3**	-	-	-	-	**3**	**3**	-
CO5	-	-	**1**	-	-	-	-	**3**	2
CO6	-	-		-	-	**2**	**2**	**2**	-

1= weakly mapped 2= moderately mapped 3= strongly mapped

Unit I	**Infection diseases**
Local	Tuberculosis, Typhoid, amoebiasis, Measles
Regional	Tetanus, Bacillary dysentery,Nosocomial Infection
National	
Global	HIV Infection and AIDS
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment &	

Sustainability	
Unit II	**Metabolic and deficiency diseases**
Local	Vitamin deficiency disease
Regional	
National	diabetes
Global	obesity
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit III	**Diseases of respiratory system**
Local	asthma
Regional	Asthma, Pneumonia
National	Asthma, Bronchitis, Emphysema
Global	COPD,
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit IV	**CVS**
Local	CHD
Regional	RF,
National	MI,IHD
Global	CCF, MI,
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	
Unit V	**HEMATOLOGY**
Local	Anaemia
Regional	hemophilia
National	
Global	
Employability	
Entrepreneurship	
Skill Development	

Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	
Unit VI	**GatriIntestinal diseases**
Local	Peptic ulcer
Regional	Diarrhea, jaundice, viral hepatitis
National	Dyspepsia, cirrhosis of liver
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	
Unit VII	**Diseases of kidney**
Local	
Regional	• Post streptococcal glomerulonephritis, Urinary tract infection
National	• Nephritic syndrome, Chronic renal failure.
Global	Nephritic syndrome
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	
Unit VIII	**Endocrinology**
Local	Gigantism
Regional	• Hypothyroidism • Hyperthyroidism •
National	
Global	Nephritic syndrome

Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	1
NEP 2020	
POE/4th IR	
Unit IX	**Dermatology**
Local	● Fungal infection: Dermatophytosis, Pitysiasis vesicular, Candidacies. ● Leprosy.
Regional	● Bacterial infection of the skin: impetigo & boil. ● Viral infections: Herpes. Eczema, Dermatitis & allergies
National	Sexual Transmitted diseases & venereal Diseases- Syphilis, Gonorrhea, HIV
Global	Nephritic syndrome, Sexual Transmitted diseases & venereal Diseases- Syphilis, Gonorrhea, HIV
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	
Unit X	**PSYCHIATRY**
Local	Anxiety disorders: Agoraphobia, panic disorder, Generalized anxiety disorders.
Regional	
National	● types of mental disorders psychosomatic complication. ● Psychosis, schizophrenia, delusional disorders, acute and transient psychotic disorders.
Global	● types of mental disorders psychosomatic complication.

	• somatoform disorders, OCD.
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	

BPT302	GENERAL SURGERY	Total hours 200
Version 1.0		
Pre-requisites/Exposure	HUMAN ANATOMY	
Co-requisites	GENERAL MEDICINE	

Course Objectives

1. Indications for surgery, etiology, clinical features and surgical methods for various conditions.
2. Foundation for understanding the role of a physiotherapist in pre and post-operative care.
3. Overview of ENT, Ophthalmology and Gynaecology-Obstetrics.

Course Outcomes

On completion of this course, the students will be able to

CO1. List the reasons for surgery and post-operative complications.
CO2. Differentiate between different types of incisions and drainage systems.
CO3. Demonstrate knowledge of surgical oncology.
CO4. Classify burns and determine type of grafting.
CO5. Demonstrate knowledge of common ENT and ophthalmic problems.
CO6. Demonstrate knowledge of obstetrics and gynecology.

Catalog Description

This course provides knowledge about the causes and types of surgical procedures performed in different specialisations. It orients the students towards multidisciplinary knowledge and helps to augment a physiotherapists role in a hospital.

Course Content

UNIT 1 :

GENERAL SURGERY

40 HOURS

1. General principles of surgeries

2. Describe different events accompanying in general anesthesia, principles of procedures, blood transfusion, body response to surgeries, anesthesia and blood trans fusion, Different types of anesthesia, complication and their management.

3. Resuscitation & support

a. Shock: types, clinical features, pathogenesis & treatment.
b. Hemorrhage: types, clinical features & management.
c. Fluid & electrolyte balances.
d. Blood transfusion : Indications & management.

4. Wound sinuse & ulcer

a. Healing by 1st & 2nd intention.
b. Factors influencing would healing.
c. Pathogenesis of healing.
d. Scars:
i) Hypertrophic scar.
ji) Keloid.
iii) Types of wound.

UNIT II :
ARTERIAL AND VENOUS DISORDERS 20 HOURS

5. Venous Disorders

a. Varicose veins.
b. Deep vein thrombosis.

6. Lymphatics B Lymph Nodes

a. Lymphomas.86 | P a g e
b. Filariasis.
c. Lymphangilis.
d. Lymphoedema.
e. cystic hygroma.

7. ARTERIAL DISORDERS

a. Acute & Chronic arterial obstruction with investigations & management - embolism and thrombi.
b. Amputations: types, Indications and decision Making, surgical procedures, Complications and their management.
c. Gangrene - types, etiology, pathogenesis and management.

UNIT II : CARDIOTHORACIC SURGERY 60 HOURS

8. CARDIO-THORACIC SURGERY

Type of incision, pre and post operative Assessment, management and complications of Cardiothoracic Surgery and their management.

1. CARDIAC SURGERY

General principles of cardiac surgery, Outline indications, Contra-indication, site of incision, pre and post operative management and complications of the following:

a. Valvotomy and Valve Replacement.
b. Open Heart Surgery/Cardiac By pass Surgery.
c. Surgery on Pericardium.
d. Operations in congenital disorders.
e. Heart transplantation.
f. Pacemaker.
g. Coronary Angioplasty.
h. Balloon Angioplasty and Vascular Surgery (Outline surgery of Artery and veins).

1. THORACIC SURGERIES

a. General principles of Thoracic surgery, Outline indication, Contraindication, site of incision, common surgical procedures, pre and post operative management, Post operative pulmonary complications & their management following:

· Lobectomy.
· Pneumonectomy.
· Segmentectomy.
· Pleuro pneumonectomy.
· Thoracoplasty.
· Decortication.
· Tracheostomy.

b. Outline clinical features and management of carcinoma of lung.
c. Outline clinical features and management of the following: Fracture of ribs, Flail chest, stove-in chest, Pneumothorax, Lung Contusion and Laceration and injury to Vessels, Haemothorax, and Pulmonary embolism
d. Describe in detail the following procedures: Endotracheal tubing, Tracheal suction, weaning the patient from ventilator, Extubation and Post-extubation care.
e. Describe the principles of Cardio-pulmonary Resuscitation, Cardiac massage, Artificial Respiration, Defibrillators and their uses.

9. ABDOMINAL SURGERY

Describe abdominal surgical incisions and their uses.
Outline indications, incisions, drains and complications and their management of various surgeries like:
Nephrectomy. Appendicectomy, Herniorraphy, Mastectomy, thyriodectomy, colostomy, Adrenalectomy, Cystectomy, Hysterectomy, Prostatectomy, Cholecystectomy, Ileostomy, Surgical procedures in various types of Hernias.
Clinical presentation, causes, Etiopathogenesis, management of the following:88 | P a g e
Hernias, peptic ulcer, carcinoma of stomach, Acute & chronic pancreatitis, Cholelithiasis, Cholecystitis, Neoplasm of gallbladder & bile duct.

10. NEURO SURGERY

A. Outline indications , incisions, drains & complications and their
Management about
various surgeries of:

1. Surgeries of cranium, scalp &brain
2. Surgeries of vertebral column &spinal cord.
3. Surgeries of peripheral nerves.
B. Surgical interventions in hydrocephalus, Head injury, Benign & malignant tumors of
brain and other congenital anomalies of brain.

UNIT IV : BURN, CONGENIATL ANOMELIES AND THYROID GLAND 50 HOURS

11. BURNS & PLASTIC SURGERY

a. Classify burns by depth and surface area, calculation of burns, outline the causes, early & late complications and their management.
b. List the potential deformities due to burns, methods of prevention and precautions, Mentions cosmetics and functional treatment measures.
c. Outline the plastic surgery procedures and management in burns, including common deformities and prevention of burns contractures.
d. Skin grafting & other procedures.
e. Principles of cineplasty, tendon transplant, cosmetic surgeries, types of grafts & surgeries of hands.

12. Maxillo Fascial Injuries and Congenital Anomalies

Cleft Lip, palate, cancer, lip & cheek their clinical presentation investigations and surgical management

13. Mouth, Eye, Cheek & Tongue

Clinical presentation, investigations and surgical management of the following:
a. Salivary tumors - benign & malignant.
b. Carcinoma tongue
c. Salivary retension cysts.
d. Acute parotites.

14. THYROID GLAND

Definition, Patho-physiology, diagnosis & management of
i) Goiter.
ii) Thtrotoxicosis.
jii) Neoplasm.
iv) Thyroglosial cyst.

UNIT V : MISCELLANEOUS 30 HOURS

15. BREAST

Surgical anatomy, nipple discharge acute & chronic Infections Different incisions & management of tumour.

16. LIVER: clinical presentation, Etiopathogenesis and management of the following
a. Amoebic liver abscess
b. Hydrated cyst
c. Obstruction jaundice.

17. SPLEEN

Causes of splenomegaly, clinical presentation, examination findings & management.

18. Clinical presentation, investigations and Management of the following-:

Peritonitis, mesenteric cyst.

19. SMALL & LARGE INTESTINE.

Clinical presentation, investigations and Management of the following:

a. Intestinal amoebiasis, tuberculosis & carcinoma
b. Ulcerative colitis & cronicsds
c. Mechanical intestinal obst.
d. Paralytic ileus.90 | P a g e
e. Appendix
f. All type of incisions & common, surgical procedures

20. RECTUM & ANAL CANAL

a. Anal fissure, fistula, hemorrhoids caranal canal rectal prolapsed

21. UROGENITAL SYSTEM

a. Renal calculi with complications.
b. Renal tuberculosis & renal tumors.
c. Hematuria, urinary obstruction.
d. stricture urethra and penis.
e. Passion testis & congenital anomalies.
f. Hydrocoel & varicocoel.

Text Books

1. Das S, (2018), A concise textbook of Surgery, 10th Edition, Dr Somen das Publishers, Kolkata.
2. General Surgical Operations – by Kirk / Williamson 2. Surgery by Nan 3. Bailey and Love's – Short Practice of Surgery
4. Chest Disease by Crofton and Douglas.
5. Patrica A Downie, Text book of Heart, Chest Vascular Disease for physiotherapists, JP Bros.
6. Standard surgrical techniques- Shriram Bhatt

Reference Books/Materials

1. William S Norman, (2018), Bailey & Love's Short practice of Surgery, Volume 1 and 2, 27th Edition, CRC Press.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination Examination Scheme:

Components	Quiz I	Assignment/ Presentation etc.	Mid Term	Attendance	End Term Exam
Weightage (%)	10	10	20	10	50

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between COs and POs		
	Course Outcomes (COs)	**Mapped Program Outcomes**
CO1	List the reasons for surgery and post-operative complications.	**PO6**
CO2	Differentiate between different types of incisions and drainage systems.	**PO3**
CO3	Demonstrate knowledge of surgical oncology.	**PO2**
CO4	Classify burns and determine type of grafting.	**PO2**
CO5	Demonstrate knowledge of common ENT and ophthalmic problems.	**PO2**
CO6	Demonstrate knowledge of obstetrics and gynecology.	**PO2**

		Physiotherapy Knowledge	Multidisciplinary/ Medical knowledge	Clinical and Practical Skills	Utilisation of Modern Technology	Evidence Based Practice	Life Skills	Assessment and Management	Teamwork	Research and Entrepreneurial Skills
Course Code	**Course Title**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PSO1**	**PSO2**	**PSO3**
BPT 302	**GENERAL SURGERY**		**3**	**1**			**1**	**2**	**2**	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	-	**3**	-	-	-	**2**	**2**	**2**	-
CO2	-	**3**	-	-	-	-	3	2	-
CO3	-	-	**2**	-	-	-	3	2	-
CO4	-	-	**2**	-	-	-	2	3	2
CO5	-	**2**	-	-	-	-	3	2	-
CO6	-	**2**	-	-	-	-	-	2	-

1= weakly mapped 2= moderately mapped 3= strongly mapped

Unit I	**GENERAL SURGERY**
Local	Shock, **Wound sinuse & ulcer**
Regional	Shock, Fluid & electrolyte balances. ,
National	**Resuscitation & support**
Global	**Resuscitation & support**
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	

Gender	
Human Values	
Environment & Sustainability	
Unit II	**VENOUS AND ARTERIAL DISORDERS**
Local	**Lymphatics B Lymph Nodes**
Regional	**Venous Disorders,** Amputations: types, Indications and decision Making, surgical procedures, Complications and their management
National	
Global	**ARTERIAL DISORDERS**
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit III	**CARDIOTHORACIC SURGERY**
Local	
Regional	Type of incision, pre and post operative Assessment, management and complications of Cardiothoracic Surgery and their management. **CARDIAC SURGERY** **THORACIC SURGERIES** **ABDOMINAL SURGERY** **NEURO SURGERY**
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit IV	**Give Heading of the Unit here (if applicable)**
Local	
Regional	**BURNS & PLASTIC SURGERY** **Mouth, Eye, Cheek & Tongue** **THYROID GLAND**
National	
Global	
Employability	
Entrepreneurship	

Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	
Unit V	**MISCELLANEOUS**
Local	
Regional	**Breast, liver, spleen, small intestine, large intestine, rectum and anal canal,urogenital system.**
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	

BPT303	**ORTHOPAEDICS**	Total Hours
Version 1.0		200
Pre-requisites/Exposure	ANATOMY	
Co-requisites	PHYSIOTHERAPY IN ORTHOPAEDICS AND SPORTS	

Course Objectives

Following the basic science course, this course introduces the student to the orthopedic conditions which commonly cause disability. Particular effort is made in this course to avoid burdening the student with any detail pertaining to diagnosis which will not contribute to their understanding of the limitation imposed by orthopedic pathology on the functioning of the individual.

Course Outcomes

Upon completion of this course the student will be able to-

CO1. Determine Etiology and Pathology of Orthopedic conditions.
CO2. Assess and explain the Clinical features of various Orthopedic conditions.
CO3. Determine various Conservative (Non-operative) management of Orthopedic conditions.

CO4. Differentiate between various surgical management of Orthopedic conditions.
CO5. Analyze and differentiate between the various Orthopedic conditions.
CO6. Acquire indepth knowledge of the investigations in the Orthopedic conditions.

COURSE OBJECTIVES

The objective of this course is that after 200 hours of lectures, demonstrations, in addition to clinics the student will be able to demonstrate an understanding of orthopedics conditions causing disability and their management.

UNIT I

Traumatology (30 hours)

A. Bony Injuries

1. Fractures (General) & Dislocations, classifications, healing of fracture, factors affecting healing, early & late complications, general principles of management.
2. Specific: Types, Complications, Management of the following fractures.
    a. Upper limb Fractures: Clavicle, Scapula, Humerus, Ulna, Radius, Carpals, phalanges, Crush injuries of Hand.
    b. Lower limb Fractures: Pelvis, Femur, Patella, tibia, Fibula, tarsals, Metatarsals.

C. Spine: Cervical, Thoracic, Lumbar.

B. Soft Tissue Injuries

1. Tendon, bursa, sprain, strain, compartment syndromes, Capsules, Synovial membrane, Semilunar cartilage Injuries, Anterio Cruciate Ligament, Posterior Cruciate Ligament, Medial Collateral Ligament, lateral Cruciate ligament.

UNIT II

Inflammatory and Infective Conditions (30 hours)

A. Etiology, pathology, clinical features, operative and non operative management of Tuberculosis and pyogenic osteomylitis.

B. Etiology, pathology, clinical features, Investigations, operative and non operative management of Rheumatoid Arthritis, tuberculosis arthritis, pyogenic arthritis, ankylosing spondylitis, gouty arthritis, Neuropathic Joints, Hemophilic joints.

C. Poliomyelitis, etiology, Classification, pathology, clinical presentation, Post polio residual paralysis, non operative and operative management.

D. Synovitis, capsulitis.

UNIT III

Deformities: (25 hours)

Etiology, epidimology, Clinical Presentation, investigations, management of the following: Torticolis, Cervical rib, CTEV, CDH, Pes Cavus, Pes Planus, spina Bifida, Klippel feil Syndrome, Goucher's diseases, scoliosis, increased thoracic Kyphosis, increased lumbar lordosis, coxa vara, Genu varum, Genu valgum, genu recurvatum, hallux valgus, hammer toe.

UNIT IV

Degenerative & Metabolic disorders: (30 hours)

A. Etiology, Pathology, Clinical features, Investigations, management of Osteoartherosis of major joints, spondylosis, spondylolisthesis PIVD.

B. Etiology, Pathology, Clinical features, Investigations, management of rickets, osteomalacia, osteoporosis.

UNIT V

Bone tumours & Amputations (25 hours)

a. Benign & Malignant, Classification, Pathology, Clinical Features, Management including chemotherapy and Radiotherapy.
b. Level of amputation of lower Limb and upper limb, causes of amputation.

UNIT VI

Corrective procedures (30 hours)

Osteotomy, Arthoplasty (Hip, Knee, Ankle, shoulder & elbow), Bone Grafting, arthodesis, tendon transfers, Soft tissue release,

UNIT VIi

Miscellaneous conditions (30 hours)

De- Querveins Diseases, Duputerynes Contracture, Myositis Ossificans, Carpal Tunnel syndrome, Chondromalacia Patella, Perthes's Diseases, Avascular necrosis of femoral head, Internal derangement of Knee, Osteochondrosis.

Textbooks:

1. Ebnezar, "Textbook of Orthopaedics", Jaypee.
2. David J. Magee 'textbook of orthopedic assessment"
3. Brotzmann "orthopedic management" Jaypee

Reference Book:

1. Donatelli, Wooden "Orthopaedic Physical Therapy", Elsevier.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination

Examination Scheme:

Components	Continuous Internal assessment				Professional Examination (80%)
	Internal examination	Preliminary examination	Attendance	Project/Assignment/class test	
Weightage (%)	5	5	5	5	80
Schedule	4 months after onset of Academic Year	Before University exam	To be calculated at the end of AY	Continuous assessment (at least 4)	End of AY

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between COs and POs		
	Course Outcomes (COs)	**Mapped Program Outcomes**
CO1	Determine Etiology and Pathology of Orthopedic conditions.	**PO1**
CO2	Assess and explain the Clinical features of various Orthopedic conditions.	**PO2**
CO3	Determine various Conservative (Non-operative) management of Orthopedic conditions.	**PO1**
CO4	Differentiate between various surgical management of Orthopedic conditions.	**PO1**
CO5	Analyze and differentiate between the various Orthopedic conditions.	**PO2**
CO6	Acquire in depth knowledge of the investigations in the Orthopedic conditions.	**PO3**

		Physiotherapy Knowledge	Multidisciplinary/ Medical knowledge	Clinical and Practical Skills	Utilisation of Modern Technology	Evidence Based Practice	Life Skills	Assessment and Management	Teamwork	Research and Entrepreneurial Skills
Course Code	**Course Title**	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PSO 1**	**PSO 2**	**PSO 3**
BPT303	**ORTHOPAEDICS**	**2**	**3**	**2**	**1**	**1**		**3**	**2**	**1**

1= weakly mapped 2= moderately mapped 3= strongly mapped

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	-	**3**	**2**	-	-	**2**	**2**	**2**	-
CO2	-	**3**	-	-	-	-	**2**	**3**	-
CO3	-	**3**	-	-	-	-	**3**	**3**	-
CO4	-	-	**2**	-	-	-	**3**	-	2
CO5	-	-	**2**	-	-	-	**3**	**3**	1
CO6	-	-		-	-	**2**	**2**	**2**	1

1= weakly mapped 2= moderately mapped 3= strongly mapped

Unit I	Traumatology
Local	soft tissue injuries
Regional	bone injuries
National	
Global	
Employability	

Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit II	Inflammatory and infective condition
Local	rheumatoid Arthritis, synovitis, capsulitis, ankylosing spondylosis, neuropathic joints, gouty arthritis,
Regional	
National	poliomyelitis, hemophilic joints
Global	tuberculosis
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit III	Deformities
Local	Torticollis, cervical rib, CTEV, CDH, pes cavus, pes planus, spin bifida, klippel fiel syndrome, gouchers disease, scoliosis, kyphosis, lordosis, coxa vara, genu valgum, genu varum, genu recurvatum, hallux varus, hammer toe
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit IV	Degenerative and metabolic disorders
Local	PIVD, spondylosis, spondylolisthesis
Regional	
National	rickets, osteomalacia
Global	osteoporosis, osteoarthrosis
Employability	
Entrepreneurship	
Skill	

Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit V	Bone tumors and Amputations
Local	Upper and lower limb Amputation
Regional	
National	
Global	Bone Tumors
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit VI	Corrective Procedures
Local	Osteotomy, Bone Grafting, Arthrodesis, Tendon transfer and soft tissue release
Regional	
National	
Global	Arthroplasty
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit VII	Miscellaneous Conditions
Local	De- Querveins Diseases, Duputerynes Contracture, Myositis Ossificans, Carpal Tunnel syndrome, Chondromalacia Patella, Perthes's Diseases, Avascular necrosis of femoral head, Internal derangement of Knee, Osteochondrosis.
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	

Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	

BPT304	Physiotherapy in Cardio-Respiratory Conditions	Hours
Version 1.0		**200**
Pre-requisites/Exposure	Anatomy,Physiology	
Co-requisites		

COURSE OBJECTIVES

This course serves to integrate the knowledge gained by the students in Clinical Cardiorespiratory conditions with the skills gained in exercise therapy, electrotherapy and massage, thus enabling them to apply these in clinical situations of dysfunction due to cardiorespiratory pathology.

Course Outcomes:

CO1. Acquire knowledge of Anatomy and Physiology of normal respiration and cardiovascular system
CO2 Determine Etiology and pathology of various Pulmonary and Cardiovascular conditions.
CO3. Compare and analyze various investigative procedures used for diagnosis of Pulmonary and cardiovascular conditions.
CO4. Describe clinical features and differentiate them in Pulmonary and cardiovascular conditions.
CO5. Describe the medical and surgical and physiotherapy management of Pulmonary and Cardiovascular conditions.
CO6. Conduct Physiotherapy assessment of Pulmonary and cardiovascular patients.

UNIT 1

Respiratory (80 Hours)

1. Review of mechanism of normal respiration (rate, rhythm, use of accessory muscles).
2. Chest examination, including auscultation, percussion, knowledge of various investigative procedures (invasive & non invasive) use in the diagnosis of various respiratory disorders.
3. Chest deformities (Barrel chest, pigeon chest)
4. Measurement: Chest expansion at different Levels.
5. Techniques of physical treatment: Breathing exercise, Chest mobilization exercises

Postural drainage, Huffing, Coughing, Percussion, Vibration & Chest Shaking.

6. Review of the Pathological and principles of management by physiotherapy to the following conditions:
    - COPD, Asthma, Lung abscess, Bronchiectasis.
    - Pleurisy and Empyema, Pneumonia.
    - Bacterial Disease.
    - Rheumatic fever, Carcinoma of respiratory tract.
    - Paralysis of diaphragm & Vocal cords.
    - Chest wall deformities.
    - Principles of Intensive Care Physiotherapy, Aerosol Therapy, Humidification.

UNIT II

Cardiovascular (80 Hours)

1. Review of anatomy and physiology of the cardiovascular system.
2. Knowledge of various investigative procedures, Physical assesment (invasive & non invasive) used in the diagnosis of 'various cardio vascular disorders
3. Review of pathological changes, Clinical presentation, Principle of management by Physiotherapy of the following conditions:

- Hypertension.
- Hypotension.
- Aneurysm.
- Congestive Cardiac failure.
- Peripheral Vascular Disordes:
    a. Atherosclerosis.
    b. Arteriosclerosis.
    c. Thrombosis.
    d. Embolism.
    e. Burger's diseases.
    f. Thrombophlebitis.
    g. Phlebitis.
- Gangrene.
- Lymphedema.

Section-III

UNIT III

Thoracic Surgery. (40 Hours)

1. Review of pathological changes and principle of pre and post operative management by physiotherapy of the following conditions:
    - Lobectomy, Pneumonectomy, Thoracotomy, Thoracoplasty, Endoscopy & Eye Hole surgeries.

- Corrective surgeries of congenital heart defects, Angioplasties, Blood vessel grafting, Open heart surgeries & Heart transplant.

Textbook:

Donna Frownfelter-Cardio Pulmonary Physical Therapy 4th edition

Reference Book:

Cash's Textbook of Chest, Heart and Vascular Disorders for Physiotherapists - 4th Edition

Susan B'O' Sullivan, Physical rehabilitation, Jaypee, 6th ed. – 2014.

Modes of Evaluation: Quiz/Oral practical oral exam/presentation/projects/Practical Examination

Examination Scheme:

Components	Internal Practical	Attendance	End Term Exam
Weightage (%)	40	10	50

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between COs and POs		
	Course Outcomes (COs)	**Mapped Program Outcomes**
CO1	To be able to Asses and interpret investigations of patients with cardio pulmonary conditions	**PO1**
CO2	To gain knowledge about physiotherapy management of cardiac -vascular conditions.	**PO2**
CO3	To be well-versed in the types of physiotherapy management of Pulmonary conditions	**PO2**
CO4	To be able to plan physiotherapy rehabilitation plan for various Post -operative Thoracic surgeries	**PO3**

CO5	To be able to plan physiotherapy rehabilitation plan for various Post -operative Cardiac surgeries	**PO3**
CO6	To become perfectly oriented with various chest physiotherapy techniques.	**PO5**

		Physiotherapy Knowledge	Multidisciplinary/ Medical knowledge	Clinical and Practical Skills	Utilisation of Modern Technology	Evidence Based Practice	Life Skills	Assessment and Management	Team work	Research and Entrepreneurial Skills
Course Code	**Course Title**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO 6**	**PSO 1**	**PSO 2**	**PSO 3**
BPT304	**Physiotherapy in Cardio-Respiratory Conditions**	3	2	**3**		**2**		**3**	**1**	

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3					**2**	3	**2**	
CO2			2				3	2	3
CO3	3						3	2	
CO4			**2**				2	2	
CO5	3						3		2
CO6	3						3	2	2

1= weakly mapped 2= moderately mapped 3= strongly mapped

Unit I	**Respiratory**
Local	Chest Deformities,Lung Abscess, Bronchietasis, Bacterial infections, paralysis of diaphragm and vocal cords
Regional	Asthma, Rheumatic fever
National	Pneumonia, Carcinoma of respiratory tract
Global	COPD
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit II	**Cardiorespiratory**
Local	hypotension, Aneurysm, peripheral vascular disorders, lymphedema
Regional	Gangrene
National	Congestive cardiac failure
Global	Hypertension
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	

Human Values	
Environment & Sustainability	
Unit III	**Thoracic Surgery**
Local	Lobectomy, Pneumonectomy, Thoracotomy, Thoracoplasty, Endoscopy & Eye Hole surgeries. Blood vessel grafting, Blood vessel grafting
Regional	
National	congenital heart defects, Angioplasties, Open heart surgeries & Heart transplant. Open heart surgeries & Heart transplant.
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	

BPT305	**PHYSIOTHERAPY IN ORTHOPAEDIC AND SPORTS CONDITIONS**	**Total Hours**
Version 1.0		**300**
Pre-requisites/Exposure	EXERCISE THERAPY	
Co-requisites	ORTHOPAEDICS	

Course Objectives

The objective of this course is that after 300 hours of lectures, demonstrations, practicals and clinics the student will be able to identify disability due to musculoskeletal dysfunction, set treatment goals and apply their skills in exercise therapy, electrotherapy and massage in clinical situation to restore musculoskeletal function.

Course Outcomes

Upon completion of this course the student will be able to

CO1. Classify fractures and determine the healing process and treatment.
CO2. Assess and prescribe physiotherapy management of fractures of upper limb, lower limb and spine.
CO3. Determine physiotherapy management of soft tissue injuries.

CO4. Formulate pre-and post-operative management of orthopaedic surgical procedures and amputations.
CO5. Diagnose and treat deformities, edema, degenerative and infective conditions, deficiency diseases, arthritis and allied conditions.
CO6. Demonstrate an understanding of the principles of sports physiotherapy and the importance of a physiotherapist in sport injuries.
CO7. Perform a thorough orthopaedic physical assessment.
CO8. Formulate long term and short term goals of physiotherapy.
CO9. Prescribe and perform physiotherapy techniques.
CO10. Assess and treat sport injuries from acute to rehabilitation phase.

Course Description

This course serves to integrate the knowledge gained by the students in Clinical Orthopaedics, with the skills gained in exercise therapy, electrotherapy and massage, thus enabling them to apply these in clinical situations of dysfunction due to musculokeletal pathology.

Unit I Traumatology (30 hours)

Brief review of the following condition and various management aims, physiotherapeutic intervention, means and technique of physiotherapy should be taught including Kalternborn, Maitland, Mulligan, Mckenzie etc.

a. Bony Tissue:
1. Fracture and dislocations: Classification and type of displacement, method of immobilization, healing of fractures and factors affecting union, non union, delayed Union etc., common sites of fractures and their general physiotherapeutic management.
2. Specific fractures and their physiotherapeutic management.
i) Upper limb: Clavicle, humerus, ulna, radius, crush injuries of hand.
ii) Lower Limb: fracture neck of femur, shaft of femur, patella, tibia fibula, pott's fracture, fracture of tarsal and metatarsals.
iii) Spine: fracture and dislocations of cervical, thoracic and lumbar vertebrae with and without neurological deficits.
b. Soft tissue injuries:
1. Synovitis.
2. Capsulitis.
3. Tendonitis and other tendon injuries around wrist, elbow, knee, shoulder, ankle.
4. Bursitis, volkman's ischemic contracture.
5. Tear of semilunar cartilage, menisectomy.
6. Injury to cruciate ligaments of knee.
7. Internal derangement of knee.
And other overuse injuries important for a Physiotherapist.

Unit II Surgical Procedures (20 hours)

a. Pre and post operative physiotherapy management of common corrective procedure like arthroplasty, arthrodesis, osteotomy, patellectomy, tendon transplants, soft tissue release, grafting, including post polio residual paralysis and leprosy deformities corrections.

b. Amputation: Level of amputation of upper limb and lower limb, stump care, stump bandaging, Pre and post operative physiotherapy management, pre and post prosthetic management including check out of prosthesis, training etc.

Unit III Deformities (20 hours)

Etiology, pathology, clinical presentation, diagnostic criterion general, orthotic, and Physiotherapy Management of the following: Congenital torticollis, Cervical rib, CTEV, Pes cavus, Pes planus and other common congenital deformities, Scoliosis, Increased and decreased Kyphosis, increased & decreased Lordosis, Coxa vara, Genu valgum, Genu varum and recurvatum.

Unit IV Degenerative and infective conditions (20 hours)

Etiology, pathology, clinical presentation, diagnostic criterion, general, orthotic, and Physiotherapy Management of the following: osteoarthritis of major joints, Spondylosis, Spondylitis, Spondylolisthesis, PIVD, Periarthritis of shoulder, Tuberculosis of spine, bone and major joints, and other miscellaneous orthopaedic conditions treated by Physiotherapy.

Unit V Arthritis and Allied conditions (20 hours)

Etiology, pathology, clinical presentation, diagnostic criterion general, orthotic, and Physiotherapy Management of the following:
a. Osteo- Arthritis-generalized, Degenerative and traumatic.
b. Rheumatoid Arthritis, Still's disease, infective Arthritis.
c. Spondylitis, ankylosing spondylitis.
d. Non articular Rheumatism, Fibrositis, trigger point, fibromyalgia.
e. Perthes disease
f. Ganglion,
g. Duputuren’s contracture

Unit VI Edema (10 hours)

Etiopathogenesis and physiotherapy and general management of the Edema-Traumatic, Obstructive, position dependent and Paralytic.

Unit VII Deficiency Diseases (10 hours)

Rickets, Osteomalacia, Osteoporosis and other deficiency disorders related to Physiotherapy their clinical presentation, etiopathogenesis, management strategies including physiotherapy interventions.

Unit VIII Sports Physiotherapy (30 hours)

a. Principle of sports physiotherapy
b. Causes of sports injury
c. Prevention of sports injuries
d. Management of acute sports injury
e. Common occurred injuries
f. Role of physiotherapist in sports principle and advanced rehabilitation of the injured athlete.

Practical (140 hours)

Various physiotherapy modalities and treatment techniques for the above-mentioned conditions to be demonstrated and practiced by the students in clinical setup.

Textbooks:

1. Ebnezar, "Textbook of Orthopaedics", Jaypee.
2. Brukner, Khan, "Clinical Sports Medicine", McGraw Hill.

Reference Book:

2. Donatelli, Wooden "Orthopaedic Physical Therapy", Elsevier.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination

Examination Scheme:

Components	Continuous Internal assessment				Professional Examination (80%)
	Internal examination	Preliminary examination	Attendance	Project/Assignment/class test	
Weightage (%)	5	5	5	5	80
Schedule	4 months after onset of Academic Year	Before University exam	To be calculated at the end of AY	Continuous assessment (at least 4)	End of AY

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between COs and POs		
	Course Outcomes (COs)	**Mapped Program Outcomes**
CO1	Classify fractures and determine the healing process and treatment.	**PO2**
CO2	Assess and prescribe physiotherapy management of fractures of upper limb, lower limb and spine.	**PO1**

CO3	Determine physiotherapy management of soft tissue injuries.	**PO1**
CO4	Formulate pre-and post-operative management of orthopaedic surgical procedures and amputations.	**PO1**
CO5	Diagnose and treat deformities, edema, degenerative and infective conditions, deficiency diseases, arthritis and allied conditions.	**PO2**
CO6	Demonstrate an understanding of the principles of sports physiotherapy and the importance of a physiotherapist in sport injuries.	**PO1**
CO7	Perform a thorough orthopaedic physical assessment.	**PO3**
CO8	Formulate long term and short term goals of physiotherapy.	**PO3**
CO9	Prescribe and perform physiotherapy techniques.	**PO3**
CO10	Assess and treat sport injuries from acute to rehabilitation phase.	**PO3**

		Physiotherapy Knowledge	**Multidisciplinary/ Medical knowledge**	**Clinical and Practical Skills**	**Utilisation of Modern Technology**	**Evidence Based Practice**	**Life Skills**	**Assessment and Management**	**Teamwork**	**Research and Entrepreneurial Skills**
Course Code	**Course Title**	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PSO 1**	**PSO 2**	**PSO 3**
BPT305	**PHYSIOTHERAPY IN ORTHOPAEDIC AND SPORTS CONDITIONS**	**3**	**2**	**3**	**1**	**2**		**3**	**1**	**1**

1= weakly mapped 2= moderately mapped 3= strongly mapped

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

CO	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PSO1**	**PSO2**	**PSO3**
CO1						**2**	**2**	**1**	
CO2			**3**				**3**		

CO3		**3**					**3**	**2**	
CO4		**3**					**2**		
CO5			**3**				**2**		
CO6		**3**					**3**		
CO7			**3**						
CO8			**3**					**3**	
CO9		**3**							3
CO10	3								3

Unit I	**Traumatology**
Local	**Bone fractures and dislocation, Soft tissue injuries**
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit II	**Surgical Procedures**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit III	**Deformities**
Local	Congenital torticollis, Cervical rib, CTEV, Pes cavus, Pes

	planus and other common congenital deformities, Scoliosis, Increased and decreased Kyphosis, increased & decreased Lordosis, Coxa vara, Genu valgum, Genu varum and recurvatum.
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit IV	**Degenerative and infective conditions**
Local	Spondylosis, Spondylitis, Spondylolisthesis, PIVD, Periarthritis of shoulder, bone and major joints, and other miscellaneous orthopaedic conditions treated by Physiotherapy
Regional	
National	
Global	osteoarthritis of major joints, Tuberculosis of spine
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit V	**Arthritis and allied conditions**
Local	Rheumatoid arthritis, Spondylitis, spondylosis, ankylosing spondilitis, Fibrositis, trigger points, fibromylagia, perthes disease, ganglion, dupterenes contracture
Regional	
National	
Global	Osteoarthritis
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	

Environment & Sustainability	
Unit VI	**Edema**
Local	Traumatic, Obstructive, position dependent and Paralytic.
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit VII	**Deficiency Diseases**
Local	
Regional	
National	Rickets, osteomalacia
Global	Osteoporosis
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit VIII	**Sports Physiotherapy**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	

BPT401	NEUROLOGY	Total Hours
Version 1.0		**120**
Pre-requisites/Exposure	ANATOMY, PHYSIOLOGY	
Co-requisites	-	

Course Objectives

The objective of this course is to be able to do 120 hours of lectures & demonstrations. In adding to clinics, the students will be able to demonstrate an understanding of neurological conditions causing disability and their management in addition, the student will be able to fulfill with 75% accuracy (as measured by written, oral& practical, internal evaluation) the following objectives of the course.

Course Outcomes

Upon completion of this course the student should be able to

CO1. Identify, analyse and apply the neuro anatomical basis of brain for various clinical neurological conditions.
CO2. Becomes familiar with neuro physiological basis of neurological conditions which drives the students to evaluate the patients with certain disorders.
CO3. Become aware of the causes, signs, symptoms, clinical management of the cerebro-vascular accidents, head and spinal cord injury.
CO4. Understand the clinical features and management of the pediatric, adult neurological conditions that includes congenital & acquired disorders.
CO5. Identify the motor, sensory perceptual dysfunction of the adult and pediatric neurological conditions.

Catalog Description

After completion of the lectures and discussion of this course, the student will be able to demonstrate an understanding of the diseases the therapist would encounter in their practice and list the etiology, clinical features and methods of investigations and management for various neurological conditions

Course Content:

UNIT I 20 hours

NEUROANATOMY: Review the basic anatomy of the brain and spinal cord including: Blood supply of the brain and spinal cord, anatomy of the visual pathway, connections of the cerebellum, and extra pyramidal system, relationship of the spinal nerves to the spinal cord segments, long tracts of the spinal cord, the brachial and lumbar plexuses, and cranial nerves.

NEUROPHYSIOLOGY: Review in brief the Neurophysiologic basic of disorder of tone posture, bladder control, muscle contraction, movement control and pain.

UNIT II 24 hours

CLINICAL FEATURE & MANAGEMENT. Briefly outline the clinical features and management of the following Neurological Disorders:

1. Congenital childhood disorders.
    a. Cerebral palsy.
    b. Hydrocephalus.
    c. Spina Bifida.
2. Cerebrovascular accident.
    a. General classification: thrombotic, embolic, hemorrhagic & inflammatory strokes.
    b. Gross localization and sequelae.
    c. Detailed rehabilitative program.

UNIT III 20 hours

Diseases of the muscle: classification, signs, symptoms, progression and management.

a. Muscular Dystrophy: definition, classification, course and management.
b. Myasthenia Gravis: Definition, course and management.
c. Myopathy: definition, classification, course and management.

Peripheral nerve disorders.

a. Peripheral nerve injuries: localization and management.
b. Entrapment neuropathies.
c. Peripheral neuropathies.

UNIT IV 24 hours

Traumatic disorders:

1. Trauma-broad localization, first aid and management of sequelae of head injury and spinal cord injury.

Diseases of the spinal cord

1) Craniocerebral junction anomalies.
2) Syringomyelia.
3) Cervical and lumber disc lesions.
4) Spinal Tumors (Intramedullary & Extra medullary)
5) Spinal arachnoiditis.

Infectious disorders of Nervous system

- Pyogenic Meningitis sequel.
- Tuberculous infection of central nervous system.
- Poliomyelitis.

UNIT V 14 hours

Demyelinating diseases (central and peripheral)

- Guilian- Barre syndrome.
- Acute disseminated encephalomyelitis.
- Transverse myelitis.
- Multiple sclerosis.

Degenerative disorders.

- Parkinson's disease
- Dementia.

UNIT VI

Miscellaneous. 8 Hours

a. Epilepsy: Definition, classification and management.
b. Intracranial tumors: Broad classification, signs and symptoms.
c. Motor neuron disease.
d. Dystonia.

ASSESSMENT (10 Hours)

Clinical assessment of neurological function to be taught through bedside or demonstration clinics spread out over at least 5 sessions.

1. Basic history taking to determine whether the brain, spinal cord of peripheral nerve is involved.
2. Assessment of higher mental functions such as orientation, memory, attention, speech and language.
3. Assessment of cranial nerves.
4. Assessment of motor power.
5. Assessment of sensory function: touch, pain and position.
6. Assessment of tone: spasticity, rigidity and hypotonia.
7. Assessment of cerebellar function.
8. Assessment of higher cortical function: apraxia, etc.
9. Assessment of gait abnormalities

Textbook:

1. Susan B'O' Sullivan, Physical rehabilitation, Jaypee, 6th ed. – 2014
2. Kenneth W Lindsay, Neurology and Neurosurgery – illustrated, Churchill Livingston, 5Ed, 2010.

Reference Book:

1. Sir Ruger Bannister, Brain and Bannister's Clinical Neurology, Oxford,7th Edition, 1992.
2. Raymond D. Adams, Principles of Neurology, 5th Edition, 1993.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination

Examination Scheme:

Components	Continuous Internal Assessment (20%)				University Examination (80%)
	Internal Examination	Preliminary Examination	Attendance	Project/ Assignment/ Class test	
Weightage (%)	**5**	**5**	**5**	**5**	**80**
Schedule	**4 months after onset of Academic Year**	**Before University exam**	**To be calculated at the end of AY**	**Continuous assessment (at least 4)**	**End of AY**

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between COs and POs		
	Course Outcomes (COs)	**Mapped Program Outcomes**
CO1	Identify, analyze and apply the neuro anatomical basis of brain for various clinical neurological conditions.	**PO2**
CO2	Becomes familiar with neuro physiological basis of neurological conditions which drives the students to evaluate the patients with certain disorders	**PO2**
CO3	Become beware of the causes, signs, symptoms, clinical management of the Cerebro-vascular accidents, head and spinal cord injury	**PO3**
CO4	Understand the clinical features and management of the pediatric, adult neurological conditions that includes congenital & acquired disorders.	**PO3**
CO5	Identify the motor, sensory perceptual dysfunction of the adult and pediatric neurological conditions	**PO1**

		Physiotherapy Knowledge	Multidisciplinary/ Medical knowledge	Clinical and Practical Skills	Utilization of Modern Technology	Evidence Based Practice	Life Skills
Course Code	**Course Title**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**
BPT401	**NEUROLOGY**	**2**	**3**	**2**			

1= weakly mapped 2= moderately mapped 3= strongly mapped

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	3	**2**	-
CO2	3	-	-	-	-	-	3	2	-
CO3	-	-	3	-	-	-	3	2	-
CO4	-	-	3	-	-	-	2	2	-
CO5	3	-	-	-	-	-	3	-	2

1= weakly mapped 2= moderately mapped 3= strongly mapped

Unit I	**Neuroanatomy and Physiology**
Local	Neurophysiologic basic of disorder of tone posture, bladder control, muscle contraction, movement control and pain.
Regional	Basic anatomy of the brain and spinal cord
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	

Gender	
Human Values	
Environment & Sustainability	
Unit II	CLINICAL FEATURE AND MANAGEMENT
Local	Congenital childhood disorders. a. Cerebral palsy. b. Hydrocephalus.
Regional	Spina Bifida, Cerebrovascular accident
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit III	**Muscular and Nerve Disorders**
Local	Classification, signs, symptoms, progression and management. a. Muscular Dystrophy: definition, classification, course and management. b. Myasthenia Gravis: Definition, course and management. c. Myopathy: definition, classification, course and management
Regional	**Peripheral nerve disorders.** a. Peripheral nerve injuries: localization and management. b. Entrapment neuropathies. c. Peripheral neuropathies.
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment &	

Sustainability	
Unit IV	**Demyelinating and Degenerative Disorders**
Local	**Demyelinating diseases (central and peripheral)** ● Guilian- Barre syndrome. ● Acute disseminated encephalomyelitis. ● Transverse myelitis. ● Multiple sclerosis. **Degenerative disorders.** ● Parkinson's disease ● Dementia.
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	
Unit VI	**Miscellaneous**
Local	a. Epilepsy: Definition, classification and management. b. Intracranial tumors: Broad classification, signs and symptoms. c. Motor neuron disease. d. Dystonia
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	Neurological Assessment
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	

NEP 2020	
POE/4th IR	

BPT402	**PAEDIATRIC**	Total Hours
Version 1.0		40
Pre-requisites/Exposure	ANATOMY, PHYSIOLOGY	
Co-requisites	GENERAL MEDICE, GENERAL SURGERY	

Course Objectives

Following the basic science course, this course introduces the student to the pediatrics conditions which commonly cause disability. Particular effort is made in this course to avoid burdening the student with any detail pertaining to diagnosis which will not contribute to their understanding of the limitation imposed by pediatric pathology on the functioning of the individual.

Course Outcomes

Upon completion of this course the student will be able to-

CO1: Collect history from a paediatric patient.

CO2: Clinically assess a paediatric patient.

CO3: Know the common problems in Children.

CO4: Know the multiple diseases occurring in paediatric population.

CO5: Know the problems associated with multiple drug therapy in paediatric population.

COURSE OBJECTIVES

The objective of this course is that after 40 hours of lectures, demonstrations, in addition to clinics the student will be able to assess and develop understanding of geriatrics conditions causing disability and their management.

UNIT I

INTRODUCTION (5 hours)

- Introduction to paediatrics.
- Growth and development: laws of growth, factors affecting growth & development, developmental delay.
- Developmental mile stone: Motor, adaptive, social milestones

UNIT II

CONGENITAL DEFORMITIES (5 hours)

- Congenital deformities, Cleft lip cleft palate, choandatresia imperforate clinical presentation, diagnosis, and management.
- Etiology, sign, symptoms, and treatment I of the following:

- Clubfoot.
- Flatfoot.
- Knock knees.
- Bowlegs.

- Spina-bifida & meningocele Diagnosis, treatment and complication.
- Scoliosis diagnosis & Management
- Congenital dysplasia Hip : clinical presentation, diagnosis & management.
- Obstetric palsies: Etiology, management, follow up & prevention

UNIT III

CEREBRAL PALSY (10 hours)

- Cerebral palsy, etiology, clinical presentation, classifications, management

UNIT IV

GENETIC CONDITIONS IN PAEDIATRICS (10 hours)

- Osteogenesis imperfect: Pathogenesis type and treatment.
- Rickets: Etiology clinical picture and treatment.
- Scurvy Etiology clinical picture and treatment.
- Anemia Etiology type and management.
- PEM Type classification and nutritional therapy.
- Muscular dystrophy Presentation and management.
- Genetic Disorders: Diagnosis and treatment.
- Down's syndrome Clinical profile and management..

UNIT V

MEDICAL CONDITION IN PAEDIATRICS (10 hours)

- Epilepsy: Types and treatment.
- Disability, Handicap Definition & implication.
- Worm infestation Types and treatment.
- Tuberculosis Primary complex diagnosis & treatment.
- Bronchial asthma: Etiology & treatment including AC secure asthma.
- Congenital Heart Disease: types, clinical presentation, diagnosis and treatment.
- Rheumatic fever Diagnosis criteria, complication & treatment.
- Diarrhea: Etiology, treatment, ORD & fluidotherapy.
- Pneumonia: Causes sign symptom &treatment.
- Nephritic Syndrome: definition pathogenesis & treatment

Textbooks:

1. Nelson textbook of pediatrics
2. Ghai's textbook of pediatrics

Reference Book:

3. Principles and Practice of Medicine, Davidson.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination

Examination Scheme:

Components	Continuous Internal assessment				Professional Examination (80%)
	Internal examination	Preliminary examination	Attendance	Project/Assignment/class test	
Weightage (%)	5	5	5	5	80
Schedule	4 months after onset of Academic Year	Before University exam	To be calculated at the end of AY	Continuous assessment (at least 4)	End of AY

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between COs and POs		
	Course Outcomes (COs)	**Mapped Program Outcomes**
CO1	Collect history from a paediatrics patient.	**PO1**
CO2	Clinically assess a paediatrics patient.	**PO1**
CO3	Know the common problems in children.	**PO3**
CO4	Know the multiple diseases occurring in paediatrics population	**PO2**
CO5	Know the problems associated with multiple drug therapy in children.	**PO2**

		Physiotherapy Knowledge	Multidisciplinary/ Medical knowledge	Clinical and Practical Skills	Utilisation of Modern Technology	Evidence Based Practice	Life Skills	Assessment and Management	Teamwork	Research and Entrepreneurial Skills
Course Code	**Course Title**	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PSO 1**	**PSO 2**	**PSO 3**
BPT402	**Paediatrics**	**2**	**3**	**2**	**1**	**1**		**3**	**2**	**1**

1= weakly mapped 2= moderately mapped 3= strongly mapped

CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO 2	PSO 3
CO1	-	**2**	-	-	-	-	**3**	**3**	**2**
CO2	**3**	-	-	-	-	-	**3**	-	**2**
CO3	**3**	-	-	-	-	-	**3**	-	-
CO4	-	-	**2**	-	-	-	**2**	-	-
CO5	-	-	**2**	-	-	-	**2**	-	-

1= weakly mapped 2= moderately mapped 3= strongly mapped

Unit I	**INTRODUCTION**
Local	
Regional	Developmental mile stone: Motor, adaptive, social milestones
National	
Global	Growth and development: laws of growth, factors affecting growth & development, developmental delay.

Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit II	**CONGENITAL DEFORMITIES**
Local	Congenital deformities, Cleft lip cleft palate, choandatresia imperforate clinical presentation, diagnosis, and management
Regional	• Spina-bifida & meningocele Diagnosis, treatment and complication. • Scoliosis diagnosis & Management Congenital dysplasia Hip : clinical presentation, diagnosis & management
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit III	**CEREBRAL PALSY**
Local	Cerebral palsy, etiology, clinical presentation, classifications, management
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit V	**GENETIC CONDITIONS IN PAEDIATRICS**

Local	● Rickets: Etiology clinical picture and treatment. ● Scurvy Etiology clinical picture and treatment. ● Genetic Disorders: Diagnosis and treatment.
Regional	● Osteogenesis imperfect: Pathogenesis type and treatment. ● Muscular dystrophy Presentation and management.
National	● Disability, Handicap Definition & implication.
Global	● Anemia Etiology type and management. ● PEM Type classification and nutritional therapy.
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	
Unit V	**MEDICAL CONDITION IN PAEDIATRICS**
Local	Epilepsy: Types and treatment
Regional	● Tuberculosis Primary complex diagnosis & treatment. ● Bronchial asthma: Etiology & treatment including AC secure asthma. Congenital Heart Disease: types, clinical presentation, diagnosis and treatment ● Pneumonia: Causes sign symptom &treatment. ● Nephritic Syndrome: definition pathogenesis & treatment
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	

Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	

BPT403	**GERIATRICS**	**Total Hours**
Version 1.0		**40**
Pre-requisites/Exposure	ANATOMY, PHYSIOLOGY	
Co-requisites	GENERAL MEDICE, GENERAL SURGERY	

Course Objectives

Following the basic science course, this course introduces the student to the geriatric conditions which commonly cause disability in elderly. Particular effort is made in this course to avoid burdening the student with any detail pertaining to diagnosis which will not contribute to their understanding of the limitation imposed by geriatric pathology on the functioning of the individual.

Course Outcomes

Upon completion of this course the student will be able to-

CO1: Collect history from a geriatric patient.

CO2: Clinically assess a geriatric patient.

CO3: Know the common problems in elderly.

CO4: Know the multiple diseases occurring in one elderly patient.

CO5: Know the problems associated with multiple drug therapy in elderly.

COURSE OBJECTIVES

The objective of this course is that after 40 hours of lectures, demonstrations, in addition to clinics the student will be able to assess and develop understanding of geriatrics conditions causing disability and their management.

UNIT I

INTRODUCTION (5 hours)

- The ageing process- Loss of sense, effect on skeletal system, altered homeostasis and how these may affect pathological processes.
- How to make life active in old age - Healthy lifestyle & modifying risk factors which may cause other health problems: like treating hypertension, hyper cholestremia to prevent stroke & MI.

UNIT II

RISK OF FALL (5 hours)

- Causes of frequent falls, common fractures associated with fall, risk factors, and management of fractures.

UNIT III

STROKE (10 hours)

- Aetiopathogenesis, clinical presentations investigations and management of stroke in old age.

UNIT IV

GERIATRIC MEDICAL CONDITIONS (10 hours)

- Palliative care, prevention, cause & management of bed sores in old age.
- Aetiology, pathology, clinical presentation, and management of the following in old age
- Delirium & dementia.
- Depression.
- Parkinsonism.
- COPD.
- IHD. & CCF.
- Rheumatoid arthritis, Osteoarthritis, Osteoporosis.
- Diabetes mellitus.

UNIT V

Examination and Investigations in older person (10 hours)

- Mini mental state examination.
- Geriatric depression scale.
- Barstool ADL.

Textbooks:

1. Guccinoe's Geriatric Physical Therapy, Dale Avers and Rita A. Wong
2. Prinicples of Geriatric Physiotherapy
3. Physcial Rehabilitation, Susan B. O'Sullivan

Reference Book:

4. Principles and Practice of Medicine, Davidson.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination

Examination Scheme:

Components	Continuous Internal assessment				Professional Examination (80%)
	Internal examination	Preliminary examination	Attendance	Project/Assignment/class test	
Weightage (%)	5	5	5	5	80
Schedule	4 months after onset of Academic Year	Before University exam	To be calculated at the end of AY	Continuous assessment (at least 4)	End of AY

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between COs and POs		
	Course Outcomes (COs)	**Mapped Program Outcomes**
CO1	Collect history from a geriatric patient.	**PO1**
CO2	Clinically assess a geriatric patient.	**PO1**
CO3	Know the common problems in elderly.	**PO3**
CO4	Know the multiple diseases occurring in one elderly patient.	**PO2**
CO5	Know the problems associated with multiple drug therapy in elderly.	**PO2**

		Physiotherapy Knowledge	Multidisciplinary/ Medical knowledge	Clinical and Practical Skills	Utilisation of Modern Technology	Evidence Based Practice	Life Skills	Assessment and Management	Teamwork	Research and Entrepreneurial Skills
Course Code	**Course Title**	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PSO 1**	**PSO 2**	**PSO 3**
BPT403	**GERIATRICS**	**2**	**3**	**2**	**1**	**1**		**3**	**2**	**1**

1= weakly mapped 2= moderately mapped 3= strongly mapped

CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO 2	PSO 3
CO1	-	**2**	-	-	-	-	**3**	**3**	**2**
CO2	-	**3**	-	-	-	-	**3**	-	**2**
CO3	-	**2**	-	-	-	-	**3**	-	-
CO4	-	-	**2**	-	-	-	**2**	-	-
CO5	-	-	**2**	-	-	-	**2**	-	-

1= weakly mapped 2= moderately mapped 3= strongly mapped

Unit I	**Introduction**
Local	
Regional	
National	
Global	hypertension, hypercholestremia
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit II	**Risk of fall**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit III	**Stroke**
Local	
Regional	
National	
Global	stroke
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit IV	**Geriatric medical condition**
Local	bedsores, dilerium, dementia, Rheumatoid Arthritis, parkinsons
Regional	
National	cardiac failure
Global	depression, COPD, ischemic Heart Disease, Osteoarthritis,

	osteoporosis, diabetes Mellitus
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit IV	**Examination and investigations in older person**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	

BPT404	**OBS & GYNE, ENT, OPTHALMOLOGY**	**Total Hours**
Version 1.0		**40**
Pre-requisites/Exposure	PHYSIOLOGY	
Co-requisites	ANATOMY	

Course Objectives

This course is about studying the basics of the female reproductive system and its associated clinical implications and disorders. The social stigma and the psychological strain regarding female health in context with anatomical anomalies.

Course Outcomes

Upon completion of this course the student will be able to

CO1 Build his/her knowledge in female health and its associated comorbidities.
CO2 Remember the gynecological characteristics of the reproductive system and outline the various lifestyle diseases.
CO3 Evaluate the upcoming advancements in medical sciences regarding chronic issues ailing the females like PCOS and breast cancer.

CO4 Apply the physiotherapeutic approaches in pregnancy namely antenatal and postnatal physiotherapy through rigorous assessment and approaches.

CO5 Create a keen interest in female related issues creating awareness for making sound independent clinical judgment.

Course Description

The core purpose of this subject is to understand the normal and abnormal physiological events during puberty, pregnancy, labour, puerperium and post menopause and to learn about complications of these along with management..

UNIT –I

OBS &Gynecology **20 Hours**

1. Anatomy of Female reproductive system:
    i. External genital.
    ii. Ovaries fallopian tubes, uterus & vagina.
    iii. Blood and nerve supply to genital organs.
2. Physiology of Pregnancy:
    i. Menstruation.
    ii. Pregnancy and fetal development.
    iii. Physiological changes in various maternal system and organs.
    iv. Endocrine system in pregnancy.
3. Complication of pregnancy:
    i. Abortion, Ectopic.
    ii. APH & PPH.
    iii. PIH.
    iv. Abnormal Presentation.
4. Antenatal and postnatal cases:
    i. Normal Pregnancy- Symptoms signs, investigation, immunization, nutrition and supplements.
    ii. Normal Delivery
    iii. Normal Puerperium role of Physiotherapy in Pregnancy, delivery, puerperium
5. Common Gynecological Problems and role of physiotherapy
    i. Disorders of menstruation, menorrhagia, DUB, menopause, menarche.
    ii. Pelvic inflammatory disease.
    iii. Fibroid uterus.
    iv. Stress incontinent.
6. Common Obstetrics and Gynecological operation
    i. Caesarean
    ii. Hysterectomy
    iii. D & C
    iv. MTP
    v. Tubectomy
    vi. D & E

UNIT-II

ENT **10 Hours**

1. Clinical Presentation, pathology, complications, and treatment of the following conditions:

a. **Rhinitis**

i. Acute rhinitis
ii. Chronic non-specific & specific rhinitis
iii. Atrophic rhinitis
iv. Vasomotor rhinitis

b. Sinusitis

i) Acute rhino sinusitis & Chronic sinusitis

c. Otitis Media

i. Acute otitis media
ii. Chronic otitis media

1. **Otosclerosis:** Incidence, Clinical features & Medical and Surgical Rx.

2. **Mastoidectomy:** Types of hearing loss, methods to detect hearing loss. Presbycusis, hearing aids, hearing loss in children.

3. **Andrology:** Pure tone audiometry, impedance audiometry, types of speech, speech defects, speech therapy.

UNIT-III

Ophthalmology **10 Hours**

EYE EXAMINATION

Eye-Anatomy and Physiology

a. Common inflammations and other infections of the eyediagnosis and management.
b. Ptosis, defects of the external rectus, management.
c. Cataract, diagnosis and management.
d. Refractions-Myopia, hyper Metropia, diagnosis and management.
e. Pleoptic Exercises and indications.
f. Physiological defects of vision and management.
g. Corneal ulcers, management.

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Textbooks:

1. Polden “Gynecological conditions”

Reference Book:

1. Dutta “Textbook of gynecology and obstetrics surgeries” Jaypee

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination

Examination Scheme:

Components	Continuous Internal assessment				Professional Examination (80%)
	Internal examination	Preliminary examination	Attendance	Project/Assignment/class test	
Weightage (%)	5	5	5	5	80
Schedule	4 months after onset of Academic Year	Before University exam	To be calculated at the end of AY	Continuous assessment (at least 4)	End of AY

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between COs and POs		
	Course Outcomes (COs)	**Mapped Program Outcomes**
CO1	Build the knowledge of students in female health and its associated comorbidities.	**PO3**
CO2	Remember the gynecological characteristics of the reproductive system and outline the various lifestyle diseases.	**PO4**
CO3	Evaluate the upcoming advancements in medical sciences regarding chronic issues ailing the females like PCOS and breast cancer.	**PO1**
CO4	Apply the physiotherapeutic approaches in pregnancy namely antenatal and postnatal physiotherapy through rigorous assessment and approaches.	**PO3**
CO5	Create a keen interest in female related issues creating awareness for making sound independent clinical judgment.	**PO2**

		Physiotherapy Knowledge	Multidisciplinary/ Medical knowledge	Clinical and Practical Skills	Utilisation of Modern Technology	Evidence Based Practice	Life Skills	Assessment and Management	Team work	Research and Entrepreneurial Skills
Course Code	**Course Title**	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PSO1**	**PSO2**	**PSO3**
BPT404	**OBS & GYNE, ENT, OPTHALMOLOGY**		**3**	**1**				**2**		**1**

1= weakly mapped 2= moderately mapped 3= strongly mapped

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
CO1	-	-	2	-	-		**2**	**2**	-
CO2	-	-	-	-	-	3	-	2	-
CO3	-	-	-	-	-	3	-	3	-
CO4	-	-	-	-	-	3	-	3	-
CO5	-	-	-	2	-	-	3	-	2
CO5	-	-	-	2	-	-	-	2	-

1= weakly mapped 2= moderately mapped 3= strongly mapped

Unit I	**OBS & Gynecology**
Local	Fibroid Uterus, Stress incontinence
Regional	Pelvic Inflammatory diseases
National	
Global	APH, PPH, PIH,
Employability	
Entrepreneurship	
Skill	

Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit II	ENT
Local	otosclerosis
Regional	
National	
Global	Rhinitis,
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit III	ophthalmology
Local	Ptosis, corneal ulcer
Regional	
National	
Global	Cataract
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	

BPT405	**PHYSIOTHERAPY IN NEUROLOGY**	Total Hours
Version 1.0		300
Pre-requisites/Exposure	NEUROLOGY AND NEUROSURGERY	
Co-requisites	PHYSIOTHERAPY IN NEUROLOGICAL CONDITIONS	

	LAB	

Course Objectives:
The objective of this course in that after 300 hours of lectures & demonstrations, practical and clinics, the student will be able to identify disability due to neurological dysfunction, set treatment goals and apply their skill in exercise therapy, electrotherapy, and massage in clinical situation to restore neurological function. In addition, the student will be able to fulfill with 75% accuracy (as measured by written, oral & practical internal evaluations) the following objectives of the course.

Course Outcomes:
Upon completion of this course the student should be able to do

CO1. Demonstrate knowledge about clinical neuroanatomy and neurophysiology
CO2. Be able to review the principles of Assessment and treatment using the clinical approaches to address the weakness, abnormal tone, posture and motor control deficits and lack of endurance.
CO3. Demonstrate knowledge about assessment and physiotherapy management of the neurological conditions like Cerebral palsy, peripheral Nerve Lesions, Neuro Muscular diseases, Hemiplegia, Polio and Multiple sclerosis.
CO4. Have knowledge of assessment and PT management of balance and vestibular disorders, spinal cord lesions, basal ganglia disorders and lesions of cerebellum
CO5. Become aware of Neurosurgeries and physiotherapy management for pre and post-surgical conditions.
CO6. Practical application of assessment and treatment using integrated approach like MRP, Bobath, Brunnstroms, Roods approach and other neurorehabilitation techniques with emphasis on recent advancements.

Catalog description:
This course serves to integrate the knowledge gained by the students in Clinical Neurology, with the skills gained in exercise therapy, electrotherapy and massage, thus enabling them to apply these in clinical situations of dysfunction due to pathology in the nervous system.

Course Content:

UNIT I Review of Clinical Neuroanatomy & Neurophysiology 30 hours

- Review, the structure and function of a) neuron b) synapse c) supporting tissue
- Review the organization and function of a) cerebral hemispheres b) cerebellum c) spinal cord d) peripheral nerves e) pyramidal system f) extra pyramidal system
- Review the factors influencing alpha motor neuron activity
- Review the neurological basis of muscle tone and movement and demonstrate the following: a) hypertonia b) spasticity and rigidity c) ataxia d) athetosis e) chorea

UNIT II Principles of Assessment 35 hours

- Review the following:
- Skill in history taking
- Assessment of higher functions, cortical sensations, cranial nerves, dorsal column sensation and pain & temperature sensations
- Assessment of motor function: grading of muscle power, assessment of range of movement, balance and coordination
- Assessment of superficial and deep reflexes

- Assessment of reflex maturation in terms of stimulus, position negative/positive reaction and their significance
- Assessment of gait- both normal and abnormal (spastic, ataxic and paralytic patterns)
- Emphasis should be placed on teaching accurate assessment techniques and various recording methods e.g. color coding on body charts, graphs etc.

UNIT III Principles of Treatment 40 hours

- Review the treatment principles as follows: -
- Sensory re -education: hypersensitivity, hyposensitivity and anesthesia.
- Treatment of altered tone: hyper tonicity and hypo tonicity.
- Motor re-education: Strengthening exercise, coordination exercise, joint mobilization exercise, use of equilibrium and labyrinthine systems, use of PNF patterns, controlled sensory stimulation to bias the spindle cells e.g. Vibration, tactile, ice etc. use of stretch to elicit movement (facilitation), light joint compression (inhibition) use of rifle, activity to improve motor function, phylogenic sequence of motor behavior.
- Treatment to improve function: Free exercise, gait training with and without aids, activities of daily living, mat exercise, exercise for recreation.
- Review the use of ambulatory aids in neurological conditions: In spastic upper motor neuron lesions, In lower motor lesions, in dorsal column dysfunction and cerebral dysfunction.
- Review the use of splints and braces in spastic upper motor neuron and in flaccid lower motor neuron lesions, in both upper and lower limbs.
- Review the management of chronic pain in neurological conditions with respect to the type of pain, treatment modalities available, selection criteria for each modality and possible complications.

UNIT IV Cerebral Palsy 25 hours

- Define cerebral palsy and describe the topographical classification, monoplegia, diplegia, paraplegia, hemiplegia & tetraplegia.
- Describe types of cerebral palsy.
- Assess reflex activity at different levels: Cortical, mid brain, brain stem, spinal. Assess developmental milestones from birth to five years, Assess functional ability: Prone to supine (rolling) Coming to sitting, quadruped, crawling, kneeling, kneel-stand, stand with support and walking.
- Examine for contractures as follows: hip flexion, adduction, internal rotation: Knee flexion: ankle plantar flexion, inversion, eversion. Flexion contracture of elbow, wrist & fingers and spinal deformities.
- Treatment - Describe and demonstrate the treatment motor dysfunction: Passive movement, stretching of soft tissue tightness, use of ice to reduce spasticity, positioning the child to prevent soft tissue contractures, to inhibit abnormal reflexes and to facilitate volitional movement.
- Describe and demonstrate techniques of carrying of different type of CP children, encouraging bimanual activities in different starting positions like prone sitting and standing and activities across the midline.
- Describe appropriate home programmes for positioning the child, handling them and assisting improvement of function.
- Introduction to treatment techniques: Bobath, Rood.

UNIT V Peripheral Nerve Lesions and Neuro Muscular Diseases 30 hours

- Identify type of peripheral nerve lesions.
- Assess the motor 'system: Specific muscles. Range of motion, active and passive ranges, muscle girth. Assess sensory system: touch, pain, temperature, par aesthesia, nerve reverberation. Assess autonomic function: sweating, skin condition, soft tissue atrophy.
- Treatment: describe muscle reeducation techniques: electrical stimulation (selection of current): active, assisted, resisted movements: Passive and self assistive stretching and massage. Describe sensory reeducation and pain relief by various modalities; describe the common splints used peripheral nerve lesions. Static, dynamic and functional. Isolating muscle contraction, specific muscle strengthening.
- Post- Operative management: Pressure bandaging reeducation after transfer. Describe a home programme.
- Amyotrophic Lateral sclerosis: introduction, etiopathology, clinical sign & symptoms, impairments, disabilities, evaluation Procedure, physiotherapy management.
- Demyelinating inflammatory polyradiculoneuropathies: Introduction, etiopathology, clinical sign & symptoms, impairments, disabilities, evaluation procedure & physiotherapy management.
- Muscular Dystrophy: Describe stages of the disease: ambulatory, wheelchair and bed stages.
- Describe significance of exercise resisted, active and free. Identify and assess common contractures and deformities. Assess range of motion and muscle power. Assess functional ability.
- Demonstrate treatment program for strengthening weak muscles: Active movements and hydrotherapy. Increase range of motion by suspension therapy, powder board,
- passive stretching positioning etc. Demonstrate gait training with appropriate orthoses, describe management of chest complication: breathing exercises chest percussion, drainage of secretions and assisted coughing.

UNIT VI Basal Ganglion disorders and Cerebellar lesions 30 hours

Introduction to the function of basal Ganglion, relation with posture and movement.

- Parkinsonism: Review the natural history, course and prognosis of the disease. Identify and assess problems in posture sitting, kneeling and standing balance, voluntary and automatic movements rigidity. Tremor and gait. Assess also hearing, speech and finger dexterity. Describe disability grading according to Yulu. Demonstrate treatment: postural awareness and relaxation training. Gait training techniques: associated reactions, heel-toe gait, overcoming obstacles, start and stop on command, turning and walking backwards, forwards and sideward. Describe an appropriate home exercise programme.
- Huntingtons Diseases: etiopathology, sign& symptoms, stages, examination procedure, physiotherapist treatment goals and treatment techniques.
- Wilsons Diseases: etiopathology, sign& symptoms, stages, examination procedure, physiotherapist treatment goals and treatment techniques.
- Tardive Dyskinesia : etiopathology, sign& symptoms, stages, examination procedure, physiotherapist treatment goals and treatment techniques.
- Dystonias : etiopathology, sign& symptoms, stages, examination procedure, physiotherapist treatment goals and treatment techniques.
- Cerebellar Lesions: Identify and assess abnormal tone, decomposition of movement. Rapid alternate movements, Pleurothotonus, proprioception, dysmetria, posture and gait. Treatment: Demonstrate exercises for in coordination- Frenkel's and weighted exercises. Demonstrate techniques for reeducation of balance and equilibrium reactions by visual compensation.

Describe use of appropriate aids far ambulation depending in the severity of affection - walker, elbow crutches, quadruped, walking sticks, etc.

UNIT VII Spinal Cord Lesions 30 hours

- Describe types of spinal cord lesions. Describe sign of tract and root Interruptions, Describe positioning of the patient in acute spinal cord injury, Describe assessment of the motor system: tone, power of specific muscle range of motion and limbs girth. Describe assessment of sensory system and reflexes.
- Describe assessment of functional ability and balance reactions in appropriate cases. Describe assessment of respiratory function. Muscles of respiration, coughing ability and vital capacity. Describe how the level of lesion is ascertained.
- Treatment: Describe the stages of immobilization & stage when weight bearing is allowed, Describe spinal orthosis. Demonstrate motor reeducation programmes and programme for respiratory care in high level paraplegics and quadriplegics. Demonstrate progressive ambulation, mat exercises, various strengthening programmes, methods of decreasing spasticity and improving sitting balance. Demonstrate paraplegic gaits and reeducation in functional activities: transfer and protective falling. Describe common ambulatory aids used in paraplegics and common plints used .in tetraplegics. Describe the use of Hydrotherapy in paraplegics. Describe the concept of team approach in rehabilitation of these patients.

UNIT VIII Hemiplegia 30 hours

- Define hemiplegia and identify the following: Sensory disturbance, alterations in tone, loss of selective movement, loss of balance reactions and communications problems.
- Treatment: Describe the unilateral and bilateral approaches to treatment. Describe positioning in the supine position, on the affected and on the unaffected sides. Demonstrate activities in the recumbent position arm mobilization. Trunk elongation-scapular movement, arm elevation, activities for a recovering arm: activities for the lower limb. i.e. hip and knee flexion over the side of the bed, knee extension with dorsi flexion, hip control, and isolated knee extension
- Mat activities: demonstrate rolling on to affected and unaffected sides, sitting and kneeling. Describe the technique of making a patient sit passively and active assisted in sitting: Demonstrate Transfer Technique. Describe activities in sitting: equal weight transference on buttocks, shuffling on buttocks, weight transfer through arms balance reaction on trunk & head.
- Demonstrate activities in the standing position : standing from plinth, from chair (assisted and independent), weight bearing an affected leg, knee, control in stand weight transfers forward, backward and side wards, Gait training and stair climbing. Describe tilt board activities in the lying and sitting positions.
- Describe additional methods of stimulation using verbal cues, ice, pressure & tapping. Describe management of shoulder pain and shoulder hand syndrome. Identify and describe hemiplegics gait, identify synergy, Components and abnormal reflex activities. Demonstrate reeducation of gait, motor relearning techniques functional approach and use of orthosis.

UNIT IX Multiple Sclerosis, Balance & Vestibular Disorders 30 hours

- Multiple Sclerosis: etiopathology, sign& symptoms, stages, examination procedure, physiotherapy treatment goals and treatment techniques.
- Balance & Vestibular Disorders: basic physiology and balance control, common vestibular disorder, assessment, therapeutic goals and treatment techniques.

UNIT X Neuro surgery 20 hours

- Review of pathological changes and principle of pre and post operative management by physiotherapy of the following conditions:
    - Common surgeries of the cranium & brain.

- Common surgeries of vertebral column & spinal cord.
- Common surgeries of peripheral nerves.
- Surgical interventions in traumatic head injuries.

Practical

Various Physiotherapy modalities and treatment techniques for above Mentioned conditions should be demonstrated and practiced by the students

Textbook:

1. Susan B'O' Sullivan, Physical rehabilitation, Jaypee, 6th ed. – 2014

Reference Book:

1. Jan Stephen Tecklin, Pediatric Physical Therapy, Lippincott Williams & Wilkins, 3rd Edition,1999.
2. Sophie Levitt, Cerebral Palsy – Treatment of cerebral palsy and motor delay, Blackwell sciences,5Ed, 2013.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination

Examination Scheme:

Components	Continuous Internal Assessment (20%)				Professional Examination (80%)
	Internal Examination	Preliminary Examination	Attendance	Project/ Assignment / Class test	
Weightage (%)	5	5	5	5	80
Schedule	4 months after onset of Academic Year	Before University exam	To be calculated at the end of AY	Continuous assessment (at least 4)	End of AY

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between COs and POs		
	Course Outcomes (COs)	**Mapped Program Outcomes**
CO1	Demonstrate knowledge about clinical neuroanatomy and neurophysiology	**PO2**
CO2	Be able to review the principles of Assessment and treatment using the clinical approaches to address the weakness, abnormal tone, posture and motor control deficits and lack of endurance.	**PO1**
CO3	Demonstrate knowledge about assessment and physiotherapy management of the neurological conditions like Cerebral palsy, peripheral Nerve Lesions, Neuro Muscular diseases, Hemiplegia, Polio and Multiple sclerosis.	**PO3**
CO4	Have knowledge of assessment and PT management of balance and vestibular disorders, spinal cord lesions, basal ganglia disorders and lesions of cerebellum	**PO3**
CO5	Become aware of Neurosurgeries and physiotherapy management for pre and post-surgical conditions.	**PO2**
CO6	Practical application of assessment and treatment using integrated approach like MRP, Bobath, Brunnstroms, Roods approach and other neurorehabilitation techniques with emphasis on recent advancements.	**PO5**

		Physiotherapy Knowledge	Multidisciplinary/ Medical knowledge	Clinical and Practical Skills	Utilisation of Modern Technology	Evidence Based Practice	Life Skills	Assessment and Management	Teamwork	Research and Entrepreneurial Skills
Course Code	**Course Title**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PSO 1**	**PSO 2**	**PSO 3**
BPT 405	**PHYSIOTHERAPY IN NEUROLOGY**	**3**	**3**	**3**		**2**		**3**	**1**	

1= Addressed to small extent
2= Addressed significantly
3= Major part of course

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO 2	PSO 3
CO1	-	-	**3**	-	-	-	**3**	**2**	**2**
CO2	-	-	**3**	-	-	-	**3**	**2**	**1**
CO3	-	-	**3**	-	-	-	**3**	-	**3**
CO4	-	-	-	-	-	**2**	-	**2**	**1**
CO5	-	-	-	-	**2**	-	**3**	**2**	**2**
CO6	-	3	-	-	-	-	-	**2**	**-**

1= weakly mapped 2= moderately mapped 3= strongly mapped

Unit I	**Review of Clinical Neuroanatomy & Neurophysiology**
Local	Factors influencing alpha motor neuron activity
Regional	Structure and function of a) neuron b) synapse c) supporting tissue
National	
Global	
Employability	
Entrepreneurship	
Skill Development	Demonstrate the following: a) hypertonia b) spasticity and rigidity c) ataxia d) athetosis e) chorea
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit II	**Principles of Assessment**
Local	
Regional	Assessment of reflexes
National	
Global	History taking
Employability	
Entrepreneurship	
Skill Development	Assessment of higher motor function, motor examination, gait

	examination
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit III	**Principles of Treatment**
Local	Treatment of altered tone, Motor re-education
Regional	Use of ambulatory aids, braces in neurological conditions
National	
Global	Treatment to improve function
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit IV	**Cerebral Palsy**
Local	
Regional	Cerebral palsy and its' types
National	
Global	Bobath and NDT treatment approach
Employability	
Entrepreneurship	
Skill Development	Assessment of reflex activity at different level, examination of contracture, Techniques of carrying CP Child
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	
Unit V	**Peripheral Nerve Lesions and Neuro Muscular Diseases**
Local	
Regional	Sensory and motor assessment, Sensory re-education
National	
Global	ALS, Polyneuropathy, Muscular dystrophy
Employability	
Entrepreneurship	
Skill Development	Assessment of functional ability
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	

SDG	
NEP 2020	
POE/4th IR	
Unit VI	**Basal Ganglion disorders and Cerebellar lesions**
Local	
Regional	Dystonia, Parkinson, Huntingtons Diseases, Wilson Disease
National	
Global	Techniques for reeducation of balance and equilibrium reactions
Employability	
Entrepreneurship	
Skill Development	Identify and assess abnormal tone, decomposition of movement
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	
UNIT VII	**Spinal Cord Lesions**
Local	
Regional	Positioning of the patient in acute spinal cord injury,
National	
Global	
Employability	
Entrepreneurship	
Skill Development	Assessment of respiratory function, muscles of respiration, coughing ability and vital capacity, treatment of spinal cord injury
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	
UNIT VIII	**Hemiplegia**
Local	Demonstrate activities in the standing position
Regional	Mat Activities for hemiplegia, treatment approaches for hemiplegia
National	
Global	
Employability	
Entrepreneurship	

Skill Development	Treatment approaches for hemiplegia
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	
UNIT IX	**Multiple Sclerosis, Balance & Vestibular Disorders**
Local	Balance & Vestibular Disorders: basic physiology and balance control, common vestibular disorder, assessment, therapeutic goals and treatment techniques.
Regional	Multiple Sclerosis: etiopathology, sign& symptoms, stages, examination procedure, physiotherapy treatment goals and treatment techniques.
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	
UNIT X	**Neuro surgery**
Local	
Regional	○ Common surgeries of the cranium & brain. ○ Common surgeries of vertebral column & spinal cord. ○ Common surgeries of peripheral nerves. ○ Surgical interventions in traumatic head injuries.
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	

Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	

BPT 406	Physiotherapy in General Medical and Surgical Conditions	Total hours 240
Version 1.0		
Pre-requisites/Exposure	HUMAN ANATOMY	
Co-requisites	GENERAL MEDICINE AND GENERAL SURGERY	

Course Objectives:

1. Practical knowledge for assessment of pre & post op surgical conditions.
2. Physiotherapy management of gynaecological conditions.
3. Physiotherapy Assessment, diagnosis and management of burns
4. Concepts of patient care & assessment in various medical cases.

Course Outcomes:

On completion of this course, the students will be able to

CO1. Understand the basis of applying the concept of physiotherapy during pregnancy and delivery.
CO2. Become familiar with care given to infants and children.
CO3. Become aware of the physiotherapy management of the elderly causes and concerns.
CO4. Understand the rehabilitation done in pre and post-surgical cases.
CO5. Identify the various approaches used in burns and wound care management.

Catalog description

This Course will enable students to identify discuss and analyze physiotherapy requirements based on pathophysiological principles and arrive at appropriate functional diagnosis, execute effective physiotherapeutic measures and exercise, conditioning in general medical and surgical conditions. The student should be able to acquire the knowledge of evaluation and physiotherapeutic treatment for obstetric and gynecological conditions, and evaluate, grade and also treat non healing wounds.

Course Content:

Practical shall be conducted for all the relevant topics discussed in theory in the following forms:

1. Bedside case presentations and case discussions

2. Lab sessions consisting of evaluation and assessment methods on student models, treatment techniques and practice sessions.

UNIT I

General, Gynecology and Obstetrics and ENT **48 hours**

Review of pathological changes and principle of pre and post operative management by physiotherapy of
the following conditions:
1) Common abdominal surgeries. Including GIT, liver, spleen, Kidney, bladder etc.
2) Common operation of reproductive system, including surgical intervention for child delivery. Ante natal & post natal, physiotherapy.
3) Common operations of the ear, nose, throat & Jaw as related to physiotherapy.
4) Common organ transplant surgeries - heart, liver, bone marrow etc.

UNIT-II

Wounds, Burns & Plastic Surgery. **48 hours**

Review of pathological changes and principle of pre and post operative management by physiotherapy of
the following conditions:
1) Wounds, ulcers, pressure sores:
2) Burns & their complications.
3) Common reconstructive surgical proceedings of the management of wounds, ulcers, burns & consequent contractures & deformities.

UNIT-III

Pediatrics. **48 hours**

A. Review the examination & assessment of a pediatric patient.
B.Review of pathological change and principle of management by Physiotherapy of the following conditions:
1) Common congenital and acquired muscle skeletal disorders.
2) Common congenital and acquired neurological disorders (CNS & PNS)
3) Common heredity disorders.
4) Common nutritional, metabolic & vitamin deficiency disorders113 | P a g e
5) Cerebral palsy, myopathy and muscular dystrophies.

UNIT-IV

Geriatrics **48 hours**

A. Review of the examination &assessment of a geriatric patient.
B. Review of pathological changes and principle of management by Physiotherapy of the following conditions:
1) Musculoskeletal disorders.
2) Cardiopulmonary disorders
3) Neurological disorders (CNS &PNS)
4) Injuries &accidents specific to the aged.

UNIT-V

Skin & Psychiatric disorders 48 hours

Review of the Pathological and principles of management by physiotherapy to the following conditions,

1. Common conditions of Skin-Acne, Psoriasis, Alopecia, Leucoderma, leprosy, Sexually transmitted diseases.
2. Psychiatric Disorders- Psychosis, Psychoneurosis, Senile dementia.

Practical

Various Physiotherapy modalities and treatment techniques for above
Mentioned conditions should be demonstrated and practiced by the students

Reference Books:

1. Tidy's Physiotherapy
2. Cash Physiotherapy in General conditions
3. Physical Rehabilitation by Susan Sullivan
4. Management Principle for Physical Therapists

Modes of Evaluation: Quiz/Oral practical oral exam/presentation/projects/Practical Examination

Examination Scheme:

Components	Internal Practical	Attendance	End Term Exam
Weightage (%)	40	10	50

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between COs and POs		
	Course Outcomes (COs)	**Mapped Program Outcomes**
CO1	Understand the basis of applying the concept of physiotherapy during pregnancy and delivery.	**PO1**
CO2	Become familiar with care given to infants and children.	**PO3**
CO3	Become aware of the physiotherapy management of the elderly causes and concerns	**PO3**
CO4	Understand the rehabilitation done in pre and post-surgical cases.	**PO5**
CO5	Identify the various approaches used in burns and wound care management.	**PO3**

		Physiotherapy Knowledge	**Multidisciplinary/ Medical knowledge**	**Clinical and Practical Skills**	**Utilisation of Modern Technology**	**Evidence Based Practice**	**Life Skills**	**Assessment and Management**	**Team work**	**Research and Entrepreneurial Skills**
Course Code	**Course Title**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PSO1**	**PSO2**	**PSO3**
BPT 406	**PHYSIOTHERAPY IN MEDICAL AND SURGICAL CONDITIONS**	2		**3**		**2**		**3**	1	**1**

1= weakly mapped 2= moderately mapped 3= strongly mapped

RELEVANCE OF THE COURSE TO VARIOUS INDICATORS

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO 2	PSO 3
CO1	**-**	**2**	-	-	-	-	**3**	**3**	**2**
CO2	**3**	-	-	-	-	-	**3**	-	**2**
CO3	**3**	-	-	-	-	-	**3**	-	-
CO4	-	-	**2**	-	-	-	**2**	-	-
CO5	-	-	**2**	-	-	-	**2**	-	-

1= weakly mapped 2= moderately mapped 3= strongly mapped

Unit I	**General gynecology and obstetrics and ENT**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit II	**Wounds, burn and plastic surgery**
Local	Wounds, ulcers, bed sores, burns
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional	

Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit III	**Pediatrics**
Local	Myopathy, muscular dystrophy
Regional	
National	Congenital and acquired musculoskeletal & neurological disorders
Global	Nutritional, metabolic and vitamin deficiency
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit IV	**Geriatrics**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit V	**Skin and psychiatric disorders**
Local	Psoriasis, Alopecia, Leucoderma, Psychosis, Psychoneurosis,
Regional	
National	Senial Dementia
Global	Leprosy, STD,
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	

BPT407	RATIONALE OF REHABILITATION	Total Hours
Version 1.0		**120**
Pre-requisites/Exposure	-	
Co-requisites	-	

Course Objectives

The objective of this course is that after 120 hours of lectures, demonstrations in addition to clinics, the student will be able to demonstrate an understanding of:

1. The concept of team approach in rehabilitation will be discussed and implemented, through practical demonstration, with contributions from all members of the team.
2. Observation and identification of diagnostic features in physical conditions will be practiced through clinical demonstration.
3. Medical and surgical aspects of disabling conditions will be explained in relation to rehabilitation.
4. Identification of residual potentials in patients with partial or total disability (temporary or permanent).
5. Formulation of appropriate goals (long & short term) in treatment & rehabilitation will be discussed.

Course Outcomes

On completion of this course, the students will be able to

CO1. Outline the epidemiological implications of impairment, handicap and disability.
CO2. Assess, prescribe and fit orthotics, prosthetics and assistive devices.
CO3. Calculate percentage of disability and apply principles of rehabilitation.
CO4. Explain the features of communication impairment and its management.
CO5. Summarise the principles of social and vocational rehabilitation.
CO6. Determine the principles of administration and organisation of a rehabilitation unit.

Catalog Description

Following the basic sciences and clinical science course, this course will enable the students to understand their role in the management of disability within the rehabilitation team.

Course Content

UNIT I Disability & Rehabilitation 20 Hours

1. Introduction to Disability & Rehabilitation.
2. Definition concerned in the phases of disability process.
3. Definition concerned with causes of impairment, functional limitation & disability.
4. Disability prevention and Rehabilitation Principles of physical Medicine, different Rehabilitation teams, their members and their role.
5. Community based Rehabilitation, Rural rehabilitation incorporated with Primary Health Centers.
6. Present rehabilitation services.
7. Reservation and Legislation for rehabilitation services for the disabled.

8. Principles of prescription writing and referral services.

UNIT II Bioengineering 24 Hours

1. Definition and principles of bioengineering. Designing and construction of upper lower extremity orthosis and spinal orthosis. Upper extremity and lower extremity prosthesis
2. Prescription, fitting, and checking.
3. Prescription of foot wear modifications and their importance
4. Wheel chair: various parts, prescription, modification, wheel chair activities & training.
5. Design and construction of adoptive devices.

UNIT III Physical Medicine 8 Hours

Principles of physical Medicine, calculation of percentage of p
hysical Disability, Physical evaluation, principles of management and rehabilitation.

UNIT IV Communication rehabilitation 8 Hours

1. Principle of Management of Communication Impairment.
2. Speech production
3. Communication disorders secondary to brain damage.
4. Evaluating Language
5. Aphasia and its treatment.
6. Dysarthria and its treatment.
7. Non- aphasic Language disorders.

UNIT V Social Rehabilitation 8 Hours

1. Principles in management of social problems.
2. Social needs of the patient.
3. Rehabilitation center environment.
4. The social worker as a member of the rehabilitation team.
5. Contribution on social work.

UNIT VI Vocational Rehabilitation 20 Hours

1. Principle in Management of Vocational problems
2. Vocational Evaluation.
3. Vocational Goals for the disabled.
4. Community Resources.

UNIT VII Administration 12 Hours

1. Description of various rehabilitation Institutions, centers and attached to Hospitals or other wise in India and abroad.
2. Space locations, climatic and environmental conditions, Preparation of scheme for set up of rehabilitation units in a hospital or outside hospital with a given number of patients and specific condition
3. Basic principles of Administration and organization philosophy & approach
4. Organizational of structure of the rehabilitation units of the handicapped including : Finances, Budgets and

income and expenditure statement.

Section VIII Organization 20 Hours

1. Principle or relationship between personnel of rehabilitation unit and other department.
2. Principles of relationship between the institution and the guardians of the handicapped or patient.
3. Principle of relationship between head of the unit with various government and semi-government, trusts and juniors.
4. Relationship between a staff and his supervisors equals and juniors.
5. Personnel Management: recruitment, ACR, implementation of policies, use of resources. Accounts register, fees register, other office registers like cash book, stock, various forms and parents correspondence, leave registers, (including leave Account, miscellaneous like, financial records, grant applications etc.)
6. Principle of maintaining department secrecy,
7. Definition of policy and how best it is to be carried out.
8. Introduction to job analysis of importance.
9. Methods of teaching to handicapped and other workers in rehabilitation Unit.
10. Principles of teaching and guiding student's juniors and senior in O.T. and PT training schools and centers.

Textbooks:

1. Waqar Naqvi, Physiotherapy in community health and rehabilitation, JP Brothers, 1 st Ed, 2011

Reference Book:

1. Judith Pitt-Brooke, Rehabilitation of movement – Theoretical Basis of clinical practice, W.B.Saunders,2 Ed, 2002

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination

Examination Scheme

Components	Continuous Internal Assessment (20%)				Professional Examination (80%)
	Internal Examination	Preliminary Examination	Attendance	Project/ Assignment/ Class test	
Weightage (%)	5	5	5	5	80
Schedule	4 months after onset of Academic Year	Before University exam	To be calculated at the end of AY	Continuous assessment (at least 4)	End of AY

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between COs and POs		
	Course Outcomes (COs)	**Mapped Program Outcomes**
CO1	Outline the epidemiological implications of impairment, handicap and disability	**PO1**
CO2	Assess, prescribe and fit orthotics, prosthetics and assistive devices.	**PO3**
CO3	Calculate percentage of disability and apply principles of rehabilitation	**PO3**
CO4	Explain the features of communication impairment and its management.	**PO2**
CO5	Summarise the principles of social and vocational rehabilitation.	**PO2**
CO6	Determine the principles of administration and organisation of a rehabilitation unit.	**PO4**

		Physiotherapy Knowledge	**Multidisciplinary/ Medical knowledge**	**Clinical and Practical Skills**	**Utilisation of Modern Technology**	**Evidence Based Practice**	**Life Skills**	**Assessment and Management**	**Teamwork**	**Research and Entrepreneurial Skills**
Course Code	**Course Title**	**PO 1**	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PSO 1**	**PSO 2**	**PSO 3**
BPT407	**Rationale of Rehabilitation**	**3**	**2**	**2**	**1**	**1**	**1**	**2**	**3**	**1**

1= weakly mapped 2= moderately mapped 3. Strongly mapped

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO 2	PSO 3
CO1	3	-	-	-	-	-	2	-	-
CO2	-	-	2	-	-	-	2	-	-
CO3	-	-	2	-	-	-	2	-	-
CO4	-	2	-	-	-	-	-	3	-
CO5	-	2	-	-	-	-	-	3	-
CO6	-	-	-	1	-	-	-	-	1

1= weakly mapped 2= moderately mapped 3= strongly mapped

Unit I	**Disability and Rehabilotation**
Local	Community based Rehabilitation, Rural rehabilitation incorporated with Primary Health Center
Regional	Definition concerned in the phases of disability process
National	Reservation and Legislation for rehabilitation services for the disabled.
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit II	**Bioengineering**
Local	.
Regional	
National	
Global	

Employability	Prescription of foot wear modifications and their importance
Entrepreneurship	Design and construction of adoptive devices.
Skill Development	Design and construction of adoptive devices.
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit IV	**Communication rehabilitation**
Local	
Regional	
National	Principles of physical Medicine,
Global	
Employability	, Physical evaluation, principles of management and rehabilitation Speech production
Entrepreneurship	
Skill Development	
Professional Ethics	calculation of percentage of physical Disability
Gender	
Human Values	
Environment & Sustainability	
Unit V	**Social Rehabilitation**
Local	Social needs of the patient.
Regional	
National	
Global	
Employability	Contribution on social work.
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit VI	**Vocational Rehabilitation**

Local	
Regional	
National	
Global	
Employability	Vocational Evaluation. Vocational Goals for the disabled.
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit VII	**Administration**
Local	
Regional	
National	Description of various rehabilitation Institutions, centers and attached to Hospitals or other wise in India and abroad.
Global	Description of various rehabilitation Institutions, centers and attached to Hospitals or other wise in India and abroad.
Employability	Basic principles of Administration and organization philosophy & approach
Entrepreneurship	
Skill Development	
Professional Ethics	Basic principles of Administration and organization philosophy & approach
Gender	
Human Values	Basic principles of Administration and organization philosophy & approach
Environment & Sustainability	
Unit VIII	**Organization**
Local	
Regional	Principle of relationship between head of the unit with various government and semi-government, trusts and juniors
National	Principle of relationship between head of the unit with various

	government and semi-government, trusts and juniors
Global	Principle of relationship between head of the unit with various government and semi-government, trusts and juniors
Employability	Introduction to job analysis of importance.
Entrepreneurship	
Skill Development	
Professional Ethics	Principle of maintaining department secrecy
Gender	
Human Values	
Environment & Sustainability	

BPT408	**PROFESSIONAL ETHICS AND LAWS**	Total Hours
Version 1.0		80
Pre-requisites/Exposure	-	
Co-requisites	-	

Course Objectives

The objective of this course is that after 80 hours of lectures and demonstrations the student will be able to gain knowledge about legal and ethical considerations of good medical practice across the whole spectrum and focus on the important and relevant topics related to legal aspects in healthcare.

Course Outcomes

Upon completion of this course the student should be able to

CO1. Understand the ethical principles of physiotherapy profession.
CO2. Understand principles of management in personal management, time management and administration including budgeting.
CO3. Understand the medico-legal issues in physiotherapy.
CO4. Differentiate between medical and physiotherapy diagnosis.

Catalog Description

This course is designed to provide basic knowledge on legal responsibility and professional culture. The subject provides the insights for rules and regulations of governing bodies of Physiotherapy

Course Content:

UNIT I **20 hours**

- History of physiotherapy.
- Philosophy and Philosophical statements.
- Major Ethical principles applied to moral issue in health care.

- Rules of professional conduct.
- Scope of practice.

UNIT II **20 hours**

- Relationships with patients.
- Relationships with medical collogues.
- Relationships between professional with carrier.
- Relationships with in the profession.
- Confidentiality and responsibility.

UNIT III **20 hours**

- Pervision of services and advertising.
- Sale of goods.
- Personnel and professional standard.
- Professional standard.
- Professional and government licensing, Accreditation and Education standards.

UNIT IV **20 hours**

- Laws and legal concepts.
    - Law.
    - Legal concepts.
    - Protection from Malpractice claims.
    - Consumer protection Act.
    - Liability and Documentation.

Text Books:

1 Nosse J, "Management Principles for Physical Therapists", Lippincott Williams.
2. Gabard D, Martin M, "Physical Therapy Ethics", F. A. Davis Company.

Reference Book:

1. Reinke W, "Health Planning for Effective Management", Oxford University Press

Mode of Evaluation: The theory and lab performance of students are evaluated separately.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written Examination

Examination Scheme:

Components	Continuous Internal Assessment (20%)	University Examination (80%)

	Internal Examination	Preliminary Examination	Attendance	Project/ Assignment / Class test	
Weightage (%)	**5**	**5**	**5**	**5**	**80**
Schedule	**4 months after onset of Academic Year**	**Before University exam**	**To be calculated at the end of AY**	**Continuous assessment (at least 4)**	**End of AY**

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between COs and Pos		
	Course Outcomes (COs)	**Mapped Program Outcomes**
CO1	Understand the ethical principles of physiotherapy profession.	**PO6**
CO2	Understand principles of management in personal management, time management and administration including budgeting.	**PO6**
CO3	Understand the medico-legal issues in physiotherapy.	**PO6**
CO4	Differentiate between medical and physiotherapy diagnosis.	**PO2**

		Physiotherapy Knowledge	**Multidisciplinary/ Medical knowledge**	**Clinical and Practical Skills**	**Utilization of Modern Technology**	**Evidence Based Practice**	**Life Skills**
Course Code	**Course Title**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**

BPT408	**PROFESSIONAL ETHICS AND LAWS**		**2**	**1**			**3**

1= weakly mapped 2= moderately mapped 3= strongly mapped

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO 2	PSO 3
CO1	**2**	-	-	-	-	-	**3**	**2**	**1**
CO2	-	-	**3**	-	-	-	**2**	**2**	-
CO3	-	-	**3**	-	-	-	**3**	-	**2**
CO4	-	-	**3**	-	-	-	**3**	**2**	**2**

1= weakly mapped 2= moderately mapped 3= strongly mapped

Unit I	**Give Heading of the Unit here (if applicable)**
Local	
Regional	
National	
Global	● History of physiotherapy.
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit II	**Give Heading of the Unit here (if applicable)**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	
Skill Development	● Relationships with patients. ● Relationships with medical collogues. ● Relationships between professional with carrier. ● Relationships with in the profession. ● Confidentiality and responsibility.
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
Unit III	**Give Heading of the Unit here (if applicable)**
Local	
Regional	
National	
Global	
Employability	
Entrepreneurship	Professional and government licensing, Accreditation and Education standards
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	

Unit IV	Give Heading of the Unit here (if applicable)
Local	
Regional	
National	• Laws and legal concepts.
Global	
Employability	
Entrepreneurship	
Skill Development	
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	
SDG	
NEP 2020	
POE/4th IR	

BPT409	RESEARCH METHODOLOGY AND BIOSTATISTICS	Total Hours
Version 1.0		120
Pre-requisites/Exposure	-	
Co-requisites	-	

Course Objectives:

1. Understand basic principle of research
2. Learn about various research methods & designs.
3. To be able to read the research articles & write on your own.
4. Learn the concept of research writing.

Course Outcomes:

On completion of this course, the students will be able to

CO1. Implement hypothesis testing.
CO2. Important concepts relating to research design and measurements and scaling. techniques.
CO3. To analyze experimental and observational study
CO4. Knowledge of Processing and analyzing data can be gained.
CO5. Interpretation and Report Writing can be well understood.
CO6. Desire to face the challenge in solving the unsolved problems and to be of service to society

Catalog Description:

The objective of this module is to help the students understand the basic principles of research and methods applied to draw inferences from the research findings.

Course Content:

UNIT 1 — 70 hours

a. Introduction & importance of research in Clinical practice, scientific approach, characteristics, purpose and limitations of research.

b. Ethical issues in research, elements of informed constant.

c. Research question including literature review.

d. Research design, statics and basic concepts.

e. Structure of a research proposal.

f. Questionnaires, surveys and sampling

g. Measurement, principles of measurement, reliability and validity.

h. Reading published research for critical analysis.

i. Techniques of Descriptive research.

j. Writing the research for publication.

k. Basic concepts for stage presentation of research.

UNIT : II — 50 Hours

a. Biostatistics:

b. Descriptive stastics.

c. Comparison of means, T-tests.

d. Analysis of variance.

e. Multiple comparisons.

f. Non-parametric statistics.

g. Correlations.

Textbook:

1. B.L Agarwal, Basic statistics, New Age International Publication.2012.

Reference Book:

1. Sundarrao, Introduction to biostatistics and Research Methodology, CBS, 1Ed, 2002.

2. C.R Kothari, Research methodology, New Age international publication, 3Ed, 2014.

Modes of Evaluation: Quiz/Assignment/ presentation/ extempore/ Written

Examination Examination Scheme:

Components	Quiz I	Assignment/ Presentation etc.	Mid Term	Attendance	End Term Exam
Weightage (%)	10	10	20	10	50

Relationship between the Course Outcomes (COs) and Program Outcomes (POs)

Mapping between COs and POs		
	Course Outcomes (COs)	Mapped Program Outcomes
CO1	The student will be able to implement hypothesis testing	PO2
CO2	Important concepts relating to research design and measurements and scaling techniques.	PO2
CO3	To analyze experimental and observational study.	PO5
CO4	Knowledge of Processing and analyzing data can be gained	PO5
CO5	Interpretation and Report Writing can be well understood	PO5
CO6	Desire to face the challenge in solving the unsolved problems and to be of service to society.	PO5

		Physiotherapy Knowledge	Multidisciplinary/Medical knowledge	Clinical and Practical Skills	Utilisation of Modern Technology	Evidence Based Practice	Life Skills	Assessment and Management	Team work	Research and Entrepreneurial Skills
Course Code	**Course Title**	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO 6**	**PSO 1**	**PSO 2**	**PSO 3**
BPT409	**RESEARCH METHODOLOGY AND BIOSTATISTICS**		**2**			**3**	**3**			**3**

1= weakly mapped 2= moderately mapped 3= strongly ma

CO	PO1	PO2	PO3	PO4	PO5	PO6	PSO 1	PSO 2	PSO 3
CO1	-	-	-	-	**3**	-	**3**	**3**	**3**
CO2	-	-	-	-	**3**	-	**3**	**2**	**2**
CO3	-	-	**3**	-	-	-	**2**	**3**	**1**
CO4	-	-	**3**	-	-	-	-	**2**	-
CO5	-	-	-	-	-	**3**	-	**3**	-
CO6	-	-	-	-	-	**3**	-	**3**	-

1= weakly mapped2= moderately mapped 3= strongly mapped

Unit I	Section 1
Local	Introduction & importance of research in Clinical practice, elements of informed constant.
Regional	
National	
Global	Research question and design
Employability	
Entrepreneurship	
Skill Development	Reading published research for critical analysis, Structure of a research proposal.
Professional Ethics	Ethical issues in research,
Gender	
Human Values	
Environment & Sustainability	
Unit II	**Biostatistics**
Local	
Regional	
National	
Global	Parametric and non-parametric test
Employability	
Entrepreneurship	
Skill Development	Analysis of variance, coorelation
Professional Ethics	
Gender	
Human Values	
Environment & Sustainability	