MPT

MUSCULOSKELETAL AND ORTHOPEDICS

1ST

SEMESTER

MASTERS OF PHYSIOTHERAPY IN MUSCULOSKELETAL AND ORTHOPEDICS
COURSE STRUCTURE

SEMESTER – I				
CORE COURSES		**Credit Hours**		**Contact Hours**
Course Code	**Course Title**	**Theory**	**Practical**	
MPT.501	Professional Practice	1		1
MPT.501P	Professional Practice Practical		1.5	3
MPT.599	Seminars	2		2
MPT.521	Clinical Discussion	1 (NC)		1 (NC)
MPT.531	Clinical Case Presentations	2 (NC)		2 (NC)
MPT.541	Journal Club	2 (NC)		2 (NC)
MPT.551P	Classroom Teaching	2 (NC)		2 (NC)
MPT.571P	Clinical Training		7.5 (NC)	15 (NC)
MPT.560	Library	2 (NC)		2 (NC)
MPT.600	Synopsis		3 (NC)	6 (NC)
OTHER ESSENTIAL COURSES				
RMB.501	Research Methodology and Biostatistics	4		4
HVE.501	Human Values	2		2
Total for Semester I		**18**	**12**	**42**
Total Credit Hours for Semester I		**30**		

PROFESSIONAL PRACTICE
MPT.501
Credits: 1hr/ week

Sr. No	Topic
1.	Development of Physiotherapy Profession
2.	Laws governing physiotherapy practice
3.	Ethical issues in practice of physiotherapy-Clinical, Research and Academics. Administration, legislation, rules and regulations governing physiotherapy practice- National & International. Scope of Physiotherapy in Hospital, Community & Industry.
4.	Roles of the physiotherapist
5.	Standards for practice for physiotherapist and the criteria
6.	SOAP format. Subjective - history taking, informed consent, personal, past, medical and socioeconomic history, chief complaints, history of present illness. Pain assessment- intensity, character, aggravating and relieving factors, site and location. Objective- on observation - body built swelling, muscle atrophy, deformities, posture and gait. On palpation- tenderness-grades, muscle spasm, swelling-methods of swelling assessment, bony prominences, soft tissue texture and integrity, warmth and vasomotor disturbances. On examination – ROM – active and passive, resisted isometric tests, limb length-apparent, true and segmental , girth measurement, muscle length testing-tightness, contracture and flexibility, manual muscle testing, peripheral neurological examination- dermatomes, myotomes and reflexes, special tests and functional tests. Prescription of home program. Documentation of case records, and follow up.
7.	Documentation of rehabilitation assessment and management using International Classification of Functioning Disability and Health (ICF)
8.	Standardized tests and scales used in various types of cases for assessment and interpretation in Physiotherapy practice. Evaluation methods and Outcome measurements used in musculoskeletal disorders like Goniometry, Manual muscle testing ,hand held dynameters ,

	Myometer, end feels, grades of edema, grades of tenderness, Strength their reliability and validity, VAS, Mc Gill questionnaire, Neck Disability Index, Cervical spine outcome questionnaire, Upper extremity functional scale, American Shoulder and elbow scale, Simple shoulder test, Disability of shoulder arm and hand questionnaire, Short musculoskeletal functional assessment, Modified Oswestery disability questionnaire, Ronaldo Morris disability questionnaire, Psoriasis research society 22 questionnaire, Achilles tendon rupture score, Foot and ankle ability measure (Sports scale), Foot and ankle outcome score, revised foot function index, foot health status questionnaire, Physical activity and disability survey, Revised Physical activity and disability survey, Physical activity scales for elderly, Evaluation Methodology and Disability calculator, Ergometery, shoulder Pain and Disability Index, WOMAC Scale, Nordic Scale, SF36, Sickness impact profile, PROMIS, 10 Global health
9.	Evaluation methods and Outcome measurements used in Neuromuscular disorders, Equilibrium and Non equilibrium test, Deep tendon reflexes, Primitive and tonic reflex, cranial nerve examination, Voluntary Control Physiotherapy functional mobility profile and Physiotherapy functional mobility profile Questionnaire, Trinity test of functional mobility, Elderly mobility scale and Swedish modified EMS, Activities specific balance confidence scale, Berg balance scale, COMA1, Barthel index, GCS, Cards index of ADL, Oasis, Step watch monitor, Short Parkinson evaluation scale, Freezing gait questionnaire, Postural assessment scale for stroke, trunk impairment scale, Multiple sclerosis impact scale, Tardieu Scale, ashworth Scale , Modified ashworth Scale, Locomotor capabilities index 5, Motor assessment scale, Wheelchair Skills Test (WST) and Wheelchair Skills Test Questionnaire (WSTQ), Wheelchair Outcome Measure (WhOM), Wheel Chair users shoulder pain index, Pain self efficiency questionnaire, Multiple dimensional pain inventory, walking index for spinal cord injury patients, stop watch monitors, Fatique impact scale and its derivatives, Daily fatigue impact

	scale, Modified fatigue impact scale, Fatigue impact scale for COPD (FIS 25), Baroneurological institute Fatigue scale, Brief inventory scale, ASIA Scale, SD Curve, NCV, EMG.
10.	Evaluation methods and Outcome measurements used in Cardiovascular disorders Vitals, Capacities, Volumes, Blood gas analysis, Modified Medical research Council Scale of Dyspnea, 6 Minute walk test, Physical Performance Test, Minnesota Living with Heart Failure Questionnaire, Chronic Respiratory Disease Questionnaire, Time up and go Test, L – Test, Star excursion test, Timed walk test, RPE Borg Scale Functional independence measures, Spinal cord independence measures, Wheel chair, Patient Satisfaction Questionnaire, Patient Satisfaction with Physical Therapy
11.	Future challenges in physiotherapy

PROFESSIONAL PRACTICE PRACTICAL

MPT.501P

Credits: 1.5 hrs/ week

The same curriculum of Professional Practice (MPT.501) should be covered in this course.

RESEARCH METHODOLOGY AND BIOSTATISTICS

RMB.501

Credits: 4 hrs/ week

Sr. No	Topic
1.	Introduction to research
2.	Types of research
3.	Defining a research question
4.	1. Qualitative study designs a. Grounded theory and Phenomenological methods.
5.	Use of Delphi process
6.	Quantitative study
7.	Type I and type II bias
8.	Study design: types Case study, Case series, longitudinal cohort, Pre post design, Time series design, repeated measures design, Randomized control design
9.	Sampling design, calculating minimum sample size based on design
10.	Measurement: Properties of measurement: reliability, validity, responsiveness, MCID.
11.	Outcome measures: Use of outcome measures in rehabilitation research
12.	Research Methods: Designing methodology, Reporting results, Type I and Type II bias
13.	Communicating research.
14.	Evaluating published research: looking at the evidence
15.	Introduction to evidence based practice, evaluating evidence
16.	Asking clinical questions
17.	Translating of evidence into practice: strategies
18.	Use of clinical practice guidelines, clinical pathways, prediction rules to inform practice
19.	Descriptive Statistics and measurement variability
20.	Statistical inference

21.	Comparison of group means: T-test
22.	Analysis of variance
23.	Multiple comparison tests
24.	Non parametric tests
25.	Correlations
26.	Regression
27.	Analysis of frequencies: Chi square
28.	Statistical measure of reliability
29.	Power analysis – Determining sample size
30.	Epidemiological Measures – Rate, Ratio, Proportion, Incidence and prevalence, Relative risk, Risk ratio, Odds ratio
31.	Definition and kinds of scientific documents – Research paper, Review paper, Book , Reviews, Thesis, Conference and project reports (for the scientific community and for funding agencies)
32.	Publication – Role of author, Guide, Co-authors.
33.	Structure, Style and contents; Style manuals (APA, MLA); Citation styles: Footnotes, References; Evaluation of research
34.	Significance of Report writing; Different steps in Report writing; Mechanics and precautions of writing research reports Oral and poster presentation of research papers in conferences/symposia; Preparation of abstracts
35.	Structure of Thesis and Content – Preparing Abstracts
36.	SCIENTIFICCONDUCT 1. Ethics with respect to science and research 2. Scientific misconducts: Falsification, Fabrication, and Plagiarism (FFP) 3. Redundant publications: duplicate and overlapping publications, salami slicing 4. Selective reporting and misrepresentation of data
37.	PUBLICATION ETHICS 1. Publication ethics: definition, introduction and importance 2. Best practices/ standards setting initiatives and guidelines: COPE,

	WAME, etc. 3. Conflicts of interest 4. Publication misconduct: definition, concept, problems that lead to and vice versa, types 5. Violation of publication ethics, authorship and contributorship

HUMAN VALUES AND ETHICS

HVE.501

Unit No.	Content
1.	**Introduction to Value Education:** Understanding the need, basic guidelines, content and process for Value Education, Self-exploration—its content and process; 'Natural Acceptance' and Experiential Validation—as the mechanism for self exploration.
2.	**Continuous Happiness and Prosperity:** A look at basic human aspirations, Right understanding, Relationship and Physical Facilities — the basic requirements for fulfillment of aspirations of every human being, Understanding Happiness and Prosperity come — A critical appraisal of the current scenario, Method to fulfill the above human aspirations: Understanding and living in harmony at various levels
3.	**Harmony in the Human Being:** Understanding human being as a coexistence of the sentient 'I' and the material 'Body', Understanding the needs of Self ('I') and 'Body' Sukh and Suvidha. **Body as an instrument of 'I'**: Being the doer. seer and enjoyer, understanding the characteristics and activities of 'I' and harmony in 'I', understanding the harmony of 'I' with the Body: Sanyam and Svasthya; correct appraisal of physical needs, meaning of prosperity in detail, programs to ensure Sanyam and Svasthya
4.	**Harmony in the Family and Society:** Understanding harmony in the Family — the basic unit of human interaction, Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhaya —tripti; Trust; vrs-vasa) and Respect (Sammana) as the foundational values of relationship. Understanding the meaning of VI-S-vasa; Difference between intention and competence, Understanding the meaning of Sammana, Difference between respect and differentiation; the other salient values in relationship,
5.	**Harmony in the society:** Understanding the harmony in the society (society being an extension of family): Sarnadhana, Samriddhi, Abhaya.

	Sah-astirva as comprehensive Human Goals, Visualizing a universal harmonious order in society — Undivided Society (Akhand Sarnal), Universal Order (Sarvabhauma Vyavasthal- from family to world family.
6.	**Harmony in the Nature (Existence):** Understanding the harmony in the Nature, Interconnectedness and mutual fulfillment among the four orders of nature—recyclability and self-regulation in nature.
7.	**Understanding Sah-astitva:** Co-existence of mutually interacting units in all-pervasive space, Holistic perception of harmony at all levels of existence
8.	**Implications of the Holistic Understanding — A Look at Professional Ethics** : Natural acceptance of human values, Definitiveness of Ethical Human Conduct, Basis for Humanistic Education, Humanistic Constitution and Universal Human Order, Competence in Professional Ethics. Ability to utilize the professional competence for augmenting universal human order, Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems, technologies and management models, Case studies of typical holistic technologies, management models and production systems.
9.	**Strategy for transition *frori* the present state to Universal Human Order:** (a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers, (b) At the level of society as mutually enriching institutions and organizations
Session Number	**Practice Sessions**
PS 1.	**Module 2: Introduction to Value Education:** Introduce yourself in detail. What are the goals in your life? How do you set your goals in your life? How do you differentiate between right and wrong? What have been your salient achievements and shortcomings in your life? Observe and analyze them.
PS 2.	Now-a-days, there is a Icy of talk about many techno-genic maladies such as energy and material resource depletion environmental pollution, global

	warming, ozone depletion, deforestation, soil degradation, etc. — all these seem to be man-made problems, threatening the survival of life on Earth — What is the root cause of these maladies & what is the way out in your opinion? On the other hand, there is rapidly growing danger because of nuclear proliferation, arms race, terrorism, criminalization of politics, large scale corruption. scams, breakdown of relationships, generation gap,depression & suicidal attempts etc. - what do you think, is the root cause of these threats to human happiness and peace - what could be the way out in your opinion?
PS 3.	1. Observe that each one of us has the faculty of 'Natural Acceptance'. based on which one can verify what is right or not right for him. (As such we are not properly trained to listen to our 'Natural Acceptance' and many a time it is also clouded by our strong pre-conditionings and sensory attractions). **Explore the following:** (i) What is 'Naturally Acceptable' to you in relationship—the feeling of respect r disrespect for yourself and for others? (ii) What is 'Naturally Acceptable' to you - to nurture or to exploit others? Is your living in accordance with your natural acceptance or different from it? 2. Out of the three basic requirements for fulfillment of your aspirations- right understanding, relationship and physical facilities- observe how the problems in your family are related to each. Also observe how much time & effort you devote for each in your dai**l**y routine.
PS 4.	**Module 2: Harmony in the Human Being:** List down all your important desires. Observe whether the desire is related to Self ('I') or the Body. If it appears to be related to both, visualize which part of it is related to Self ('I') and which part is related to Body.

PS 5.	1. (a) Observe that any physical facility' you use, follows the given sequence with time: Necessary and tasteful unnecessary but still tasteful unnecessary and tasteless —> intolerable (b) In contrast, observe that any feeling in you is either naturally acceptable or not acceptable at all. If naturally acceptable, you want it continuously and if not acceptable, you do not want it any moment 2. List down all your important activities. Observe whether the activity is of 'I' ,)r of Body or with the participation of both 'I' and Body 3. Observe the activities within 'I'. Identify the object of your attention for different moments (over a period of say 5 to 10 minutes) and draw a line diagram connecting these points. Try to observe the link between any two nodes
PS 6	1. Chalk out some programs towards -insuring your harmony with the body - in terms of nurturing, protection and right utilisation of the body. 2. Find out the plants and shrubs growing in and around your campus, which can be useful in curing common diseases.
PS 7	**Module 3: Harmony in the Family and Society** Form small groups in the class and make them carry out a dialogue focusing on the following eight questions related to 'TRUST': 1a. Do I want to make myself happy? 2a. Do I want to make the other happy? 3a. Does the other want to make himself/herself happy? 4a. Does the other want to make me happy? What is the answer? **Intention (Natural Acceptance)** 1b. Am I able to always make myself happy? 2b. Am I able to always make the other happy' 3b. Is the other able to always make himself/herself happy? 4b. Is the other able to always make me happy?

	What is the answer? **Competence** Let each student answer the questions for himself and everyone else. Discuss the difference between intention and competence. Observe whether you evaluate yourself and others on the basis of intention/ competence.
PS 8.	1. Observe, on how many occasions, you are able to respect your related ones (by doing the right evaluation) and on how many occasions you are disrespecting by way of under-evaluation, over-evaluation or otherwise evaluation. 2. Also, observe whether your feeling of respect it based on treating the other as you would treat yourself or on differentiations based on body, physical facilities or beliefs.
PS 9.	1. Write a narration in the form of a story, poem, skit or essay to clarify a salient Human Value to the children. 2. Recollect and narrate an incident in your life where you were able to exhibit willful adherence to values in a difficult situation.
PS 10.	**Module 4: Harmony in the Nature (Existence)** List down some common units (things) of Nature which you come across in your daily life and classify them in the four orders of Nature. Analysis and explain the aspect of mutual fulfillment of each unit with other orders.
PS 11.	Make a chart to show the whole existence as co-existence. With the help of this chart try to identify the role and the scope of some of the courses of your study. Also indicate the areas which are being either over-emphasized or ignored in the present context.
PS 12.	**Module 5: Implications of the Holistic Understanding — a Look at Professional Ethics**: Identify any two important problems being faced by the society today and analyze the root cause of these problems. Can these be solved on the basis of natural acceptance of human values. If so, how should one proceed in this direction from the present situation?

PS 13.	Suggest ways in which you can use your knowledge of Science/Technology/Management etc. for moving towards a universal human order. Propose a broad outline for Humanistic Constitution at the level of Nation.
PS 14.	The course is going to be over new. It is time to evaluate what difference in your thinking has it made. Summarize the core message of this course grasped by you. How has this affected you in terms of; a. Thought b. Behavior c. Work and d. Realization What practical steps are you able to visualize for the transition of the society from its present state.

MPT

2ND

SEMESTER

SEMESTER – II				
CORE COURSES		**Credit Hours**		**Contact Hours**
Course Code	**Course Title**	**Theory**	**Practical**	
MPT.503	Biomechanics and Kinesiology	3		3
MPT.503P	Biomechanics and Kinesiology Practical		1.5	3
MPT.599	Seminars	2		2
MPT.522	Clinical Discussion	2 (NC)		2 (NC)
MPT.532	Clinical Case Presentations	1 (NC)		1 (NC)
MPT.542	Journal Club	1 (NC)		1 (NC)
MPT.552P	Classroom Teaching	2 (NC)		2 (NC)
MPT.560	Library	1 (NC)		1 (NC)
MPT.572P	Clinical Training		8 (NC)	16 (NC)
MPT.600	Dissertation Work		4 (NC)	8 (NC)
Elective Courses (Choose Any One)				
EVS.501	Principles of Environment studies	3	-	3
EXP.501	Exercise Physiology	2	-	2
ERG.501	Ergonomics	2	-	2
SPT.501	Sports Physiotherapy	2	-	2
DIS.501	Disability Diseases	2	-	2
Total for Semester II		**15**	**13.5**	**42**
Total Credit Hours of Semester II		**28.5**		

BIOMECHANICS & KINESIOLOGY
MPT.503
Credits- 3 hrs/week

Sr. No	Topic
1.	Biomechanics of Tissues and structures of the musculoskeletal system and clinical application.
2.	Normal and applied Biomechanics of Spine **Biomechanics of the vertebral column** a. General structure and function b. Regional structure and function – Cervical region, thoracic region, lumbar region, sacral region c. Muscles of the vertebral column d. General effects of injury and aging
3.	Normal and applied Biomechanics of Upper extremity a. **The shoulder complex**: Structure and components of the shoulder complex and their integrated function b. **The elbow complex:** Structure and function of the elbow joint – humeroulnar and humeroradial articulations, superior and inferior radioulnar joints; mobility and stability of the elbow complex; the effects of immobilization and injury. c. **The wrist and hand complex:** Structural components and functions of the wrist complex; structure of the hand complex; functional position of the wrist and hand.
4.	Normal and applied Biomechanics of Lower extremity. a) **The hip complex**: structure and function of the hip joint; hip joint pathology- arthrosis, fracture, bony abnormalities of the femur: b) **The knee complex:** structure and function of the knee joint – tibiofemoral joint and patellofemoral joint; effects of injury and disease. c) **The ankle and foot complex.:** structure and function of the ankle joint, subtalar joint, talocalcaneonavicular joint, transverse tarsal joint, tarsometatarsal joints, metatarsophalangeal joints, interphalangeal joints, structure and function of the plantar arches, muscles of the ankle and foot, deviations from normal structure and function – Pes Planus and Pes Cavus
5.	**Clinical kinesiology of posture.** Static and dynamic posture, postural control, kinetics and kinematics of posture, ideal posture analysis of posture, effects of posture on age, pregnancy, occupation and recreation

6.	**Biomechanics and Patho-mechanics of respiration, circulation, hand function and gait.** a) general features of gait, gait initiation, kinematics and kinetics of gait, energy requirements, kinematics and kinetics of the trunk and upper extremities in relation to gait, stair case climbing and running, effects of age, gender, assistive devices, disease, muscle weakness, paralysis, asymmetries of the lower extremities, injuries and mal-alignments in gait; Movement Analysis: ADL activities like sitting – to standing, lifting, various grips , pinches.
7.	**Basic Concepts in Biomechanics: Kinematics and Kinetics** Types of Motion, Location of Motion , Direction of Motion, Magnitude of Motion, Definition of Forces, Force of Gravity, Reaction forces, Equilibrium, Objects in Motion, Force of friction, Concurrent force systems, Parallel force system, Work, Moment arm of force, Force components, Equilibrium of levers
8.	Methods of kinetics and kinematics investigation
9.	Patient Positioning, Body Mechanics and Transfer Techniques
10.	Ergonomic Approach to lifting and handling, workspace and Environment
11.	**Biomechanics of the Thorax and Chest wall -** a) General structure and function b) Rib cage and the muscles associated with the rib cage c) Ventilatory motions: its coordination and integration d) Developmental aspects of structure and function e) Changes in normal structure and function I relation to pregnancy, scoliosis and COPD
12.	**The Temporomandibular Joint-** General features, structure, function and dysfunction

BIOMECHANICS & KINESIOLOGY PRACTICAL
MPT.503P
Credits- 1.5hrs/ week

The same curriculum of Biomechanics & Kinesiology (MPT.503) should be covered in this course.

ENVIRONMENT STUDIES

EVS.501

Credits- 3 hrs/week

Unit No.	Content
1.	**Introduction to ecology and environment** Definition, scope and importance of environment and environmental science. Structure of Environment – layers of atmosphere, hydrosphere – water budget, groundwater and ocean, lithosphere – soil formation and profile. Concept of ecology and ecosystem; types of ecosystem (Forest, pond, lakes, river, desert and grass land); energy flow of ecosystem; food chain and food web; ecological pyramids and succession
2.	**Natural resources** Forest resources–uses and exploitation, deforestation and conservation; Renewable, Nonrenewable and alternate energy resources; Mineral resources - Use and exploitation, environmental effects of extracting and using mineral resources; water resources–uses and exploitation; Human resources and food resources; Bioresources–biodiversity value, threats and conservation, hot spots of biodiversity and endangered species, red data book; soil erosion and desertification.
3.	**Environmental pollution** Air, water, soil and noise – sources, effects and consequences; marine and thermal pollution; Greenhouse effect, acid rain, ozone depletion, nuclear winter, photochemical smog, London smog Solid waste management–sources of waste generation, collection, segregation and disposal. Waste hierarchy and Integrated solid waste management Pollution control methods–sewage treatment plant, water treatment plant, air pollution control methods
4.	**Natural disasters** Earthquakes, floods, tsunamis, cyclones, droughts, landslides and tsunamis
5.	**Environmental laws, conventions and protocols**

	Water (Prevention and control of Pollution) act; Air (Prevention and Control of Pollution) Act; Environment Protection Act; Forest Conservation act; Kyoto protocol, Montreal protocol, Stockholm convention, Rio summit 1992 and convention on biodiversity, Cartagena protocol, IPCC.
6.	**Social issues and the environment** Rain water harvesting; wasteland reclamation; environmental ethics; sustainable development; population growth, industrialization, urbanization, family, child and women welfare programmes, human health and environment; Role of Information Technology in Environment; value education; sustainable development
7.	**Field work** Visit to local polluted site, biogas plant, waste management site, wastewater treatment plant, wildlife sanctuary; Study of simple ecosystems-pond, river etc.

Suggested Books:

Sr. No.	**Authors/ Name of Books/Publisher**
1.	Rana, S. V. S. Essentials of Ecology and Environmental Science Edition: Fifth edition.
2.	S. P. Mishra and S. N. Pandey (2008) Essential Environmental Studies, First edition, CRC press.
3.	Andrew Friedland, Rick Relyea, David Courard-hauri and Ross Jones (2012) Essentials of Environmental Science. Freeman Publishers.
4.	Kamaraj. P & Arthanareeswari. M (2010) Environmental Science – Challenges and Changes", 4th Edition, Sudhandhira Publications.
5.	R. Jeyalakshmi, (2008) 'Principles of environmental science, Devi publications,2nd ed.
6.	Kurian Joseph, R.Nagendran, (2005) 'Essentials of Environmental Studies', Pearson Education, 2nd edition.
7.	P. Anandan (2009) Environmental Science and Engineering, Scitech Publishers.
8.	Helen P. Kavitha (2008) Principles of Environmental Science, Science tech

	Publications, 2nd Edition.
9.	De A. K. (1996) 'Environmental Chemistry, New Age International, NewDelhi.
10.	Vasudevan N. (2006) Essentials of Environmental Science 1st Edition, Alpha Science International Ltd.
11.	William Cunningham and Mary Cunningham Environmental Science: A Global Concern.
12.	P. R. Trivedi (2004) Environmental Pollution and Control, APH Publishing Corporation.
13.	Rajagopalan (2015) Environmental Studies: From Crisis to Cure 3rd edition, OUP India Publishers.

EXERCISE PHYSIOLOGY

Teaching Hours: 30 (2 hours / week)

1. **Introduction to Exercise Physiology** **3 Hours**
2. **Nutrition and Energy** **5 Hours**
   - **a)** Macronutrients and Micronutrients
   - **b)** Food Energy and Optimum Nutrition for Exercise, carbohydrate loading
   - **c)** Nutritional and Pharmacological Aids to Exercise
   - **d)** Doping and dope test
3. **The Physiological Support System** **14 Hours**
   - e) The Pulmonary System and Exercise
   - f) The Cardiovascular System and Exercise
   - g) The Neuromuscular System and Exercise
   - h) Hormones Exercise and Training
4. **The Exercise Training and Adaptations** **5 Hours**
   - i) Training the Aerobic and Anaerobic Energy Systems
   - j) Training Muscle To Become Stronger
   - k) Factors Affecting Physiological Functions: the environment and special aids to performance
5. **Optimizing Body Composition, Successful Aging and Health Related Exercise Benefits** **3 Hours**
   - l) Body Composition, Obesity and Weight Control
   - m) Physical Activity, Exercise, Successful Aging and Disease Prevention
   - n) Clinical Aspects of Exercise Physiology

ERGONOMICS

Teaching Hours: 60(2 hours / week)

Basic course content

Overview of ergonomics and design relevancies'; Man – the prime system component; Man-machine- environment interaction system and user- friendly design practice; Human compatibility, comfort and adaptability; Fundamentals of ergonomics; Physical(anthropometrics), Physiological (work physiology) and Psychological aspects (behavior, cognitive aspects and mental workload); Information processing, human error and risk perception; Visual performance and visual displays; environmental factors influencing human performance; Occupational stress; safety and health issues; Ergonomics criteria/ check while designing; Design process involving ergonomics check and ergonomic design evaluation and Participatory ergonomics aspects.

Section I: Introducing Ergonomics, Welcome and content details

1. Welcome and content details: Syllabus
2. Design today-Human aid to lifestyle

Section II: Discipline approach: Ergonomics/Human factors

1. Journey, Fitting task to man their contractual structure
2. Domain, Philosophy and Objective
3. Mutual task comfort: two way dialogue, communication model
4. Ergonomics/human Factors fundamentals
5. Physiology(work physiology) and stress

Section III: Human physical dimension concern

1. Human body-structure and function, anthropometrics
2. Anthropometry: body growth and somatotypes
3. Static and dynamic anthropometry ,Stand Posture- erect
4. Anthropometry landmark: Sitting posture
5. Anthropometry: squatting and cross- legged postures
6. Anthropometric measuring techniques
7. Statistical treatment of data and percentile calculations

Section IV: Posture and movement

1. Human body- structure and function
2. Posture and job relation
3. Posture and body supportive devices

4. Chair characteristics
5. Vertical work surface
6. Horizontal work surface
7. Movement
8. Work Counter

Section V: Behaviour and perception

1. Communication and cognitive issues
2. Psycho-social behavior aspects, behavior and stereotype
3. Information processing and perception
4. Cognitive aspects and mental work load
5. Human error and risk perception

Section VI: Visual Issues

1. Visual performance
2. Visual displays

Section VII: Environments Factors

1. Environmental factors influencing human performance

Section VIII: Ergonomic design process

1. Ergonomics design methodology
2. Ergonomics criteria/check while designing
3. Design process involving ergonomics check
4. Some checklists for task easiness

Section IX: Performance support and design interventions

1. Occupational safety and stress at work place in view to reduce the potential fatigue, errors, discomforts and unsafe acts
2. Workstation design
3. Furniture support
4. Vertical arm reach and design application possibility
5. Humanizing design: Design and human compatibility, comfort and adaptability aspects

Section X: Design Ergonomics in India: scope for exploration

1. Concluding session: Design Ergonomics in India: scope for exploration

Books suggested :

1. Bridger,RS: Introduction to Ergonomics, 2nd Edition, Taylor & Francis, 2003.

2. Dul, J. and Weerdmeester, B. Ergonomics for beginners, a quick reference guide, Taylor & Francis, 1993.
3. Green, W.S. and Jordan, P. W, Human Factors in Product Design, Taylor &rancis, 1999.
4. D.Chakrabarti, Indian Anthropometric Dimensions for ergonomic design practice, National Institute of Design, Ahmedabad, 1997.
5. G. Salvendy (edit), Handbook of Human Factors and ergonomics, John Wiley & Sons, Inc., 1998.
6. Singh, S(Edt), Ergonomics Interventions for Health and Productivity, Himanshu Publications, Udaipur, New Delhi, 2007.

SPORTS PHYSIOTHERAPY

Teaching Hours: 2 hours/week

Section- I: Foundation of sports Injury management 4 HOURS

Sports Medicine: Responsibilities of the primary sports medicine team, Team Physician, Primary care physician, Athletic trainer, Coach or sport Supervisor, Sport Participant, Student Athletic trainer, Physical therapist

Standards of Professional Practice: NATA Certification for the athletic trainer**,** Continuing Education Requirements**,** Registration and Licensure

Legal Liability: Negligence**,** Failure to warn**,** Informed consent**,** Foresee ability of harm**,** Product liability**,** Confidentiality

Section-II: Sports Injury Assessment 5 HOURS

Anatomical Foundation: Body segments and anatomical positions**,** Directional terms**,** Regional terms**,** Joint movement terms

Assessing an Injury: On the field vs off the field assessment

Primary Injury Assessment: Assess unresponsiveness; Open the airway, Establish Breathing, Establish Circulation and Secondary Injury Assessment: History of the Injury, Observation, Palpation, Special Tests, Determination of Findings, Moving the injured participant

History of the injury: Primary complaint**,** Mechanism of injury**,** Characteristics of the symptoms**,** Disability resulting from the injury**,** Related Medical history

Observation and Inspection: Observation**,** Inspection of the injury site

Palpation, Special Tests, Joint range of motion**,** resisted manual muscle testing**,** Neurologic testing**,** Stress tests**,** Functional testing**,** Injury Recognition

SOAP Notes: Subjective evaluation**,** Objective evaluation**,** Assessment, Plan

Section-III: The mechanics of tissue injury and healing 4 HOURS

Injury Mechanisms: Force and its effect**,** Torque and its effect

Soft tissue injuries: Anatomical properties of Soft tissue**,** Skin Injury Classifications**,** Other soft tissue Injury Classification, Soft tissue healing

Bone Injuries: Anatomical Properties of Bone**,** Bone Injury Classification, Epiphyseal Injury Classification**,** Bone tissue Healing

Injuries to the lower extremity Foot, Ankle and Lower leg, Anatomy review of the foot, ankle and lower leg

Nerve Injuries: Anatomical properties of nerve, Nerve Injury Classification, Nerve Healing

Pain: Neurological basis of pain, Factors that Mediate Pain, Referred Pain and Radiating Pain

Section-IV: Therapeutic exercise and therapeutic modalities 7 HOURS

Psychology and Injured participant

Developing a Therapeutic Exercise Program: Phase One: Controlling Inflammation, Control of inflammation**,** Protect and restrict Activity**,** Phase Two: Restoration of Motion**,** Joint range of Motion**,** Flexibility**,** Phase Three: Developing a muscular strength**,** Endurance and Power**,** Muscular Strength**,** Muscular Endurance**,** Muscular Power**,** Open VS Closed Chain Exercises, Phase Four: Return to sport activity**,** Coordination**,** Sports specific Skill Conditioning**,** Cardiovascular Endurance

Therapeutic Modalities and Medications: Cryotherapy**,** Thermotherapy**,** Neuromuscular Electrical stimulation**,** Intermittent Compression Units**,** Continuous passive Motion (CPM)**,** Massage**,** Medications

Section-V: Protective Taping and Wraps 7 HOURS

Principles of Taping and wrapping: Uses of Tape and Wraps**,** Types of Tape and Wraps, Application of tape**,** Application of Wraps

Common Taping and wrapping Techniques: Taping and wrapping Techniques for the Lower extremity**,** Taping and wrapping Techniques for the upper extremity

Protective Equipment: Principles of protective equipment**,** Protective equipment for the head and face**,** Football Helmets**,** Ice Hockey helmets**,** Batting Helmets**,** Other Helmets, Face Guards**,** Mouth Guards**,** Eye wear**,** Ear wear**,** Throat and neck protectors, Protective equipment for the upper body: Shoulder protection**,** Elbow, forearm, wrist and hand protection**,** Thorax, rib and abdominal protection

Sports Brace: Lumbar/Sacral Protection, Protective equipment for the lower body, Hip and buttock protection, Thigh protection, Hypothermia, Preventing cold-related injuries, Frostbite Injuries, Systemic body cooling

Section-VI: Career Opportunities in Athletic training **3 HOURS**

High School and collegiate settings**,** Sports Medicine and Clinic, Dual High School/ Clinic athletic trainer, Industrial Health Care Programs, Professional Sports Teams

DISABILITY DISEASES

Credit Point - 02

1. Clinician (Medical Knowledge+Patient Care)

Who understands and provides preventive promotive, curative, palliative and holistic care with dignity and compassion (Can be equated with ACGME competency of Medical knowledge and Patient care). Art IMG should be able to:

1.1. Describe disability as per United Nations Convention on the Rights of Persons with Disabilities while demonstrating acceptance of and respect for the differences and capacities of persons with disabilities as part of human diversity and humanity

1.2. Understand the human rights model of disability and compare and contrast it with medical and social model of disability

1.3. Provide for and encourage genetic testing and counseling for families, where there may be suspected genetically related disability issues.

1.4. Make an early diagnosis and suggest methods to prevent the common disabilities present the community, using a lifecycle approach

1.5. Identify the additional healthcare needs of a patient with disability including sexual and reproductive health needs

1.6. Demonstrate awareness of the range of assistive devices counsel them to choose the appropriate one.

1.7. Assess and document disability on a functional basis

1.8. 1.8 Interpret and critically analyze a disability certificate.

1.9. Discuss long term management of the common disabilities in the community

2. Leader and Member of the health care team and system

With capabilities to collect, analyze, synthesize and communicate health data appropriately (Can be equated with ACGME competency of Systems based Practice):

2.1 Promote patient-centered, supported decision-making approach involving family members in delivering effective healthcare to patients with disabilities.

2.2 Build an understanding of the concept and practical application of reasonable accommodation in healthcare, both in in-patient and in out-patient departments.

2.3 Engage healthcare staff and all members of an interprofessional team to collaborate towards multidisciplinary assessment and management of patients with disabilities to provide disability-inclusive compassionate care

2.4 Advocate social inclusion by raising awareness of the human rights of persons with disabilities through training and the promulgation of ethical standards for public and private health care

3. Communicator

With patients: families, colleagues and community. (Can be equated with ACGME competency of Interpersonal and Communication Skills)

3.1 Demonstrate the use of verbal and non-verbal empathetic communication techniques while communicating with patients with disabilities and their caregivers in a manner acceptable to the specific disability culture

3.2 Assess capacity of a patient with disability to give informed consent and demonstrate the ability to take an informed consent from a patient with disability.

3.3 Explain the need for referral and the referral procedure to a patient with disability.

3.4 Check understanding of the medical advice related to treatment, prognosis, follow-up, and/or referral given to patients with disabilities 3.5 Provide health education to the patients with disabilities, their caregivers, their families, and at the community level in a culturally appropriate manner.

4. Lifelong learner

Committed to continuous improvement of skills and knowledge (Can be equated with ACGME competency of Practice based learning & improvement).

4.1 Demonstrate awareness of the disabilities included in the Rights of Persons with Disabilities Act, 2016 and keep abreast of updates.

4.2 Demonstrate an understanding of accessible healthcare setting for patients with disabilities, including universal design to ensure physical accessibility, and accessible formats of information and communication.

4.3 Demonstrate familiarity with government run programs, schemes, legislation and legal services available for persons with disabilities, and keep abreast of updates,

4.4 Demonstrate awareness of rights-based and disabled people's organizations in the community.

4.5 Encourage research on disabling conditions, their prevalence, and their management, so as to add to the body of knowledge on the issue.

5. Professional

Who is committed to excellence, is ethical, responsive and accountable to patients. community and profession (Can be equated with ACGME competency of Professionalism).

5.1 Demonstrate respect for inherent dignity and autonomy of patients with disabilities, and their caregivers

5.2 Demonstrate commitment to give priority to patients or caregivers with disabilities in outpatient departments of health facilities

5.3 Demonstrate a non-discriminatory behavior towards patients or caregivers with disabilities and a commitment to provide to them care of the same quality as to others.

5.4 Demonstrate integrity in treating patients with disabilities who are vulnerable to physical. Mental, sexual, social and financial exploitation.

MPT

3RD

SEMESTER

SEMESTER – III				
CORE COURSES		**Credit Hours**		**Contact Hours**
Course Code	**Course Title**	**Theory**	**Practical**	
MPT.504	Advanced Physiotherapeutic	2		2
MPT.504P	Advanced Physiotherapeutic Practical		2	4
MPT.505	Physiotherapy Diagnosis and Clinical Decision Making	1		1
MPT.505P	Physiotherapy Diagnosis and Clinical Decision Making Practical		1	2
MPT.506	Electrophysiology and Electro Diagnosis	3		3
MPT.506P	Electrophysiology and Electro Diagnosis Practical		1	2
MPT.599	Seminars	2		2
MPT.533	Clinical Case Presentations	1 (NC)		1 (NC)
MPT.543	Journal Club	1 (NC)		1 (NC)
MPT.553P	Classroom Teaching	2 (NC)		2 (NC)
MPT.573P	Clinical Training		7.5 (NC)	15 (NC)
MPT.600	Dissertation Work		3.5 (NC)	7 (NC)
Total for Semester III		**12**	**15**	**42**
Total Credit Hours of Semester III		**27**		

ADVANCED PHYSIOTHERAPEUTIC

MPT.504

Credits: 2hrs/ week

1.	Pain (Neurobiology, various theories, modulation and management of pain.
2.	Maternal and child care in general Physiotherapy
3.	Theories of motor control and motor learning.
4.	Theories of aging.
5.	Cardiopulmonary medications and their effect on activity performance.
6.	Exercise planning and prescription.
7.	Use of Exercise therapy techniques and application on various types of cases.
8.	Ergonomic aspects of exercise on oxygen, energy consumption MET value of various exercises and activity.
9.	Effect of aerobic, anaerobic as well as Isometric and Isokinetic exercises on cardiac function.
10.	Physiotherapy in psychiatric conditions.
11.	Therapeutic and Sports Massage.
12.	Principles of Neurological approaches
13.	General Guidelines to be followed in Cardiac Rehabilitation, Pulmonary Rehabilitation, Burns Rehabilitation and Cancer Rehabilitation Protocol.
14.	CPR, monitoring systems and defibrillators and artificial respirators
15.	Physiotherapy in common conditions of skin.
16.	Physiotherapy following Plastic Surgery
17.	Physiotherapy following Obstetric and Gynecological Disorders
18.	Manual therapy – different schools of thought
19.	Soft tissue manipulations, neural mobilization, acupressure.(Cyriax, Butler, McKenzie)
20.	Myofascial Release technique and Muscle Energy technique
21.	Pilates-school of thought, Chiropractic school of thought, Osteopathic school of thought

22.	Joint mobilization & manipulation – peripheral joints and vertebral joints. (Maitlands, Mulligan, Keltonborn)
23.	Neuromuscular Taping Techniques
24.	Community based rehabilitation in musculoskeletal disorders
25.	Recent Advances in Musculoskeletal Disorders and Sports Physiotherapy.
26.	Positional Release Technique
27.	Proprioceptive Neuromuscular Facilitation

PHYSIOTHERAPY DIAGNOSIS AND CLINICAL DECISION MAKING MPT.505

Credits: 1hr/week

1.	Clinical examination in general and detection of movement dysfunction
2.	Principles of pathological investigations and imaging techniques related to neuromuscular, skeletal and cardiopulmonary disorders with interpretation
3.	Developmental screening, motor learning –motor control assessment.
4.	Anthropometric measurements
5.	Physical fitness assessment by Range of motion, Muscle strength, endurance and skills, Body consumption, Fitness test for sports.
6.	Evaluation Methods, Special tests and Scales used in Musculoskeletal, Neurological and Cardiopulmonary disorders.
7.	Biophysical measurements, physiotherapy modalities, techniques and approaches.
8.	Evaluation of aging.
9.	Aids and appliances, adaptive functional devices to improve movement dysfunction
10.	Pulmonary function tests and Spirometry.
11.	Physical disability evaluation and disability diagnosis
12.	Gait analysis and diagnosis
13.	Clinical decision making in electrotherapeutics

PHYSIOTHERAPY DIAGNOSIS AND CLINICAL DECISION MAKING PRACTICAL
MPT.505P
Credits: 1 hrs/ Week

1.	**Introduction to Screening For Referral In Physiotherapy** b. Reasons to Screen c. Screenings and Surveillance d. Diagnosis by the Physiotherapist e. Differential Diagnosis Versus Screening f. Direct Access **g.** Decision-Making Process Case Examples and Case Studies.
2.	**Introduction to the interviewing process** a. Concepts in Communication b. Cultural Competence c. The Screening Interview d. Subjective Examination e. Core Interview f. Hospital Inpatient Information
3.	**Overview of the physiology of pain and systemic causes of pain** a. Mechanisms of Referred Visceral Pain b. Multisegmental Innervations c. Assessment of Pain and Symptoms d. Sources of Pain e. Types of Pain f. Comparison of Systemic Versus Musculoskeletal Pain g. Patterns h. Characteristics of Viscerogenic Pain, i. Screening for Emotional and Psychologic Overlay j. Screening for Systemic Versus Psychogenic Symptoms
4.	**Physical assessment as a screening tool** a. General Survey b. Techniques of Physical Examination c. Integumentary Screening Examination d. Nail Bed Assessment e. Lymph Node Palpation f. Musculoskeletal Screening Examination g. Neurologic Screening Examination

	h. Regional Screening Examination i. Systems Review
5.	**Screening for hematologic disease** a. Signs and Symptoms of Hematologic Disorders b. Classification of Blood Disorders
6.	**Screening for cardiovascular disease** a. Signs and Symptoms of b. Cardiac Pathophysiology c. Cardiovascular Disorders d. Laboratory Values.
7.	**Screening for pulmonary disease** a. Signs and Symptoms of Pulmonary Disorders b. Inflammatory/Infectious Disease c. Genetic Disease of the Lung d. Occupational Lung Diseases e. Pleuropulmonary Disorders
8.	**Screening for gastrointestinal disease** a. Signs and Symptoms of Gastrointestinal Disorders b. Gastrointestinal Disorders
9.	**Screening for hepatic and biliary disease** a. Hepatic and Biliary Signs and Symptoms b. Hepatic and Biliary Pathophysiology c. Gallbladder and Duct Diseases
10.	**Screening for urogenital disease** a. Signs and Symptoms of Renal and Urological Disorders, b. The Urinary Tract c. Renal and Urological Pain d. Renal and Urinary Tract Problems
11.	**Screening for endocrine and metabolic disease** a. Associated Neuromuscular and Musculoskeletal Signs and Symptoms b. Endocrine Pathophysiology c. Introduction to Metabolism
12.	**Screening for immunologic disease** a. Using the Screening Model b. Immune System Pathophysiology c. Physician Referral
13.	**Screening for Cancer** a. Cancer Statistics b. Risk Factor Assessment c. Cancer Prevention d. Major Types of Cancer

	e. Metastases f. Clinical Manifestations of Malignancy g. Oncologic Pain h. Side Effects of Cancer Treatment i. Cancers of the Musculoskeletal System j. Primary Central Nervous System Tumors **k.** Cancers of the Blood and Lymph System
14.	**Screening the head, neck, and back** a. Using the Screening Model to Evaluate the Head, Neck, or Back, b. Location of Pain and Symptoms c. Sources of Pain and Symptoms d. Screening for Oncologic Causes of Back Pain e. Screening for Cardiac Causes of Neck and Back Pain f. Screening for Peripheral Vascular Causes of Back Pain g. Screening for Pulmonary Causes of Neck and Back Pain h. Screening for Renal and Urologic Causes of Back Pain, i. Screening for Gastrointestinal Causes of Back Pain j. Screening for Liver and Biliary Causes of Back Pain k. Screening for Gynecologic Causes of Back Pain l. Screening for Male Reproductive Causes of Back Pain m. Screening for Infectious Causes of Back Pain
15.	**Screening the sacrum, sacroiliac, and pelvis** a. The Sacrum and Sacroiliac Joint b. The Coccyx c. The Pelvis
16.	**Screening the lower quadrant: buttock, hip, groin, thigh, and leg** a. Using the Screening Model to Evaluate the Lower Quadrant b. Trauma as a Cause of Hip, Groin, or Lower Quadrant Pain c. Screening for Systemic Causes of Sciatica d. Screening for Oncologic Causes of Lower Quadrant Pain e. Screening for Urologic Causes of Buttock, Hip, Groin, or Thigh Pain f. Screening for Male Reproductive Causes of Groin Pain g. Screening for Infectious and Inflammatory Causes of Lower Quadrant Pain h. Screening for Gastrointestinal Causes of Lower Quadrant Pain i. Screening for Vascular Causes of Lower Quadrant Pain j. Screening for Other Causes of Lower Quadrant Pain
17.	**Screening the chest, breasts, and ribs** a. Using the Screening Model to Evaluate the Chest, Breasts, or Ribs b. Screening for Oncologic Causes of Chest or Rib Pain c. Screening for Cardiovascular Causes of Chest, Breast, or Rib Pain

	d. Screening for Pleuropulmonary Causes of Chest, Breast, or Rib Pain e. Screening for Gastrointestinal Causes of Chest, Breast, or Rib Pain f. Screening for Breast Conditions that Cause Chest or Breast Pain g. Screening for Other Conditions as a Cause of Chest, Breast, or Rib Pain h. Screening for Musculoskeletal Causes of Chest, Breast, or Rib Pain i. Screening for Neuromuscular or Neurologic Causes of Chest, Breast, or Rib Pain
18.	**Screening the shoulder and upper extremity** a. Using the Screening Model to Evaluate Shoulder and Upper Extremity b. Screening for Pulmonary Causes of Shoulder Pain c. Screening for Cardiac Causes of Shoulder Pain d. Screening for Gastrointestinal Causes of Shoulder Pain e. Screening for Liver and Biliary Causes of Shoulder Pain f. Screening for Rheumatic Causes of Shoulder Pain g. Screening for Infectious Causes of Shoulder Pain h. Screening for Oncologic Causes of Shoulder Pain i. Screening for Gynecologic Causes of Shoulder Pain

ELECTROPHYSIOLOGY & ELECTRO DIAGNOSIS
MPT.506
Credits: 3 hrs/ week

1.	**Section I: Review of Basic Electrotherapeutics.** **Basic types of current** a. Direct Current: types, physiological &therapeutic effects. b. Alternating Current **Types of Current used in Therapeutics** a. Modified D.C i. Faradic Current ii. Galvanic Current b. Modified A.C i. Sinusoidal Current ii. Diadynamic Current
2.	**HVPGS:** Parameters & its uses
3.	**Ionization/Iontophoresis**: Techniques of Application of Iontophoresis, Indications, Selection of Current, Commonly used Ions (Drugs) for pain, hyperhydrosis, would healing.
4.	Cathodal/Anodal galvanism
5.	Micro Current & Macro Current
6.	**Types of Electrical Stimulators** a. NMES- Construction component. b. Neuro-muscular diagnostic stimulator- construction component. c. Components and working Principles
7.	**Principles of Application**: Electrode tissue interface, Tissue Impedance, Types of Electrode, Size & Placement of Electrode – Water bath, Unipolar, Bi-polar, Electrode coupling, Current flow in tissues, Lowering of Skin Resistance
8.	**Nerve Muscle Physiology**: Action Potential, Resting membrane potential, Propagation of Action Potential, Motor unit, synapse, Accommodation, Stimulation of Healthy Muscle, Stimulation of Denervated Muscle, Stimulation for Tissue Repair. a) Electrical properties of muscle and nerve. b) Muscles plasticity in response to electrical stimulation.
9.	**TENS:** Define TENS, Types of TENS, Conventional TENS, Acupuncture TENS, Burst TENS, Brief & Intense TENS, Modulated TENS. Types of Electrodes & Placement of Electrodes, Dosage parameters, Physiological & Therapeutic effects, Indications & Contraindications.

10.	Application of electrotherapy techniques on patients, monitoring of dosages and winding up procedure.
11.	**FG Test**
12.	**SD Curve**: Methods of Plotting SD Curve, Apparatus selection, Characters of Normally innervated Muscle, Characters of Partially Denervated Muscle, Characters of Completely denervated Muscle, Chronaxie & Rheobase.
13.	**Interferential Therapy**: Define IFT, Principle of Production of IFT, Static Interference System, Dynamic Interference system, Dosage Parameters for IFT, Electrode placement in IFT, Physiological & Therapeutic effects, Indications & Contraindications
14.	Russian Current, Rebox type Current
15.	Electro Magnetic Spectrum.
16.	**SWD**: Define short wave, Frequency & Wavelength of SWD, Principle of Production of SWD, Circuit diagram & Production of SWD, Methods of Heat Production by SWD treatment, Types of SWD Electrode, Placement & Spacing of Electrodes, Tuning, Testing of SWD Apparatus, Physiological & Therapeutic effects, Indications & Contraindications, Dangers, Dosage parameters.
17.	**Pulsed Electro Magnetic Energy**: Principles, Production & Parameters of PEME, Uses of PEME.
18.	Micro Wave Diathermy: Define Microwave, Wave length & Frequency, Production of MW, Applicators, Dosage Parameters, Physiological & Therapeutic effects, Indications & Contraindications, Dangers of MWD
19.	**Ultrasound:** Define Ultrasound, Frequency, Piezo Electric effects: Direct, Reverse, Production of US, Treatment Dosage parameters: Continuous& Pulsed mode, Intensity, US Fields: Near field, Far field, Half value distance, Attenuation, Coupling Media, Thermal effects, Non-thermal effects, Principles & Application of US: Direct contact, Water bag, Water bath, Solid sterile gel pack method for wound. Uses of US, Indications & Contraindications, Dangers of Ultrasound. Phonophoresis: Define Phonophoresis, Methods of application, commonly used drugs, Uses. Dosages of US
20.	**IRR**: Define IRR,wavelength & parameters, Types of IR generators, Production of IR, Physiological & Therapeutic effects, Duration & frequency of treatment, Indication & Contraindication.
21.	**UVR**: Define UVR, Types of UVR, UVR generators: High pressure mercury vapour lamp, Water cooled mercury vapour lamp, Kromayer lamp, Fluorescent tube, Theraktin tunnel, PUVA apparatus. Physiological & Therapeutic effects. Sensitizers & Filters. Test dosage calculation. Calculation of E1, E2, E3, E4 doses. Indications, contraindications. Dangers. Dosages for different therapeutic effects, Distance in UVR lamp

22.	**LASER**: Define LASER. Types of LASER. Principles of Production. Production of LASER by various methods. Methods of application of LASER. Dosage of LASER. Physiological & Therapeutic effects of LASER. Safety precautions of LASER. Classifications of LASER. Energy density & power density
23.	a) Wax Therapy b) Contrast Bath: c) Moist Heat Therapy d) Cyclotherm e) Fluidotherapy f) Whirl Pool Bath g) Magnetic Stimulation h) Cryotherapy
24.	a) Characteristics and components of Electro therapeutic stimulation systems and Electro physiological assessment devices. b) Anatomy and physiology of peripheral nerve, muscle and neuromuscular junction. c) Electrical stimulation and its effects on various systems. d) Clinical Electro physiological testing. e) Safety considerations in electrotherapy f) Electromyography and evoked potential studies. g) Nerve Conduction Studies h) Biofeedback i) Exercise ECG testing and monitoring

ELECTROPHYSIOLOGY & ELECTRO DIAGNOSIS PRACTICAL
MPT.506P
Credits: 1.5 hrs/ week

The same curriculum of Electrophysiology & Electro Diagnosis (MPT.506) should be covered in this course.

MPT

4TH

SEMESTER

SEMESTER – IV				
Elective Courses		**Credit Hours**		**Contact Hours**
Course Code	**Course Title**	**Theory**	**Practical**	
MPT.511	Hand Rehabilitation	2		2
MPT.511P	Hand Rehabilitation Practical		1	2
MPT.512	Physiotherapy in Orthopedics Conditions	3		3
MPT.512P	Physiotherapy in Orthopedics Conditions Practical		2.5	5
MPT.599	Seminars	2		2
MPT.534	Clinical Case Presentations	2 (NC)		2 (NC)
MPT.544	Journal Club	1 (NC)		1 (NC)
MPT.554P	Classroom Teaching	2 (NC)		2 (NC)
MPT.574P	Clinical Training		7.5 (NC)	15 (NC)
MPT.600	Dissertation Work		4 (NC)	8 (NC)
Total for Semester IV		**11**	**15**	**42**
Total Credit Hours of Semester IV		**26**		

HAND REHABILITATION

MPT.511

Credits: 2 hrs/ week

Sr. No	Topic
Unit I	Function of Hand as motor and sensory organ with advanced bio and patho-mechanics of hand. Classification of hand injuries and principles of Hand rehabilitation (Functional and vocational rehabilitation)
Unit II	
1.	Tendon Injuries
2.	Nerve Injuries and entrapment
3.	Crush Injuries
4.	Fractures, Joint Injuries and Correction of deformities, their effect on rehabilitation
Unit III	
5.	Burns in Hand
6.	Spastic Hand
7.	Rheumatoid Hand
8.	Hand in Hansen's Disease
9.	Reflex sympathetic dystrophy
10.	Stiff Hand
Unit IV	
11.	Phantom Pain
12.	Prosthetic Hand
13.	Orthoses for hand and their uses

HAND REHABILITATION PRACTICAL

MPT.511P **Credits: 1 hr/ week**

The same curriculum of Hand Rehabilitation (MPT.511) should be covered in this course.

PT in Orthopedic Conditions

MPT.512

Credits: 3 hrs/ week

Sr. No	Topic
1	Shoulder injuries: General Principles of Shoulder Rehabilitation, Dislocations and fractures around shoulder, Impingement Syndrome, Rotator Cuff Tendinitis, Rotator Cuff Tears, Shoulder Instability, Frozen Shoulder (Adhesive Capsulitis), Rehabilitation after Shoulder Arthroplasty (Replacement), Biceps Tendon Disorders, Acromioclavicular Joint Injury.
2	Elbow injuries: Medial Collateral Ligament (Ulnar Collateral Ligament) Injuries, Ulnar Nerve Injury at the Elbow (Cubital Tunnel), Treatment and Rehabilitation of Elbow Dislocations and fractures, Lateral and Medial Epicondylitis, Elbow Arthroplasty, Olecranon Bursitis, Post-Traumatic Elbow Stiffness
3	Wrist and hand injuries: Flexor Tendon Injuries, Trigger Finger (Stenosing Flexor Tenosynovitis), Flexor Digitorum Profundus Avulsion ("Jersey Finger"), Extensor Tendon Injuries, Fractures and Dislocations of the Hand, Fifth Metacarpal Neck Fracture (Boxer's Fracture), Injuries to the Ulnar Collateral Ligament of the Thumb Metacarpophalangeal Joint (Gamekeeper's Thumb), Nerve Compression Syndromes, Carpal Tunnel Syndrome, Nerve Injuries, Splinting for Nerve Palsies, Replantation, Dupuytren's Contracture, Arthroplasty, Wrist Disorders, Scaphoid Fractures, Fracture of the Distal Radius, Triangular Fibrocartilage Complex Injury, De Quervain's Tenosynovitis, Intersection Syndrome of the Wrist, Dorsal and Volar Carpal Ganglion Cysts
4	Hip and femur Injuries: Groin Pain, Hamstring and quadriceps injuries, Hip dislocations, fractures of femoral neck, Trochantric and intertrochantric fractures, Femoral shaft fractures, Femoral condylar fractures, Osteochondritis dessicans
5	Knee and leg injuries: Anterior Cruciate Ligament Injuries, Posterior Cruciate Ligament Injuries, Medial Collateral Ligament Injury, Meniscal Injuries, Patellofemoral Disorders, Patellar Tendon Ruptures, Articular Cartilage Procedures of the Knee, Baker's Cyst (Popliteal Cyst), Patella dislocation and fractures, Tibial and fibular fractures
6	Foot and ankle injuries: Ankle Sprains, Chronic Lateral Ankle Instability, Inferior Heel Pain (Plantar Fasciitis), Achilles Tendon Dysfunction, Posterior Tibial Tendon Insufficiency, Metatarsalgia, Hallux Rigidus, First Metatarsophalangeal Joint Sprain (Turf Toe), Morton's Neuroma (Interdigital Neuroma).
7	Neck & Low back injuries: Definitions and Common Terms, Incidence of Low Back Pain, False-positive Radiographic Studies in Low Back Pain Evaluation, Risk Factors Previously Associated with the Development of Low Back Pain, Predictors of Retum-to-Work Status of Patients with Back Pain (Chronicity), Evaluation of Patients with

	Low Back Pain, Clinical Pearls for Low Back Pain, Physical Therapy Approaches in Low Back Pain, Prolapse of intervertebral disc (PIVD), Spondylosis, Spondylolisthesis
8	Joint Infections: Haematogenous osteomyelitis, Suppurative arthritis, Tropical ulcers, Tuberculosis, Leprosy.
9	Inflammatory Rheumatic Disorders: Rheumatoid arthritis, Reiter's syndrome, Systemic lupus erythematosus, Reflex sympathetic dystrophy.
10	Crystal deposition disorders: Gout, Psudogout, Basic calcium phosphate crystal deposit disease.
11	Osteoarthritis (Arthritic lower extremity), Neuropathic joint disease, Haemophilic arthropathy.
12	Osteonecrosis and related disorders, Osteochondrosis.
13	Metabolic and endocrine disorders: Endochondral ossification, Age- related changes in Bone, Osteoporosis, Rickets and Osteomalacia, Hyperparathyroidism, Renal Osteodystrophy, Scurvy, Hypervitaminosis, Flurosis, Paget's disease, Pituitary dysfunction,
14	Genetic disorders, Skeletal dysplasias and malformations, Limb anomalies, Spinal deformities
15	Tumors
16	Neuromuscular disorders: Poliomyelitis, Motor Neuron disease, Muscular dystrophies, Peripheral neuropathy, Arthrogryphosis, Myotonia.
17	Peripheral nerve injuries: Brachial Plexus injuries, Obstetrical Bracial plexus palsy, Long thoracic nerve, Spinal accessory nerve, Suprascapular nerve, Axillary nerve, Radial nerve, Ulnar nerve, Median nerve, Lumbosacral plexus, Femoral nerve, Sciatic nerve, Peroneal nerves, Tibial nerves, Nerve compression (Entrapment) syndromes: Median nerve compression, Ulnar nerve compression, Radial nerve compression, Lower limb compression syndromes, Compartment syndromes, Leprosy
18	Orthopaedic operations: Thromboprophylaxis, Osteotomy, Bone fixation, Bone grafts and substitutes, Distraction Osteogenesis and limb reconstruction- Ilizarov's method, Leg- length equalization, Arthrotomy, Arthroidesis, Arthroplasty, Microsurgery and limb reimplantation, Amputations
19	Orthopaedic Implants: designs, materials, indications, post- operative assessment and training.
20	External Aids, appliances, adaptive self- help devices: prescription, biomechanical compatibility, check- out and training
21	Community based rehabilitation in musculoskeletal disorders

PT in Orthopedic Conditions Practical
MPT.512 P
Credits: 2.5 hrs/ week

The same curriculum of PT in Orthopedic Conditions (MPT.512P) should be covered in this course.