Department of Physiotherapy
Era University, Lucknow
Course Outline
Effective From: 2023-24

Name of the Program	**MPT**			**Year/ Semester:**	1st year/1st Sem
Course Name	**RESEARCH METHODOLOGY**	**Course Code:**	**MPT-104**	**Type:**	**Theory**
Credits	**04**			**Total Sessions Hours:**	**60 Hours**
Evaluation Spread	**Internal Continuous Assessment**	**30 Marks**		**End Term Exam:**	**70 Marks**
Type of Course	Compulsory	• Core		Creative	Life Skills
Course Objectives	1. Incorporate evidence based practice into clinical decisions of patient care and Management.				
Course Outcomes (CO): *After the successful course completion, learners will develop following attributes:*					
CO1	Develop Research Skills				
CO2	Describe, represent, visualize and transform data				
CO3	Study relationship between variables and apply parametric and non-parametric tests on data to draw fruitful inferences from data				
CO4	Communicate Research Findings				
CO5	Apply Evidence-Based Practice				
Pedagogy	Interactive, discussion-bases, student-centered, presentation.				
Internal Evaluation Mode	1. Attendance: 2. Project/Assignment 3. Class Participation 4. Presentations 5. Bedside Behavior/Class discipline 6. Written Exam:				

Session Details	**Topic**	**Hours**	**Mapped CO**
UNIT 1	Research – Definition, concept, purpose, approaches, Internet sites for Physiotherapist Research in Physiotherapy Introduction -Research for Physiotherapist: Why? How? When? Research Fundamentals -Define measurement, Measurement framework, Scales of measurement, Pilot Study, Types of variables, Reliability & Validity, Drawing Tables, graphs, master chart etc. Writing a Research Proposal, Critiquing a research article-Defining a problem , Review of Literature, Formulating a question, Operational Definition, Inclusion & Exclusion criteria, Forming groups, Data collection & analysis, Results, Interpretation, conclusion, discussion , Informed Consent , Limitations, Research Design-Principle of	**20**	**CO1, CO4**

	Designing, Design, instrumentation & analysis for qualitative research, Design, instrumentation & analysis for quasi-experimental research, Design models utilized in Physiotherapy Research Ethics-Importance of Ethics in Research, Main ethical issues in human subjects' research, Main ethical principles that govern research with human subjects, Components of an ethically valid informed consent for research		
UNIT 2	Biostatistics, Introduction, Definition, Types, Application in Physiotherapy, Data- Definition, Types, Presentation, Collection methods, Measures of central value, Arithmetic mean, median and mode. Relationship between them, Partitioned values- Quartiles, Deciles, Percentiles, Graphical determination, Measures of Dispersion-Range, Mean Deviation, Standard Deviation, Normal Distribution Curve - Properties of normal distribution, Standard normal distribution, Transformation of normal random variables, Inverse transformation, Normal approximation of Binomial distribution.	**20**	**CO2, CO4, CO5**
UNIT 3	Correlation analysis - Bivariate distribution: Scatter Diagram, Coefficient of correlation, Calculation & interpretation of correlational coefficient, T-test, Z-test, P-value, Regression analysis- Lines of regression, Calculation of Regression coefficient, Sampling- Methods of Sampling, Sampling distribution, Standard error, Types I & II error, Probability (in Brief), Hypothesis Testing - Null Hypothesis, Alternative hypothesis, Acceptance & rejection of null Hypothesis, Level of significance, Parametric & non parametric tests - Chi square test, Mann-Whitney U test, Wilcoxon Signed test, Kruskal-Wallis test, Friednam test, T-test/student T test, Analysis of variance	**20**	**CO3, CO4, CO5**

CO-PO and PSO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	-	2	-	-	3	-	-	-	3	1
CO2	-	3	-	-	1	-	-	-	3	3
CO3	-	2	2	-	1	-	-	-	3	3
CO4	-	2	3	-	1	-	-	-	3	2
CO5	-	2	3	-	2	-	-	-	3	2

Strong contribution-3, ***Average contribution-2 ,*** ***Low contribution-1,***

Suggested Readings:

Text- Books	1. Research Methodology by C. R. Kothari, New age international
Reference Books	1. Principles of Research Methodology: A Guide for Clinical Investigators, Phyllis G. Supino, Jeffrey S. Borer, Springer Nature; 1st edition
Para Text	• **https://www.youtube.com/watch?v=jyv9paQDYy0&list=PLk3poRqYftlhDGto5oSxeNeFWHzajbVuA** • **https://www.youtube.com/watch?v=0dRtFDlb2Wk&list=PLQnNyE1lxfVIZp27Oorkl1uO5z8bJQVKD**

Recapitulation & Examination Pattern		
Internal Continuous Assessment:		
Component	**Marks**	**Pattern**
Mid Semester	12	As per University Pattern
Class Test	04	
Class Presentation/Discipline	04	
Assignment/ Project	04	
Bedside Behavior	02	
Attendance	04	As per Policy
Total Marks	**30**	

Master of Physiotherapy

Era University, Lucknow

Course Outline
Effective
From:2024-25

Name of the Program	**Master of Physiotherapy**			**Year/Semester:**	**1st year/1st sem**
Course Name	**BASIC THERAPEUTIC SCIENCES**	**Course Code:**	**MPT-103 MPP-103**	**Type:**	**Theory & Practical**
Credits	**04+01**			**Total Sessions Hours:**	**60 Hours**
Evaluation Spread	**Internal Continuous Assessment:**		**30 Marks**	**End Term Exam:**	**70Marks**
Type of Course	Compulsory		✓ Core	Creative	Life Skill
Course Objectives	• Student will learn the basic principles, technique, and effects of different concepts of anatomy, exercise, electrotherapy, and biomechanics in the restoration of basic knowledge and also implementation of evidence based practical approach in the field of physiotherapy.				

Course Outcomes(CO): *After the successful course completion ,learners will develop following attributes:*

CO1	• To understand about basic concept of exercise therapy and terms related to mobility and stretching.
CO2	• To understand about fundamental concept of electrotherapy.
CO3	• To understand basic concept of Biomechanics & overview of Biomechanics of Human Movement:
Pedagogy	Interactive, discussion-based, student-centered, presentation.
Internal Evaluation Mode	Mid-term Examination: 30 Marks Class test: 12 Marks Class participation or any other : 04 Marks Assignments/Project: 04 Marks Attendance: 04 Marks Class Presentation: 04 Bed Side behavior or Interaction in Class: 02

Session Details	Topic	Hours	Mapped CO
Unit1	**FUNDAMENTALS OF EXERCISE THERAPY-** **General Concepts:**. Principles, Procedures, Indications, Goals, Limitations, Precautions and Contraindications for applying various type of exercise techniques –Active, Passive, Resistance, Concentric and Eccentric, Isokinetic Exercise, Open-Chain and Closed-Chain Exercise. Examination, Upper Extremity, Lower Extremity. Determinants of an exercise program: Intensity, Duration, Frequency, Mode, Reversibility Principle, Exercise Program, Warm-Up Period, Aerobic Exercise Period, Cool-Down Period **Overview of Terms Related To Mobility And Stretching:** Alignment and Stabilization, Intensity, Duration, Speed, Frequency, Relaxation Training Flexibility, Hypo mobility, Contracture & their types. Selective Stretching, Overstretching and Hypermobility, Muscle Guarding and Spasm, Exercise-induced muscle soreness, Joint Effusion & Inflammation. Strength, Power, Endurance, Overload Principle, SAID Principle, Reversibility Principle**.**	20	CO1
Unit2	**FUNDAMENTALS OF ELECTROTHERAPY-** **General outline of therapeutic currents (Low, Medium & High Frequency Currents) -** Transcutaneous Electrical Neuromuscular Stimulation, Functional electrical stimulation, Medium Frequency Currents: Interferential Currents, Russian Currents, Heat Therapy & its Application, Cryotherapy. High Frequency Currents: SWD, U.S, I.R, U.V, Laser, Traction-Methods, Techniques & Dosage. Extracorporeal Shock Wave Therapy,	20	CO2
Unit3	**FUNDAMENTALS OF BIOMECHANICS-** **Basic Terminology-** Biomechanics versus kinesiology, Anatomy versus Functional anatomy, Linear versus Angular motion, Kinematics versus Kinetics, Statics versus Dynamics, **Planes and Axes**- Degree of freedom, **Measuring the Mechanical Properties of Body Tissues**, Biomechanical Characteristics of Bone, Mechanical Properties of Bone, Muscle Tissue Properties, Force Generation in the Muscle, Force–Velocity Relationships in Skeletal Muscle.	20	CO3
Practical	**Demonstration for :** Types and Effects of Stretching, Interventions to Increase Mobility of Soft Tissues, Selective Stretching, Determinants & Special precautions for upper & lower extremity stretching, Grades or Dosage of Movement, Positioning and Stabilization, **Demonstration for:** Preparation of apparatus & patient. Applications & Termination of Low, Medium & High Frequency Current Treatment.	20 hours	

CO-PO and PSOMapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	2	1	3	1	1	2	2	-	-	-	-	-	-	-
CO2	1	2	2	1	2	1	1	-	-	-	-	-	-	-
CO3	2	1	2	3	1	2	3	-	-	-	-	-	-	-

Strongcontribution-3, Averagecontribution-2, Lowcontribution-1,

SuggestedReadings:

ReferenceBooks

1.Therapeutic exercise by Carolyn Kisner
2. Principles of exercise therapy by M. Dena Gardiner
3. Joint Structure & Function by Cynthia Norkins
4. Claytons Electrotherapy by Forster & Plastangs
5. Electrotherapy by Khokher

ParaText	1. https://youtu.be/3y9xvenNoCo?si=dq_lfRqK6bcCDUPD 2. https://youtu.be/UQevUU58j0g?si=5vDERnslXKzs06KM 3. https://youtu.be/sGdaojhjlrk?si=G0IARr13VN9b2Jnm 4. https://youtu.be/LePMCq7qGP4?si=uDbCHRdb8J_NnQ4K

Recapitulation&ExaminationPattern

InternalContinuousAssessment:

Component	**Marks**	**Pattern**
Class test	12	Contains **01 long question.** question carries **04**Marks. **02 Short questions.** Each question carries **02**Marks **04 multiple choice questions.** Each question carries **01**Marks
Class participation or any other	04	This to be made on activities and instruction given by subject teacher.
Marks Assignments/Project:	04	Assignment to be made on topics and instruction given by subject teacher
Class Presentation:	04	This to be made on topics and instruction given by subject teacher
Bed Side behavior or Interaction in Class	02	This to be made on activities and instruction given by subject teacher.
Attendance	04	As per policy
Total Marks	**30**	

Master of Physiotherapy

Era University, Lucknow

Course Outline
Effective
From: 2024-25

Name of the Program	**Master of Physiotherapy**			**Year/Semester:**	**1st year/1st sem**
Course Name	**PEDAGOGY IN PHYSIOTHERAPY EDUCATION - 1**	**Course Code:**	**MPT-105**	**Type: Theory**	
Credits	**04**			**Total Sessions Hours:**	**60**
Evaluation Spread	**Internal Continuous Assessment:**			**End Term Exam:**	
Type of Course	Compulsory		✓ Core	Creative	Life Skill
Course Objectives	On completion of the study of this subject the student should be able to • Understand the Dynamics of teaching & learning • Plan effective teaching sessions in Physiotherapy				

Course Outcomes(CO): *After the successful course completion ,learners will develop following attributes:*

CO1	Demonstrate an understanding of the fundamental educational philosophies (Idealism, Naturalism, and Pragmatism) and their implications for the aims and functions of education across formal, informal, and non-formal settings, while critically evaluating current issues and trends in higher education, including quality, autonomy, accountability, and privatization.
CO2	Analyze the meaning and scope of educational psychology and its relationship to teaching and learning, while evaluating key learning theories and understanding the dynamics of behavior and individual differences in educational settings.
CO3	Critically examine the meaning and concept of curriculum, understand the bases for curriculum formulation, and articulate the process of curriculum development, including the framing of objectives and factors influencing evaluation.
Pedagogy	Interactive, discussion-based, student-centered, presentation.
Internal Evaluation Mode	Mid-term Examination: 30 Marks Class test: 12 Marks Class participation or any other : 04 Marks Assignments/Project: 04 Marks Attendance: 04 Marks Class Presentation: 04 Bed Side behavior or Interaction in Class: 02

Session Details	**Topic**	**Hours**	**Mapped CO**
Unit1	**EDUCATION** Introduction, Educational Philosophy- Idealism Naturalism, Pragmatism, Aims & Functions of Education, Formal, informal and non-formal Education, Agencies of Education, Current issues and Trends in Higher Education, Issue of quality in Higher Education, Autonomy and Accountability, Privatization of Education	20	CO1

Unit2	**CONCEPT OF TEACHING AND LEARNING** Meaning and scope of Educational Psychology, Meaning and Relationship between teaching and learning, Learning Theories, Dynamics of behavior, Individual difference	20	CO2
Unit3	**CURRICULUM** Meaning and concept, Basis of curriculum formulation, Framing objectives for curriculum, Process of curriculum development and factors involved, Evaluation of curriculum	20	CO3

CO-PO and PSOMapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	1	1	2	2	3	2	1	2	1	1	2	2	1	2
CO2	1	1	2	2	3	2	1	2	1	2	2	1	1	2
CO3	1	1	2	2	3	2	1	2	2	1	1	1	1	2

Strongcontribution-3, Averagecontribution-2, Lowcontribution-1,

SuggestedReadings:

1 Developing a Pedagogy of Teacher education: Understanding teaching and learning about Teaching.

2. Language, Culture and community in Teacher education.

ReferenceBooks	.Handbook of Technological pedagogical content knowledge (TPCK) for educators
ParaText	https://www.bing.com/search?pglt=41&q=PEDAGOGY+IN+PHYSIOTHERAPY+EDUCATION

Recapitulation&ExaminationPattern

InternalContinuousAssessment:

Component	Marks	Pattern
Class test	12	Contains **01 long question.** question carries **04**Marks. **02 Short questions.** Each question carries **02**Marks **04 multiple choice questions.** Each question carries **01**Marks
Class participation or any other	04	This to be made on activities and instruction given by subject teacher.
Marks Assignments/Project:	04	Assignment to be made on topics and instruction given by subject teacher
Class Presentation:	04	This to be made on topics and instruction given by subject teacher
Bed Side behavior or Interaction in Class	02	This to be made on activities and instruction given by subject teacher.
Attendance	04	As per policy
Total Marks	**30**	

Master of Physiotherapy

Era University, Lucknow

Course Outline

Effective

From: 2024-25

Name of the Program	**Master of Physiotherapy**			**Year/Semester:**	**1st year/1st sem**
Course Name	**Physiotherapy & Ethics**	**Course Code:**	**MPT-102**	**Type:**	**Theory**
Credits	**04**			**Total Sessions Hours:**	**60 Hours**
Evaluation Spread	**Internal Continuous Assessment:**		**30 Marks**	**End Term Exam:**	**70Marks**
Type of Course	Compulsory		✓ Core	Creative	Life Skill
Course Objectives	• Know about all the rules and regulation that have to be follow in practice • Know how to practice ethically & main ethical issues coming in practice				

Course Outcomes(CO): *After the successful course completion ,learners will develop following attributes:*

CO1	• Students will gain a comprehensive understanding of the core ethical principles that guide physiotherapy practice, including autonomy, beneficence, non-maleficence, and justice.
CO2	• Students will develop the ability to apply ethical decision-making frameworks in real-world clinical scenarios, ensuring that patient care is both effective and ethically sound
CO3	• Students will learn about the legal responsibilities of physiotherapists, including understanding relevant laws, regulations, and standards of practice within their jurisdiction
CO4.	• Students will be able to demonstrate the importance of patient-centered care, respecting patients' rights, dignity, and preferences while maintaining professional boundaries
CO5	• Students will understand the importance of cultural competence in ethical practice, recognizing and respecting the diversity of patients' backgrounds and beliefs in their care.
Pedagogy	Interactive, discussion-based, student-centered, presentation.
Internal Evaluation Mode	Mid-term Examination: 30 Marks Class test: 12 Marks Class participation or any other : 04 Marks Assignments/Project: 04 Marks Attendance: 04 Marks Class Presentation: 04 Bed Side behavior or Interaction in Class: 02

Session Details	**Topic**	**Hours**	**Mapped CO**
Unit 1	**ETHICAL RULES OF PROFESSIONAL CONDUCT** Ethical principles in health care, Ethical principles related to physiotherapy, Scope of practice, Enforcing standards in health profession-promoting quality care, Professional ethics in research, education and patient care delivery, Informed consent issues, Medical ethics and Economics in clinical decision-making. **Rules of professional conduct:** Relationship with patients, health care institutions, colleagues and peers, medical and other professional staff. Confidentiality and Responsibility, Malpractice and negligence, Provision of services and, Advertising. Legal aspects: Consumer protection act, Legal responsibility of physiotherapist for their action in professional context and understanding liability and obligations in case of medico-legal action.	20	CO1

Unit2	**FUNCTIONS OF PHYSIOTHERAPY ASSOCIATIONS** Memorandum, Rules and Regulation, Role of international health agencies. Role of W.C.P.T. and W.H.O. Roles Of Physical Therapist, Physical Therapy Director, Physiotherapy Supervisor, Physiotherapy Assistant, Physiotherapy Aide, Home Health Aide, Volunteer.	20	CO2
Unit3	**HOSPITAL ADMINISTRATION AND PERSONNEL MANAGEMENT** **Hospital administration:** Hospital as an organization - Functions and types of hospitals, Quality assurance programme in hospitals & medical audit, International quality system. Principles of hospital administration and its applications to Physiotherapy. National health policy and health care system in India. Organization of physiotherapy department: Planning, Space, Manpower, Other basic resources. Organizing meetings, committees, and negotiations. **Personnel management**: Personnel performance appraisal system, Quality care delivery from the staff, Material management, Pharmacy, Hospital waste disposal, Quality assurance, Hospital acquired infection, Quality assurance through record review and medical audit. Public relations in hospital and human resource management.	20	CO3

CO-PO and PSOMapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1	3	3	1	1	1			-	-	-	-	-	-	-
CO2	1	2	1		2	1	2	-	-	-	-	-	-	-
CO3	2	3	1	1	3	3	1	-	-	-	-	-	-	-

Strongcontribution-3, Averagecontribution-2, Lowcontribution-1,

Suggested Readings:

Reference Books	1. Medical Ethics by C M Francis. 2. George V Lobo – Current Problems in Medical Ethics 3. Consumer Protection Act – 1986, Government of India, New Delhi. 4. Health Services Management, Analysis & Application, Wadsworth Publishing Company
Para Text	https://www.youtube.com/watch?v=xL-3VXs22hA&t=65s Unit 2: https://www.youtube.com/watch?v=t1U53BcQVmo Unit 3: https://www.youtube.com/watch?v=FpQEwbAV3Qw

Recapitulation & Examination Pattern

Internal Continuous Assessment:

Component	Marks	Pattern
Class test	12	Contains **01 long question.** Question carries **04**Marks. **02 Short questions.** Each question carries **02**Marks **04 multiple choice questions.** Each question carries **01**Marks
Class participation or any other	04	This to be made on activities and instruction given by subject teacher.
Marks Assignments/Project:	04	Assignment to be made on topics and instruction given by subject teacher
Class Presentation:	04	This to be made on topics and instruction given by subject teacher
Bed Side behavior or Interaction in Class	02	This to be made on activities and instruction given by subject teacher.
Attendance	04	As per policy
Total Marks	**30**	

MASTER OF PHYSIOTHERAPY

Era University, Lucknow

Course Outline: 2024-2025

Name of the Program	**MPT**			**Year/ Semester:**	**I year/I Sem**
Course Name	**Exercise Physiology**	**Course Code:**	**MPT-101 MPP-101**	**Type:**	**Theory & Practical**
Credits	**04+01**			**Total Sessions Hours:**	**60 Hours**
Evaluation Spread	**Internal Continuous Assessment:**	**30 Marks**		**End Term Exam:**	**70 Marks**
Type of Course	○ Compulsory	◉ Core		○ Cre	○ Life Skill
Course Objectives	1. To understand the role of nutrition in energy metabolism, physical performance, and physiological regulation. 2. To learn techniques for body composition assessment and strategies for energy balance and weight control. 3. To understand the mechanisms of energy delivery and utilization in the aerobic system, focusing on pulmonary, cardiovascular, muscular, and neural contributions. 4. To explore the regulation and integration of physiological systems during physical activity and their adaptations to exercise. 5. To study energy transfer, training adaptations, and energy expenditure in various physical activities and environments.				
CourseOutcomes(CO): *Afterthesuccessfulcoursecompletion,learnerswilldevelopfollowing attributes:*					
Course Outcome(CO)	**Attributes**				
CO1	Students will apply nutritional principles to optimize physical performance.				
CO2	Students will assess body composition and design effective weight management strategies.				
CO3	Students will analyze the roles of pulmonary ventilation, cardiovascular dynamics, and skeletal muscle in meeting energy demands during physical activity.				
CO4	Students will explain neural control mechanisms, including motor unit function and proprioception, and their impact on movement and athletic performance.				
CO5	Students will assess and apply physiological principles to improve performance and training outcomes.				
Pedagogy	Interactive, discussion-bases, student-centered , presentation.				
Internal Evaluation Mode	Mid-term Examination: 30 Marks Class test: 12 Marks Class participation or any other : 04 Marks Assignments/Project: 04 Marks Attendance: 04 Marks Class Presentation: 04 marks Bed Side behavior or Interaction in Class: 02 marks				

Session Details	Topic	Hours	Mapped CO
UNIT 1	• **NUTRITION: THE BASE FOR HUMAN PERFORMANCE:** Carbohydrates, Lipids, Proteins Vitamins, Enzymes and Coenzymes Minerals & Water: Kinds and Sources, Recommended Intake, Role in the Body, Dynamics during Physical Activity, Acid-Base regulation, Buffering, Physiologic buffers, Hydrolysis and Condensation, Energy Transfer During Physical Activity, The ATP–PCR System, The Aerobic System, Respiratory Quotient, Respiratory Exchange Ratio (RER). • **BODY COMPOSITION, ENERGY BALANCE, AND WEIGHT CONTROL:** Body Composition Assessment, Overweight, Overfatness, and Obesity, The Body Mass Index, Physique, Performance, and Physical Activity, Upper Limit for Fat-Free Body Mass, Health Risks of Excessive Body Fat, Energy Balance: Input Versus Output, Physical Activity, Regular Moderate Physical Activity.	20 hrs	CO1 & CO2
UNIT 2	• **AEROBIC SYSTEMS OF ENERGY DELIVERY AND UTILIZATION:** **Pulmonary Ventilation**: Variations from normal breathing patterns, Gas exchange and transport, Concentrations and partial pressures of respired gases, Oxygen and Carbon Dioxide transport in blood, Regulation of pulmonary ventilation: Ventilatory control & regulation of ventilation during physical activity, Pulmonary ventilation and energy demands during physical activity, Effects of intense physical activity. **The Cardiovascular System**: Blood Pressure response to physical activity, Cardiovascular regulation and integration, Intrinsic & Extrinsic regulation of heart rate and circulation, Distribution of blood, Integrative Response during physical activity, Physical activity after cardiac transplantation, Functional capacity of the cardiovascular system, Cardiac Output, Cardiac Output at Rest, Cardiac Output During Physical Activity, Cardiac Output Distribution and Oxygen Transport, Cardiovascular Adjustments to Upper-Body Exercise. **Skeletal Muscle**: Chemical and mechanical events during muscle action and relaxation, Muscle fiber type, Fiber type differences among athletic groups. **Neural Control of Human Movement**: Nerve Supply to Muscle, Motor Unit Functional Characteristics, Receptors in Muscles, Joints, and Tendons: The Proprioceptors	20 hrs	CO3 & CO4
UNIT 3	• **APPLIED EXERCISE PHYSIOLOGY: ENHANCEMENT OF ENERGY TRANSFER CAPACITY** Exercise Training Principles, Anaerobic & Aerobic System, Factors that affect Aerobic & Anaerobic System, Training Methods, Overtraining, Physical Activity During Pregnancy. Strength Measurement And Resistance Training: Structural and functional adaptations of Resistance Training, Detraining Effects on Muscle, Measurement of Muscle Strength, Special Aids to Exercise Training and Performances, Physical Activity at Medium and High Altitude, Exercise and Thermal Stress, Thermal Balance, Hypothalamic Temperature Regulation, Physical Activity in The Heat, Maintaining Fluid Balance: Rehydration and Hyperhydration. Physical Activity in the Cold, Cold Acclimatization. **Human Energy Expenditure during Rest and Various Physical Activities**: Energy Expenditure at Rest: Basal and Resting Metabolic Rate,	20 hrs	CO5

	Metabolic Size Concept, Metabolic Rates of Humans: Age and Gender Comparisons. Energy Expenditure during Physical Activity: Classification of Physical Activities by Energy Expenditure, The Met, Energy Cost of Household, Industrial, and Recreational Activities, Heart Rate to Estimate Energy Expenditure. Energy Expenditure During Walking, Jogging, Running, and Swimming, Gross Versus Net Energy Expenditure.		
PRACTICALS	Chart preparation for Anaerobic and Aerobic Power Training, Aerobic fitness & physical performance, Clinical Exercise Recommendation for Cancer, Cardiovascular, and Pulmonary Rehabilitation, Factors that modify the expression of Human Strength, Training Muscles to Become Stronger, Comparative Training Responses in Men and Women, Dieting for Weight Control, Factors That Affect Weight Loss, Increased Physical Activity for Weight Control, Weight Loss Recommendations for Wrestlers and Other Power Athletes, Gaining Weight, Exercises Provides Significant Benefits	20 hrs	

CO-PO Mapping

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	3	-	3	-	1	2	3	3	3	1
CO2	3	-	3	-	1	2	3	3	3	1
CO3	3	-	3	-	1	2	3	3	3	1
CO4	3	-	3	-	1	2	3	3	3	1
CO5	3	-	3	-	1	2	3	3	3	1

Strong contribution-3, ***Average contribution-2,*** ***Low contribution-1,***

Suggested Readings:

Text-Books	1. Therapeutic exercise by Carolyn Kisner 2. Exercise Physiology Book by William D McArdle
Reference Books	1. Physiology of sports and exercise by W.Larry Kenney
Para Text	1. https://youtu.be/u_JGzA0Y6Gw 2. https://youtu.be/QZ7BEqxXSzs 3. https://youtu.be/vC9c74mWwQA 4. https://youtu.be/Tp9zQHj4JBs 5. https://youtu.be/YEQpnTGD4gk

Recapitulation & Examination Pattern

Internal Continuous Assessment:

Component	Marks	Pattern
Class test	12	Contains 01 long queation. question carries 04 marks 02 short questions. each question carries 02 marks 04 multiple choice questions. each question carries 01 marks
Class participation or any other	04	This to be made on activities and instruction given by subject teacher
Marks assignments/project	04	Assignment to be made on topics and instruction given by subject teacher
Class presentation	04	This to be made on topics and instruction given by subject teacher
Bed side behavior or interaction in class	02	This is to be made on activities and instruction given by subject teacher
attendance	04	As per policy
Total marks	**30**	