School of Physiotherapy

Syllabus

For

Master of Physiotherapy

(Sports Medicine)

(SEMESTER: I to IV)

DELHI PHARMACEUTICAL SCIENCES AND RESEARCH UNIVERSITY

Physiotherapy in Sports Medicine is closely involved in the care and wellbeing of athletes encompassing athletic injury management with acute care, initiating from assessment and diagnosis of an initial injury; treatment which may include application of specialist advice and techniques to encourage healing; rehabilitation which includes certain goals to progressive management for full return to sport; prevention, which identifies and address the deficiencies known to directly result in, or act as precursors to injury; education, provides sharing of specialist knowledge to individual athletes, teams or clubs to assist in prevention or management of injury. The benefits which may be provided through this specialty are early return to sports with full enthusiasm, improvement in mood, strength and endurance stamina building, healing and fast recovery from injuries and ultimately serving the society and nation and the athletes and sportsman the representatives of the country.

Goals

- The specific goal of the educational program is to prepare individuals to undertake the roles of a Physiotherapist in India and abroad as well. These roles include clinical practitioner, communicator, collaborator, manager, advocate, scholarly practitioner, and professional. With critical enquiry and evidence-based practice as the foundation, our program promotes the acquisition of advanced academic knowledge, skills and behaviors that are essential for a primary health care provider in a complex and continually evolving health care environment.
- The Master of Physiotherapy (MPT endorsed) programme endorsed in one of the specialist areas (Sports Physiotherapy) aims to advance the student's clinical reasoning and sports injury management and fitness skills beyond that of the entry level practitioner and provide one of the prerequisites necessary to achieve specialization.
- The School of Physiotherapy aims to provide students with a high level of knowledge and experience in order to help them develop their own research skills whether using qualitative or quantitative methodologies for statistical analysis, lab-based studies or community work, prevalence studies or intervention trialing – our aim is to have students complete their master's confident in their abilities to conduct research and assess relevant literature and practices, whether this leads to PhD study in the future or to more assured clinical practice.

Career Opportunities

- Physiotherapist with various sports teams and sports clubs
- Physiotherapists practice in many settings such as Government hospitals
- Defense medical establishments
- Private hospitals
- Private Practice
- Outpatient clinics
- Health and Wellness clinics
- In the rehabilitation Department.

- Centers for the differently abled, schools for the mentally retarded and physically disabled children (ParaOlympics)
- Health institutions
- In Multinational companies.
- Academics
- Research analyst in Research Centers
- Schools and Private homes
- They can also practice in non patient care roles like health policy, health insurance, and Health care administration and as health care executives.
- Physiotherapists are also involved in medical legal field serving as expert and performing peer reviews.

Objectives of the course:

- To create such Sports Physiotherapy Professionals who work in such a system of decorum, either made by others or by themselves with a depth of knowledge to impart and apply that with experiences of work.
- To work with the other Sports Medicine and Rehabilitation team members with common goals.

Practical Examination

- Practical examination which includes patient assessment, evaluation and management, viva–voce etc.

Research and Dissertation – 14 Credits

- Student will be provided with guide at the beginning of 3rd semester. Literature survey will be done by the student in the semester and if feasible may submit the title and the proposal by the end of the semester and candidate will work in the final semester and submit a written thesis in IV semester.

Practical Attachments:

- To enable the students to acquire practicing in hands on skills, maximum emphasis will be laid on regular practical classes, demonstration and clinical practice. The students will undergo Clinical / Field training in DPSRU Campus and other sports centers and to the coverage of various tournaments as and when required and decided by department of Sports. The students will attend on field training which may consist of early morning hours and evening late hours inclusive of weekends. Internal assessment for practical examination will be provided on the basis of sessional examination and feedback and evaluation of the clinical/ field supervisors sent to the Sports Clinical Coordinator(s).

Subject Code	Subject	Hrs/Week		Credits	Total Teaching hours	Examination (Marks)		
		Th	Pr			Internal	External	Total
First Semester								
MPTS 101 T *	Advanced Human and Health Sciences (Including Genomics)	4		4	64	20	80	100
MPTS 102 T*	Applied Biomechanics and Kinesiology	3		3	48	20	80	100
MPTS 103 T*	Advanced Diagnostics and Physiotherapeutics	4		4	64	20	80	100
MPTS 104 T*	Research Methodology and Biostatistics	3		3	48	20	80	100
MPTS 105 T*	Value Added	2		2		50	-	50
MPTS 101 P *	Advanced Human and Health Sciences (Including Genomics)		2	1	32	10	40	50
MPTS 102 P*	Applied Biomechanics and Kinesiology		3	2	48	10	40	50
MPTS 103 P*	Advanced Diagnostics and Physiotherapeutics		3	2	48	10	40	50
MPTS 106 P*	Evaluative Clinical Practice- I** (Based on Viva, Case presentation of clinical postings)		15	8	240	50	50	100
Non University/ NU- I	Research Appraisal- I		2	1	32	50	-	50
	Total	16	25	30	624	260	490	750

** Clinical training will be for 12 weeks x 4hours x 5daysand evaluated as Evaluative Clinical Practice- I

Subject Code	Subject	Hrs/Week		Credits	Total Teaching hours	Examination (Marks)		
		Th	Pr			Internal	External	Th
Second Semester								
MPTS 201 T *	Exercise Physiology	4		4	64	20	80	100
MPTS 202 T	Sports Mechanics and Physiology	4		4	64	20	80	100
MPTS 203 T	Traumatology in Sports	6		6	96	20	80	100
MPTS 204 T	Yogic Sciences (Elective I)	2		2	-	50	-	50
MPTS 205T	Machine Learning (Elective 2)	2		2	-	50	-	50
***Students can choose 1 elective subject out of the given 2**								
MPTS 201 P *	Exercise Physiology		2	1	32	10	40	50
MPTS 202 P	Sports Mechanics and Physiology		3	2	48	10	40	50
MPTS 203 P	Traumatology in Sports		3	2	48	10	40	50
MPTS 206 P	Evaluative Clinical Practice- II** (Based on Viva, Case presentation of clinical postings)		15	8	240	50	50	100
Non University/ NU- II	Research Appraisal- II		2	1	32	50	-	50
	Total	16	25	30	624	240	410	650

** Clinical training will be for 12 weeks x 4hours x 5days and evaluated as Evaluative Clinical Practice- II

Subject Code	Subject	Hrs/Week		Credits	Total Teaching hours	Examination (Marks)		
		Th	Pr			Interna	External	Th
Third Semester								
MPTS 301 T	Fundamentals of Sports and Training	4		4	64	20	80	100
MPTS 302 T	Rehabilitation in Sports	6		6	96	20	80	100
*MPTS 303 T	Computer Skills Programing Elective 1	2		2	-	50	-	50
*MPTS 304 T	Clinical Nutrition Elective 2	2		2	-	50	-	50
***Students can choose 1 elective subjects out of the given 2**								
MPTS 301 P	Fundamentals of Sports and Training		2	1	32	10	40	50
MPTS 302 P	Rehabilitation in Sports		4	4	64	10	40	50
MPTC 305 P	Evaluative Clinical Practice- III** (Based on Viva, Case presentation from clinical postings)		18	9	288	50	50	100
MPTC 306 P	Introduction to Research		6	3	96	10	40	50
	Total	12	30	29	640	170	330	500

** Clinical training will be for 12 weeks x 4hours x 6days and evaluated as Evaluative Clinical Practice- III

Subject Code	Subject	Hrs/Week		Credits	Total Teaching hours	Examination (Marks)		
		Th	Pr			Internal	External	Th
Fourth Semester								
MPTS 401 T*	Bioethics and Hospital Administration	4	-	4	64	20	80	100
MPTS 402 T	Pedagogy Elective 1	2		2	-	50	-	50
MPTS 403 T	Entrepreneurship Elective 2							
***Students can choose 1 elective subject out of the given 2**								
MPTS 404 P*	Dissertation	-	18	9	288	60	140	200
MPTS 405 P*	Evaluative Clinical Practice- IV** (Based on Viva, Case presentation from clinical postings)	-	18	9	288	20	80	100
	Total	6	36	24	640	150	300	450

** Clinical training will be for 12 weeks x 4hours x 6days and evaluated as Evaluative Clinical Practice- IV

Summary

Subject Code	Subject	Hrs/Week		Credits	Total Teaching hours	Examination (Marks)		
		Th	Pr			Internal	External	Th
First Semester								
Total		16	25	30	624	260	490	750
Second Semester								
Total		16	25	30	624	240	410	650
Third Semester								
Total		12	30	29	640	170	330	500
Fourth Semester								
Total		6	36	24	640	150	300	450
Grand Total		**50**	**96**	**113**	**2528**	**820**	**1530**	**2350**

Non University/ NU- I: In this examination, the student needs to appear and pass the exam. He/ She may present any one full text paper of the interest after critically analyzing before the staff.

Non University/ NU- II: In this examination, the student needs to appear and pass the exam. He/ She may present any one full text paper of the interest after critically analyzing before the staff or a case presentation based on his experience of clinical postings.

The student will complete his 750 hours of Clinical training during the 2 years program and that will be evaluated through practical examination progressively in all the semester in Evaluative Clinical Practice I, II, III, and IV. The examination will be conducted separately as per the respective specialization.

* Common Papers for all Streams

during the 1st semester, the student will be provided with a mentor. At the conclusion of 2nd Semester, the student will be provided with a Guide for the Project and Dissertation work.

Note: Value Added Course (s), Elective Subjects will remain common for all PG programs of the university. The student may earn 2 credits for each value added or elective subject.

The list of such courses is as under:

1. Yogic Sciences
2. Environment Science
3. Computer Skills Programing
4. English
5. Clinical Nutrition
6. Pedagogy
7. Entrepreneurship
8. Machine Learning

1st Semester

Advanced Human and Health Sciences (Including Genomics)

MPTS 101 T *

Subject Code	Subject	Hrs/Week		Credits	Total Teaching hours	Examination (Marks)		
		Th	Pr			Internal	External	Th
MPTS 101 T *	Advanced Human and Health Sciences (Including Genomics)	4		4	64	20	80	100

Course Description: This course covers the topics related to advances in Human and Health Sciences with particular emphasis on anatomical, physiological pathological and biochemical advances.

Course Objective: This course aims to study the recent advances in Human and Health Sciences

Course Outcome: On completion of the study of this Course the student should be able; To advance and comprehend the knowledge of the structure & function of the human body in relevance to Physiotherapy To correlate and apply the knowledge gained, in understanding and analysing the dysfunction of the human body

I Applied Anatomy

- Topographic anatomy concerning the neck, arm, leg and back with a focus on vessels, nerves and muscles/fascia and joints.
- Topographic anatomy concerning thorax, abdomen and the pelvic region with a focus on the abdominal wall, viscera, vessels and nerves.
- Surface anatomy and palpations concerning extremities, thorax, abdomen and the pelvic region Pathoanatomy of peripheral nerve injuries, various bone pathologies

II Applied General Physiology

Cardiovascular system

- Physical characteristics of systemic circulation, Pressure pulses
- Oxygen demand theory of local blood flow circulation
- Nervous control of blood circulation, Humorous control of blood circulation,
- Cardiac output and its regulation

Neuromuscular System

- Basic physics of membrane potentials, Recording of membrane potentials and action potentials
- Mechanism of muscle contraction, Sources of energy for muscle contraction, Neural control of movement

Respiratory System

- Review of mechanics of respiration
- Pulmonary volumes and capacities
- Methods of studying respiratory abnormalities
- Regulation of Respiration

III Pharmacology

Drugs used in pain, Local anaesthetics, Steroids, Muscle relaxants, Drugs acting upon central nervous system & autonomic nervous system, Tropically acting drugs. Inhalers, drugs acting on bronchospasm.

IV Pathology

General pathology (cell injury, inflammation, repair, immune system), Musculoskeletal system
Bones: Hereditary & Metabolic diseases (osteoporosis, rickets osteomalacia ,osteitisfibrosa cystic, renal osteodystrophy)
Infections: (osteomyelitis, tuberculosis), Joints: Degenerative joint disease, Bursitis
Skeletal Muscles: Muscle atrophy, myositis, muscular dystrophy, myasthenia gravis
Nervous system: Infections (meningitis, encephalitis), vascular diseases (ischaemic encephalopathy, cerebral infarction, intracranial haemorrhage), Degenerative disease (Alzheimer's disease, Huntington's disease, Parkinsonism, motor neuron disease), Demyelinating disease (multiple sclerosis), the peripheral nervous system (peripheral neuropathy, Acute idiopathic polyneuropathy, diabetic neuropathy)
Cardio-respiratory diseases- COPD, Bronchial asthma, Brochitis etc

VI General Microbiology

- Definitions: infections, parasite, host, vector, fomite, contagious disease, infectious disease, epidemic, endemic, pandemic.
- Sterilization, asepsis, disinfection and universal precautions in relation to patient care and disease Prevention,
- Basic principles of immunity, immunobiology.

VI Biochemistry

- Review of Metabolism: Carbohydrates, Lipids, Proteins andfats, Water: Fluid and electrolyte balance, Water and sodium balance
- Enzymes and Markers in Blood: Cardiovascular Markers: Troponin, Creatine Kinase, Lactate Dehydrogenase ,Myoglobin, Aspartate transaminase.
- Neuromuscular Markers: Acetylcholine, Dopamine, GABA.
- Inflammatory Markers and Free Radicals: TNF alpha, Interleukins, NO, H2O2,Superoxides
- Biochemical and Genetic Basis Of Diseases: Cardiovascular Disorders: Myocardial Infarction, Cardiomyopathy, Diabetes,Artherosclerosis, Neuromuscular Disorders: Epilepsy , Parkinson Disease, Alzheimer,Schizophrenia.Muscular Disorders: Cystic Fibrosis, Congenital muscular dystrophy, Duchenne muscular dystrophy, Biochemical, physiological& anatomical change in Ability, Disabilities,Ageing.

Essential Readings

- Clinical Biochemistry (Fundamentals of Biomedical Science) by Nessar Ahmed
- Clinical Biochemistry 6th Edition by Michael Murphy Rajeev Srivastava Kevin Deans ISBN: 9780702072987 eBook ISBN: 9780702072970

- A textbook of Biochemistry by B D Chaurasia
- Textbook of Medical Physiology Guyton and Hall
- Textbook of Physiology by A K Jain

Applied Biomechanics and Kinesiology

MPTS 102 T*

Subject Code	Subject	Hrs/Week		Credits	Total Teaching hours	Examination (Marks)		
		Th	Pr					Th
MPTS 102 T *	Applied Biomechanics and Kinesiology	3		3	48	20	80	100

Course Description: the course covers the understanding of Biomechanics and kinesiology of body movement.

Course Objective: the course should enable the student to acquire in depth knowledge in understanding the biomechanics and kinesiology.

Course Outcome: On completion of the study of this Course the student should be able to identify and apply the principles of biomechanics and kinesiology in understanding the normal functioning of the human body. To identify and apply the principles of biomechanics in understanding pathomechanics of various conditions. To use these principles in managing various clinicalconditions.

I. Tissue Biomechanics and Adaptation: Physical Properties of bone, cartilage, tendon and ligaments, functional adaptation under pathological conditions, Tissue loads, response of tissues to forces- Stress, Strain, Stiffness and mechanical strength, visco elasticity.

II. Mechanism of injury: Overview of Injury Mechanisms, Principles of Mechanical Loading, Principles of Injury, Tissue Injury, Joint Injury

III. Biomechanics, Pathomechanics and muscular involvement in movement of joints of Upper Limb including Shoulder Joint, Elbow Joint, Wrist and Hand Joints

IV. Biomechanics, Pathomechanics and muscular involvement in movement of joints of lower limb, hip joint, knee joint and ankle joint

V. Biomechanics, Pathomechanics and muscular involvement in movement of vertebral Spine including Cervical Spine, Thoracic spine, and Lumbar Spine.

VI. Posture, Effect of gravity and indicate the location of the gravity line in the sagittal plane in optimal posture. Analyze posture with respect to the optimal alignment of joints in the antero posterior and lateral view.

VII. Gait, Stance. Swing and double support phases of gait. Subdivision of the stance and swing phase of gait.Time and distance parameters of gait.Gait Analysis Method.

VIII. Motion analysis - concept, instrumentation and Method

Essential Readings:

1. Kinesiology by Carol A.Oatis
2. Kinesiology – Scientific Basis of Human Motion, Brown &Benchmark
3. Kinesiology and Applied Anatomy by Philip J.Rasch.
4. Clinical Biomechanics of Spine by Punjabi andwhite
5. Biomechanics – A Qualitative approach for studying HumanMotion
6. Joint Structure and Function - A Comprehensive Analysis byNorkin
7. Neumann, Donald A. - Kinesiology of the musculoskeletal system _ foundations for physical rehabilitation.-Mosby_Elsevier (2010).

Suggested Readings:

1. Basic Biomechanics in Sports and OrthopedicTherapy
2. The Biomechanics of Sports Techniques by Hay, JamesG.
3. Basic Biomechanics of Muscular Skeletal System byNordin
4. Introduction to Sportsbiomechanics
5. Ted TemertzoglouKinesiology: Lab Manual & Study Guide(2015).

Advanced Diagnostics and Physiotherapeutics

MPTS 103 T*

Subject Code	Subject	Hrs/Week		Credits	Total Teaching hours	Examination (Marks)		
		Th	Pr			Internal	External	Total
MPTS 103 T*	Advanced Diagnostics and Physiotherapeutics	4		4	64	20	80	100

Course Description: The course covers topics related to Advanced and recent updates in physiotherapy treatment with respect to exercise intervention, electrotherapeutics modalities advanced diagnostics.

Course Objective: The course should enable the student to acquire recent knowledge of exercise therapy intervention, electrotherapeutic modalities and advanced diagnostics used in physiotherapy conditions.

Course Outcome: The student should be able to apply recent knowledge and skill related to exercise therapy intervention and electrotherapeutic modalities and advanced diagnostics in different physiotherapy condition for patient recovery**.**

I Exercise and Manual Therapy Intervention &Practice

1. Revision of Assessment techniques like MMT and core evaluation, Goniometry,Types of Exercises: Stretching, Mobilization .Core exercises, Soft tissue manipulation, Re-education, Strengthening, .Balance,Coordination exercise, Relaxation Techniques,
2. Exercise therapy intervention & practice in: Pain management ,Endurance impairment, Impaired mobility, Impaired neuromuscular control,Impaired Gait & posture
3. Specific exercise interventions: Isokinetic, Plyometric, Open & closed kinetic chain, PNF, Core stabilization , Aquatic therapy, Home programme& itsadherence
4. Specific consideration in exercise therapy: Female, Paediatric, Amputation
5. Specific Techniques: History of Manipulation, Cyriax, Maitland, Mulligan, Neural mobilisation, Mc-Kenzie, Pilates, MET, PRT, MFR and its techniques. Ischemic compression, foam roller and other fascial release therapies, Dry needling, Kochi techniques, visceral mobilization.

II. Electrotherapy Intervention & Practice

1. Pain management
2. Wound management
3. Oedema management
4. Specific deep heat interventions: Class IV Laser, Microwave, Shortwave, Russian current Didynamic current Iontophoresis, Phonophoresis,Biofeedback, Electromagnetic Therapy

5. Special consideration for deep heat modalities: Pregnant women, Menstruating women, Paediatric, Geriatric, Neurologically impaired, Mentally impaired
6. Cryotherapy :Physiological & therapeutic effects,Various techniques
7. Recent advances in cryotherapy application

III. Taping techniques for joints, muscles and various pathological conditions : therapeutic and prophylactic,

IV. Diagnostics in Physiotherapy

1. SD and FG Curve
2. Nerve conduction studies and EMG: Normal & abnormal action potential its recording protocols, analysis and apparatus
3. Biofeedback: principles, effects, uses and contraindications
4. Isokinetic Dynamometry
5. BMI Measurement manually and by equipment

V Radiology and Diagnostic studies: - reading and analysis of:

1. X- Ray, C.T. Scan and MRI Scan, Their clinical relation with various muscular skeletal disorder.
2. Lab pathology investigations: methodology of routine examination of blood, urine only, Analysis of various laboratory examination reports and their clinical correlation with various muscular skeletal disorder and nervous disorders.

Essential reading:

1. Electrotherapy Explained Principles and practice Fourth Edition, Val Robertson,Alex ward, John Low and AnnReed
2. Physical Rehabilitation, SussanBO'Sullivan
3. Tidy's Physiotherapy, Edited by StuartPorter
4. Core Assessment and Training, Human Kinetics with JasonBrumitt
5. Taping Techniques, Rose Mac donald
6. Physical therapy for Children. Suzann K. Cappbell, Robert J.Palisano
7. Physical Agents in Rehabilitation, From Research to Practice, Michelle

H.Cameron**Suggested Reading:**

1. Taping Technique principle and practice, Tom Hewetson and KarinAustin
2. Isokinetics in Human Performance, Lee F.Brown
3. Electrotherapy evidence - based practice: Edited by TimWatson
4. Dutton's Orthopaedic Examination, Evaluation, and Intervention, MarkDutton

Research Methodology and Biostatistics
MPTS 104 T*

Subject Code	Subject	Hrs/Week		Credits	Total Teaching hours	Examination (Marks)		
		Th	Pr			Internal	External	Total
MPTS 104 T*	Research Methodology and Biostatistics	3		3	48	20	80	100

Course Description: The course covers the concept of research methodology, EBP and biostatistics related to physical therapy.

Course Objective: The course aims to introduce the principles of research, methods of research and analysing the research studies using Biostatistics.

Course Outcome: On completion of the study of this Course the student should be able to understand the methods of research process and design so as to effectively plan a research. To understand the statistical measures used in the analysis and interpretation of research data. To acquire skills of critically reviewing the literature.

Research Methodology

I Introduction to Research in Physiotherapy
Introduction, Research for Physiotherapist: – Definition, concept, purpose, types, and phasesapproaches

II Fundamentals of Research
Definemeasurement**,** Measurementframework**,** Scales ofmeasurement**,** Types ofvariables**,** Reliability &Validity**,**.

III Research Proposal writing (for grants), Critical Analysis of an Article
Defining aproblem, Review ofliterature, Formulating a question, operationaldefinition, Method of sampling and assignment, Inclusion and Exclusioncriteria, Data collection &analysis, Results, Interpretation, Conclusion,Discussion, Informedconsent, Limitations. Grant Agencies

IV ResearchDesign
Principle ofdesigning, Design, instrumentation & analysis for: qualitativeresearch, quantitativeresearch Group design and Single system design, experimental and non-experimental research, Designs models for Physiotherapy

V Research Ethics
Importance of Ethics inResearch, Ethical issues in human Courses'research, Ethical principles that govern research with humanCourses, Components of an ethically valid informed consent forresearch

VI Research and Evidence Based Practice

Concept of evidence based practice by addressing topics related to: search strategy, database, Critical analysis of evidence.

Biostatistics

I Introduction toBiostatistics

Introduction- Definition and Application inPhysiotherapy, DataPresentation-Drawing tables, graphs, master chartetc, Standarderror, Types I & IIerror, HypothesisTesting, Null Hypothesis, Alternativehypothesis, Acceptance & rejection of nullhypothesis, Level of significance

II Measures of Central Value & Measures ofDispersion

Arithmetic mean, median mode, Relationship betweenthem Measures of Dispersion absolute and relative, Normal Distribution Curve- Properties of normal distribution, Standard normaldistribution, skewness and kurtosis

III Correlations & RegressionAnalysis

Bivariatedistribution, Scatterdiagram, Coefficient ofcorrelation, Calculation & interpretation of correlationalcoefficient, Lines ofregression
Calculation of RegressionCoefficient

IV Analysis and Evaluation

Parametric & Non Parametric Tests- Chi square test, Mann-Whitney U test, Wilcoxon Signed test, Kruskal-Wallis test, Friedman test, T-test/student T test, Analysis ofvariance, Software Used in Research andStatistical Analysis

Essential Readings:

1. Research for physiotherapists Research for Physiotherapists: Project Design and Analysis by Carolyn M. Hicks
2. APA Handbook of Research Methods in Psychology by Harris Cooper, PhD
3. Elements of Research in Physical Therapy by Dean P. Currier
4. Mahajan's Methods In Biostatistics For Medical Students And Research Workers by Bratati Banerjee

Suggested Readings:

1. Physical Therapy Research by Elizabeth
2. An Introduction to Biostatistics 3rd Edition, by Thomas Glover , Kevin Mitchell
3. Introduction to research in Health Sciences by Stephen Polgar, BSc(Hons), MSc, Shane A. Thomas
4. Research Methodology: Methods and Techniques by C R Kothari
5. Research Design: Qualitative, Quantitative, and Mixed Methods Approaches by John W. Creswell

Advanced Human and Health Sciences (Including Genomics)

MPTS 101 P *

Course Description: This course covers the topics related to advances in Human and Health

Subject Code	Subject	Hrs/Week		Credits	Total Teaching hours	Examination (Marks)		
		Th	Pr			Internal	External	Th
MPTS 101 P *	Advanced Human and Health Sciences (Including Genomics)		2	1	32	10	40	50

Sciences with particular emphasis on anatomical, physiological pathological and biochemical advances.

Course Objective: This course aims to study the recent advances in Human and Health Sciences

Course Outcome: On completion of the study of this Course the student should be able; To advance and comprehend the knowledge of the structure & function of the human body in relevance to Physiotherapy To correlate and apply the knowledge gained, in understanding and analysing the dysfunction of the human body

Demonstration of the following lab tests:

1. Enzymes and Markers in Blood: Cardiovascular Markers: Troponin, Creatine Kinase, Lactate Dehydrogenase ,Myoglobin, Aspartate transaminase.
2. Neuromuscular Markers: Acetylcholine, Dopamine, GABA.
3. Inflammatory Markers and Free Radicals: TNF alpha, Interleukins, NO, H2O2,Superoxides
4. Surface marking of anatomic landmarks

Applied Biomechanics and Kinesiology

MPTS 102 P*

Subject Code	Subject	Hrs/Week		Credits	Total Teaching hours	Examination (Marks)		
		Th	Pr			Internal	External	Total
MPTS 102 P *	Applied Biomechanics and Kinesiology		3	2	32	10	40	50

Course Description: The course covers topics related to practical training on biomechanics and kinesiology.

Course Objective: The course should enable the student to attainin-depthknowledge and skill in techniques used in biomechanics andkinesiology.

Course Outcome: The student should be able to demonstrate skill in techniques used in in biomechanics and kinesiology.

1. Detection of scapular position in rotation of spinousprocess
2. Measurement of functional limb varus under bilateral and unilateralstance
3. Subtalar neutral jointpositioning
4. Determination ofQ-angle
5. Measurement of eversion and inversion ranges at subtalarjoint
6. Measurement of poplitealangle
7. Measurement of calcaneal inversion and eversion in non weightbearingand weightbearingstance

Advanced Diagnostics and Physiotherapeutics

MPTS 103 P*

Subject Code	Subject	Hrs/Week		Credits	Total Teaching hours	Examination (Marks)		
		Th	Pr			Internal	External	Total
MPTS 103 P*	Advanced Diagnostics and Physiotherapeutics		3	2	32	10	40	50

Course Description: The course covers topics related to Practical aspects in Advanced and recent updates in physiotherapy treatment with respect to exercise intervention and electrotherapeutics modalities.

Course Objective: The course should enable the student to acquire recent knowledge of exercise therapy intervention and electrotherapeutics modalities used in physiotherapy conditions.

Course Outcome: The student should be able to apply recent knowledge and skills related to exercise therapy intervention and electrotherapeutic modalities in different physiotherapy condition for patient recovery**.**

1. High class electrotherapeutic modalities like LASER Class IV, Extra Corporeal Shock Wave, Isokinetic exercises, Vacuum Therapy, Electromagnetic Therapy, etc.
2. Interpretation of X- Ray, CT Scans and MRI of various musculoskeletal conditions.
3. Isokinetic Testing
4. Interpretation of EMG
5. Body Composition using different anthropometric measurement
6. All the techniques, like Mulligan, Mcanzie, Maitland, Cyiax, Joint Techniques, Kaltenborn, Soft tissue techniques, Butler, Positional release, MET
7. Taping Techniques- Kinesio and Dynamic

Evaluative Clinical Practice- I

MPTS 106 P*

Subject Code	Subject	Hrs/Week		Credits	Total Teaching hours	Examination (Marks)		
		Th	Pr			Internal	External	Total
MPTS 106 P*	Evaluative Clinical Practice- I (Based on Viva, Case presentation of clinical postings)		15	8	240	50	50	100

Course Description: The course covers topics related to hands on training in physiotherapy assessment and management of different disease and disorders that the student would see during clinical postings.

Course Objective: The course should enable the student to acquire in-depth understanding and skill in physiotherapy assessment and management of disease and disorders.

Course Outcome: The student should be able to interpret and differentiate between various, diagnostic tools used for therapeutic plan, by history takingprocess initially, of the conditions of patients. They should have knowledge of all the physiotherapeutic intervention pertaining to the patient. They should be able to evaluate and plan physiotherapy treatment: its presentation and documentation of all the conditions.

- The student will present a case (study/ description) from his/ her clinical postings, including, Demographic Data, history taking, subjective and objective examination, differential diagnosis, confirmatory diagnosis and possible physiotherapeutic plan.

2nd Semester

Exercise Physiology

MPTS 201 T*

Subject Code	Subject	Hrs/Week		Credits	Total Teaching hours	Examination (Marks)		
		Th	Pr			Internal	External	Total
MPTS 201 T*	Exercise Physiology	4		4	64	20	80	100

Course description: This course aims to deliver scientifically based standards on exercise testing and prescription. It prepares students through the process of selecting and administering fitness assessments, using Guidelines to interpret results, and drafting an exercise prescription that is in line with Guidelines parameters.

Course Objective: this course should deliver the concepts in exercise physiology and prepares students to test and prescribe suitable exercises to different group of population.

Course Outcome: On completion of the study of this Course the student should be able to select and administer fitness assessments, using Guidelines to interpret results, and drafting an exercise prescription to different populations.

I. Bioenergetics and Exercise metabolism

Energy transfer in cells during exercise, Oxygen metabolism and transfer during metabolism, Oxygen transport in blood, Oxygen deficit and debt, Oxygen measurement, oxygen during exercise, oxygen during recovery, Energy release from carbohydrates, lipids and proteins, Principles of training, Aerobic training, Anaerobic training, System adaptation to aerobic and anaerobic training, Measurement of energy expenditures (direct and indirect calorimetry)

II. Cardiovascular System and Exercise

Cardiovascular regulation and integration during exercise, Cardiovascular adaptations to sustained aerobic exercises, Cardiovascular Endurance testing, Athletes heart and sudden cardiac death in sports, Lipids and sports, protection from coronary heart disease, exercise and optimization of lipid profile, Energy cost and breaking Cardiovascular drift , blood pressure during exercise blood pressure during

III. Respiratory System and Exercise

Lung function and its role in exercise performance Regulation of respiration duringexercise, Acid-Base regulation duringexercise, Respiratory adaptations to sustained aerobicexercise, Air Conditioning, Second wind, Oxygendebt, Regulation of ventilation

IV. Musculoskeletal System and Exercise

Growth and exercise, Repair and adaptation duringexercise, Biochemical responses and molecular mechanisms to endurance and powertraining, Effects of training anddetraining, StrengthMeasurement, Dynamometery,DOMS, Strength training, **Fatigue -** Muscle fiber, types and its role in exercise performance Muscle endurance testing, Assessment of muscle damage &fatigue, Exercise associated muscle cramps.

V.Gastrointestinal Tract and Endocrine System and Exercise

Effect of exercise on GIT and liver, Hormone regulation of fluid and electrolytes during exercise, Stress hormones in exercise, Opioids and Runners High

VI. Nervous system and Exercise

General nervous system function, sensory information and reflexes, Somatic function and motor neuron, Exercises enhances brain health, Overview of heat balance during exercise, Body's Thermostat – Preoptic-anterior Hypothalamus, Exercise in Hot, Exercise in cold environment, Control of internal environment- homeostasis, Exercise and immune system

VII. Exercise Testing prescription and Aging

Prescription of exercise, General guidelines for improving, Exercise prescription for fitness. Human performance analysis, Exercise stress testing for diagnosis ofCHD, Bodycomposition, Aging and physiologicalfunction, Exercise andlongevity, Exercise prescription for healthy, aged, sedentary adults, Osteoporotic and mooddisorders.

Essential Readings:

1. Exercise Physiology by Mc Ardle, Katchandkatch
2. Text Book of Radiology by K.Bhargava
3. Electromyography and Neuromuscular disorders by David C.Preston
4. Cram's Introduction to SurfaceElectromyography
5. ACSM's Guidelines for Exercise Testing and Prescription Paperback –by American College ofSportsMedicine

Suggested Readings:

1. Essentials of Electromyography byGabriel
2. Johnson's Practical ElectromyographyHardcover– 15 Sep 2005 byWillaimS.Pease(Editor), Henry L. Lew (Editor), Ernest W.Johnson

Sports Mechanics and Physiology

MPTS 202 T

Subject Code	Subject	Hrs/Week		Credits	Total Teaching hours	Examination (Marks)		
		Th	Pr			Internal	External	Th
MPTS 202 T	Sports Mechanics and Physiology	4		4	64	20	80	100

Course Description: The course covers topics related to sport biomechanics and various manual therapyapproach based athletic assessment, diagnoses and management.

Course Objective: The course should enable the student to acquire in-depth knowledge in sport biomechanics and various manual therapy approach based athletic assessment, diagnoses and management.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in sport biomechanics and various manual therapy approach based athletic assessment, diagnoses and management.

I. Aspects of biomechanical analysis of sports movements

1. Movementdescriptors
2. Structural analysis of movements, temporal and phaseanalysis

II. Principles and Application inSports

1. Biomechanics of running: Kinematic and kinetic phases, mechanical principles to study running mechanics, pathomechanical errorsetc.
2. Biomechanics of rowing: Phases of rowing, mechanical factors to improve rowing performance, rowing as exercise for fitnessetc.
3. Biomechanics of throwing and swimming: Kinematic and kinetic phases of throwing, mechanical factors to improve throwing performance, pathomechanical errors etc. basic principles of fluid mechanics, phases of swimming mechanics, pathomechanical errors etc.
4. Biomechanics of jumping: Biomechanical components of jumping, factors to improve jump Performanceetc.
5. Biomechanics ofcycling

III. **Segmental Stabilization Concepts ofSpine**

1. Muscle function in spinalstabilization
2. Contribution of various muscles to spinalstabilization

3. Local Muscle dysfunction in Low backpain
4. Principles of clinical management of deep muscle system for segmentalstabilization

IV.**Causes and Mechanism ofInjury (Pathomechanics)**

1. General Aetiological and pathomechanicalfactors involved in sportsinjury
2. Common mechanisms ofinjury
3. Preventive aspects of sportsinjury

V.Biochemical Basis of Exercise in Sports

1. Sources of Energy and various Body Organs
2. Individual sports event & their metabolism in endurance and strength events
3. Exercise & Gene Expression: Nucleic Acids, Eukaryotic Gene Organization, Gene Therapy, Gene Doping, Control

VIBrief idea about some common sports: Terminology, methodology, rules, equipments& infrastructure and related injuries.

- Cricket, football, hockey, tennis, badminton, Volleyball, basketball, table tennis, wrestling, boxing, track & field, Gymnastics & aquatic sports.
- Principles of protective equipment, Protective Equipment for: Head & Face, Upper & Lower Extremity

Essential reading

1. Sports Biomechanics: Reducing Injury and Improving Performance; Melanie Bussey, Roger Bartlett.
2. Biomechanics of Sport and Exercise; Peter M. McGinnis
3. Maitland's Manipulation; Volume 1 and 2; Elly Hengeveld, Kevin Banks

Suggested reading

1. Principles of Manual Therapy; Deepak Sebastian
2. The Mulligan Concept of Manual Therapy : Textbook of Techniques; Wayne Hing, Toby Hall, Darren A Rivett, Bill Vicenzino, Brian Mulligan
3. Orthopedic Manual Therapy;Chad Cook

Traumatology in Sports

MPTS 203 T

Subject Code	Subject	Hrs/Week		Credits	Total Teaching hours	Examination (Marks)		
		Th	Pr			Internal	External	Th
MPTS 203 T	Traumatology in Sports: Clinical and Therapeutic Management	6		6	96	20	80	100

Course Description: The course covers topics related to physiotherapy assessment and techniques used in managing different injuries such as traumatic affecting upper extremity, head and neck.

Course Objective: The course should enable the student to acquire in-depth knowledge indifferentassessment and techniques used in management of different injuries inathletes.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in different assessment and techniques used in management of different injuries inathletes.

IInjury evaluation & management

- Sporting emergencies
- On field and off field assessment
- Clinical assessments
- Principles of management (acute management, remodeling & conditioning, maintenance of fitness & rehabilitation)

II Sports Traumatology and Physiotherapy Management (UpperExtremity, Head and Face)

a. ShoulderComplex
Background: General Principles of rehabilitation, Intake evaluation, clinical examination of overheadathlete, Impingement Syndrome, Rotator cuff tendinitis in overhead athletes, Rotator Cufftear, Shoulder Instability: Unidirectional andMultidirectional, Biceps tendon disorders, Acromioclavicular Joint Injuries, Scapular Dyskinesias and fractures.

2. Elbow Complex
Background: General Principles of rehabilitation, Intake evaluation, clinical examination of anathlete, Pathomechanics of humeral epicondylitis: valgus extension overloadsyndrome, Ulnar CollateralInjuries, Rehabilitation of elbowinjuries, Nerve Compression Syndromes- Cubital Tunnel Syndrome, Radial Nervecompression, Fractures and dislocations at the elbow and theirmanagement

.

3. Wrist andHand

Background: General Principles of rehabilitation, Intake evaluation, clinical examination of anathlete, Fractures and dislocations of Metacarpals and phalanges- metacarpal fractures, Thumb Metacarpal fracture, Proximal Interphalanegealfractures, Ulnar Collateral Injuries, avulsion of FDP, Boutonniere deformity and Pseudo Boutonnaire Deformity, Proximal Interphalangeal Injuries: Acute dorsal PIP dislocation, PIP joint collateral injuries, Malletfinger, Wrist Injuries: Scaphoid Fracture, fracture of hamate, lunate dislocation, keinbockdisease, Soft tissue Overuse Injuries: Tendinitis, Dequervein's Disease, tenosynovitis of other dorsal compartment, recurrent subluxation of extensor tendon of ulnar side, flexor tendinitis of ulnarwrist, Rehabilitation of OveruseInjuries, Nerve Compression Syndromes: Median Nerve, UlnarNerve,

4.Head

Background: General Principles of rehabilitation, Intake evaluation, clinical examination of an athlete, Review of functional anatomy andbiomechanics, Clinical Injuries: Skull fracture, epidural hematoma, subdural hematoma, subdural hematoma, cerebralcontusions, Concussion: Classification system, post concussion syndrome and itsmanagement, Punch drunksyndrome, Post concussionsyndrome

5. MaxillofacialRegion

Background: General Principles of rehabilitation, Intake evaluation, clinical examination of an athlete, Initial Managementpriorities, AirwayManagement, Soft tissueinjuries, Lacerations and itstypes, Ocular and facial injuries: LefortClassification

IIISports Traumatology and Physiotherapy Management (Lower Extremity and Spine)

1. Hip AndThigh

Background: General Principles of rehabilitation, Intake evaluation, clinical examination of an athlete, Fractures and dislocations: Stress fracture, traumatic avlusion, Avulsion fractures, traumatic subluxation and hip dislocation, Muscle Strains: Gluteus Medius, Adductor strain, hamstring strain, Quadriceps strain, Contusions: Hip pointer, Quadriceps contusion, Myositis ossificans, Acute compartmental syndrome, Snapping hip, Other conditions: Apophysitis, Osteitis Pubis, transient synovitis of hip, Nerve Compression syndrome

2. KneeComplex

Background: General Principles of rehabilitation, Intake evaluation, clinical examination of an athlete, Review of functional anatomy and biomechanics and role of knee proprioception, Foundations for surgical and non surgical management of meniscal and ligamentous injuries, Straight plane vs. rotational knee instability, Knee dislocations and multiple ligament injuries at knee, Fractures of knee joint complex, Patellofemoral Pain Syndrome, patellar ruptures, articular cartilage procedure of knee, baker's cyst.

3. Foot And AnkleJoint

Background: General Principles of rehabilitation, Intake evaluation, clinical examination of an athlete, Review of functional anatomy andbiomechanics, Ankle Sprain, chronic lateral ankle instability-Rehabilitation considerations following lateral ankle ligamentreconstruction, Planar fasciitis- Pathomechanics, aetiology andmanagement,

Achilles tendon dysfunction, Posterior tibial tendoninsufficiency, Metatarsalgia, Hallux rigidus, turf toe, Nerve Compression syndrome- Morton'sNeuroma

3. Spine AndPelvis

   Background: General Principles of rehabilitation, Intake evaluation, clinical examination of an athlete, Review of functional anatomy and biomechanics, Traumatic injuries to cervical spine, Injuries to thoracolumbar spine and pelvis- Injuries to sternum, rib injuries, thoracic disc lesions, Scheurmann's disease, Injuries to lumbar spine: Muscle Strains, ligament sprains, Spondylolysis, spondylolesthesis, lumbar disc lesions, lumbar facet injuries, spinal fracture, lateral spinal stenosis, central canal stenosis, Post surgical rehabilitation interventions for lumbar surgeries, Pelvis injuries: Sacroiliac joint sprain, pelvic stress fractures, avlusion fracture.

III. Emergency Medical Planning And Cover For SportsEvents

a) Emergency Situations, Primary and secondary emergency assessment, emergency plan, transportation of an injured athlete
b) Treatmentofcollapsedathlete-Severeheadinjury,Athletewithspinalinjury,
c) Hypothermia.
d) Causes ofCollapse

Essential reading

1) Physical Therapies in Sport and Exercise; Gregory Kolt, LynnSnyder-Mackler
2) Athletic and Sport Issues in Musculoskeletal Rehabilitation; David J. Magee, James E. Zachazewski, William S. Quillen, RobertManske
3) Sports physical therapy; BarbaraSanders
4) Brukner& Khan's Clinical Sports Medicine: Injuries, Fifth Ed; Peter Brukner, KarimKhan

Suggested reading

1) Orthopedic and Sports Physical Therapy; Terry Malone, Thomas G. McPoil, Arthur J.Nitz
2) Managing Sports Injuries : a guide for students and clinicians; Christopher M Norris
3) Evidence-Based Sports Medicine; DomhnallMacAuley, Thomas Best

YOGIC SCIENCES
MPTS 204 T

Course Outcomes:
The students will be able to appreciate the role of yoga in their day to day life. The course has focus on basic concept of yoga, ashtanga yoga and its effect, various kinds of asanas and pranayama and different aspects of mudra.

Module I : Introduction of Yoga

- Etymology of Yoga
- Concept of Chitta and Chitta Bhumis
- General introduction to four paths of Yoga
- Importance of Nadi & Chakra in Yoga

Module II : Ashtanga Yoga: Purpose, Significance and Effects
Eight limbs of Yoga as per Yogasutra of Patanjali – Discipline/self restraint (Yama), Observance (Niyama), Posture (Asana), Restraint of breath/exercises of life force (Pranayama), Abstraction of senses/Introversion-of attention (Pratyahara), Concentration (Dharna), Meditation(Dhyana) and Super conscious state/illumination (Samadhi)

Module III : Asana and Pranayama

- Introduction of Asanas
- Benefits and Contra-indication of Asanas
- Define and understand the concept of Prana & Pranayama
- Benefits and Contra-indication of Pranayama
- Physiological effect of Pranayama

Module IV : Shatkarma, Mudra and Bandh

- Introduction of Mudra
- Benefits and Contra-indication of Mudra
- Introduction of Bandh
- Benefits and Contra-indication of Bandh
- Introduction of Shatkarma
- Benefits and Contra-indications of Shatkarma

Module V :

- Yoga Nidra (The Conscious Dynamic Sleep),
- Meditation Technique
- Cause of Pain (Dukha) according to Yog Sutra of Patanjali
- Yogic lifestyle (Ahara, Vihar, Achar, Vichar),
- Yogic attitudes (Maitri, Karuna, Mudita and Upeksha) and practices for Mental Wellbeing.

Reference Books

1. Asana Pranayama Mudra Bandha by Swami Satyananda Saraswati. Publisher: Yoga Publication Trust, Munger, Bihar, India
2. Karma Yoga, Bhakti Yoga, Raja Yoga, JnanaYoga by Swami Vivekananda
3. Yoga Nidra by Swami Satyananda Saraswati. Publisher: Yoga Publication Trust, Munger, Bihar, India

4. Yoga Sutras of Patanjali by Swami Venkateshananda Publisher: Motilal Banarsidass

Publishers Private Limited, New Delhi, India
5. Hatha Yoga by Swami Sivananda. Publisher: The Divine Life Society, Uttarakhand, India
6. Gheranda Samhita by Swami Niranjanananda Saraswati. Publisher: Yoga Publication

MACHINE LEARNING
MPTS 205T

COURSE OVERVIEW: To acquire the updated knowledge of production / biophysics as well as the Physiological / therapeutics effects (at the cellular levels) of various electrical currents, Thermal agents, ultra sound & electro – magnetic forces & potential risk factors on prolonged exposure. Acquire the knowledge about various Therapeutic agents to be used in combination with various electro – therapeutic modes, with appropriate clinical decision & reasoning in the management of pain / tissue healing / Wound care & skin condition conditions.

COURSE OBJECTIVES: At the end of the course the candidate will Be able to interpret the technical machineries that will be used in physiotherapy unit like: ultrasound, TENS, IFT, E.M.G. and nerve conduction studies with appropriate clinical reasoning. Expertise in the skill of using various electrical currents for the purpose of Electro diagnosis able to interpret the same with appropriate clinical reasoning. Be able to train the undergraduate students at Pre clinical and clinical level.

MODULE I

- Medical Physics of various therapeutic currents, ultrasound & Electro – magnetic energy, SWD.
- Cellular response & tissue response to environment & man-made Electro – magnetic field – risk factor of prolonged exposure – safety measures.
- Appropriate dose for the treatment of various disorders / disease conditions with various therapeutic modalities.
- Advanced Electro therapeutic in the management of Pain, and various other conditions.
- Principles of combination of Therapeutic currents & / ultrasound . with Pharmaco – Therapeutics with special reference to Musculoskeletal, / neuropathic & psychosomatic pain and various other conditions.
- Advanced Electro, Therapeutics in Tissue healing, Wound Care, management of Scars, Keloids & De-pigmentation – skin conditions.
- Acupressure and Acupuncture Points

REFRENCE BOOKS:

Clinical Electrophysiology - Robinson
Electrotherapy Explain – Low & Read
Electrotherapy – Sheila Kitchen

Exercise Physiology

MPTS 201 P*

Subject Code	Subject	Hrs/Week		Credits	Total Teaching hours	Examination (Marks)		
		Th	Pr			Internal	External	Total
MPTS 201 P*	Exercise Physiology		2	1	32	10	40	50

Course Description: The course covers topics related to practical training on exercise physiology, exercise testing and exercise prescription for different age groups and patient population. The student also undergoes hands on training in physiology and clinical biochemistry.

Course Objective: The course should enable the student to attain in-depth knowledge and skill in techniques used in exercise physiology, exercise testing and exercise prescription for different age groups and patient population. They should be able to attain skills in physiology and clinical biochemistry techniquesalso.

Course Outcome: The student should be able to demonstrate skill in techniques used in exercise physiology, exercise testing and exercise prescription for different age groups and patient population. They should be able to demonstrate skills in physiology and clinical biochemistry techniques also.

1. Energy expenditure andexercise
2. Energymetabolism
3. Cardiovascular effect ofexercise
4. Respiratory air flow andvolume
5. Respiratory gasanalysis
6. Blood pressure inhumans
7. Electromyogram(EMG)recording andinterpretation
8. Oxygen concentration (02measurements)
9. Sensory and motor nerve responses (NCV)recording andinterpretation

Sports Mechanics and Physiology

MPTS 202 P

Subject Code	Subject	Hrs/Week		Credits	Total Teaching hours	Examination (Marks)		
		Th	Pr			Internal	External	Th
MPTS 202 P	Sports Mechanics and Physiology		3	2	48	10	4	50

Course Description: The course covers topics related to manual therapy assessment, diagnosis and management of upper quadrant neuromusculoskeletal sports injuries and biomechanical evaluation of the athletes.

Course Objective: The course should enable the student to acquire in-depth understanding and skill in manual therapy assessment, diagnosis and management of upper quadrant neuromusculoskeletal sports injuries and biomechanical evaluation of the athletes.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in manual therapy assessment, diagnosis and management of upper quadrant neuromusculoskeletal sports injuries and biomechanical evaluation of the athletes.

1. Student must be demonstrated different mechanical phases of basis games and injuries related to each phase.
2. Evaluation of pathomechanical subsequence.

Traumatology in Sports

MPTS 203 P

Subject Code	Subject	Hrs/Week		Credits	Total Teaching hours	Examination (Marks)		
		Th	Pr			Internal	External	Th
MPTS 203 P	Traumatology in Sports: Clinical and Therapeutic Management		3	2	48	10	40	50

Course Description: The course covers practical related to physiotherapy assessment and techniques used in managing different injuries such as traumatic affecting upper extremity, lower extremity, spine, head and neck.

Course Objective: The course should enable the student to acquire in-depth knowledge practically indifferentassessment and techniques used in management of different injuries inathletes.

Course Outcome: The student should be able to demonstrate adequate knowledge and skills in different assessment and techniques used in management of different injuries inathletes.

1. Description of the on field and off field assessment.
2. Emergency management of the condition on ground
3. Lifting procedures

Evaluative Clinical Practice- II

MPTS 206 P*

Subject Code	Subject	Hrs/Week		Credits	Total Teaching hours	Examination (Marks)		
		Th	Pr			Internal	External	Th
MPTS 206 P*	Evaluative Clinical Practice- II** (Based on Viva, Case presentation of clinical postings)		15	8	240	50	50	100

Course Description: The course covers topics related to hands on training in physiotherapy assessment and management of different disease and disorders that the student would see during clinical postings.

Course Objective: The course should enable the student to acquire in-depth understanding and skill in physiotherapy assessment and management of disease and disorders.

Course Outcome: The student should be able to interpret and differentiate between various, diagnostic tools used for therapeutic plan, by history taking process initially, of the conditions of patients. They should have knowledge of all the physiotherapeutic intervention pertaining to the patient. They should be able to evaluate and plan physiotherapy treatment: its presentation and documentation of all the conditions.

- The student will present a case (study/ description) from his/ her clinical postings, including, Demographic Data, history taking, subjective and objective examination, differential diagnosis, confirmatory diagnosis and possible physiotherapeutic plan.

Research Appraisal- II

Non University/ NU- II

Subject Code	Subject	Hrs/Week		Credits	Total Teaching hours	Examination (Marks)		
		Th	Pr			Internal	External	Th
Non University/ NU- II	Research Appraisal- II		2	1	32	50	-	50

Course Description: The course covers topics related to writing and development of project work.

Course Objective: The course should enable the student to acquire in-depth understanding and skill in writing and development of projects. To also enable the student the publish the review paper in a good journal (possibly Scopus) at the end of 2nd semester with the guidance of the mentor provided.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in writing and development of projects. They should be able to prepare a formal research proposal on the chosen topic for the dissertation under the guidance of supervisor. The student shall make a final presentation of the topic in front of the committee.

The student should be able to demonstrate adequate knowledge and skill in writing and development of projects. They should be able to prepare a formal research proposal on the chosen topic for the dissertation under the guidance of the mentor.

1. Identifying the problem and statement of research question
2. Review of literature
3. Existing knowledge and gap in knowledge
4. Quality of publications
5. Type of publications
5. Databases
6. Search strategies
7. Costing
8. Ethical concerns
9. Knowledge addition

3rd Semester

Fundamentals of Sports and Training

MPTS 301 T

Subject Code	Subject	Hrs/Week		Credits	Total Teaching hours	Examination (Marks)		
		Th	Pr			Internal	External	Th
MPTS 301 T	Fundamentals of Sports and Training	4		4	64	20	80	100

Course Description: The course covers topics related to scientific basis of athletic training development and implementation.

Course Objective: The course should enable the student to acquire in-depth knowledge in scientific basis of athletic training development and implementation.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in scientific basis of athletic training development and implementation.

I. Periodization

1. Planning: Principles, need and importance ofplanning
2. Types of plan (training conception, macro, micro, meso and training session plan)
3. Annual Training Program, phases andcharacteristics
4. Periodization, psychological supercompensation, Periodization of strength training, speed and endurance, Periodization for Injury Prevention andSurveillance
5. Peaking for Competitions, Factors facilitating peaking duringcompetition
6. Technical preparation: Definition and meaning of technique, skill andstyle
7. Technique training & its implication in various phases; methods employed for technique training, causes of technical fault and their correction, Definition and meaning of tactics, aim of tactics according tosport
8. Long Term Athlete Development: Stages of Athletic Development: Generalized and Specialized training, Olympic Cycle: classification of Olympic cycle plan and compiling an Olympic cycle Plan Talent Identification: Methods, Criteria, Factors and Phases of Talent Identification

II. Precision Heart Rate Training

1. Heart rate monitoring andtraining
2. Training in heartzones
3. Precision heart rate training for specificsports
4. Multi Activity training
5. Monitoring of training effects

IIIPsychological aspects in sports

1. Spirit & moral values
2. Different models of Athletic Psychology
3. Coping techniques and strategies

IV Doping in sports

1. Doping In Sports, Procedure of dope testing and Control of dopingabuse
2. Banneddrugs and methods
3. Performance enhancing drugs
4. Special aids in performance

VTraining in sports: Various techniques like plyometrics, interval training, circuit, strength, endurance, and cross fitness sports training.

VIMiscellaneous Topics

1.Medical and pre competition screening of sportspersons
2.Hazards of coldwater
3.Time zone shift and sleep deprivationproblems
4.Hyperthermia
5.Tiredathlete

VII. Sports Management

1. History of Sports
2. sports and Recreational Events
3. Financial and Corporate Management in Sports – clubs,events
4. Marketing and Management
5. International Relations and Business
6. Organizational Behavior and Culture
7. Sports Economics

Essential reading:

1. Physical Therapies in Sport and Exercise; Gregory Kolt, Lynn Snyder-Mackler
2. Athletic and Sport Issues in Musculoskeletal Rehabilitation; David J. Magee, James E. Zachazewski, William S. Quillen, Robert Manske
3. Sports physical therapy; Barbara Sanders
4. Brukner& Khan's Clinical Sports Medicine: Injuries, Fifth Ed; Peter Brukner, Karim Khan

Suggested reading:

1. Orthopedic and Sports Physical Therapy; Terry Malone, Thomas G. McPoil, Arthur J. Nitz

2. Managing Sports Injuries : a guide for students and clinicians; Christopher M Norris
3. Evidence-Based Sports Medicine; DomhnallMacAuley, Thomas Best

Rehabilitation in Sports

MPTS 302 T

Subject Code	Subject	Hrs/Week		Credits	Total Teaching hours	Examination (Marks)		
		Th	Pr			Internal	External	Th
MPTS 302 T	Rehabilitation in Sports	6		6	96	20	80	100

Course Description: The course covers topics related to sports psychological and nutritional basis of athletic training and injury management.

Course Objective: The course should enable the student to acquire in-depth knowledge in different sports psychological and nutritional basis of athletic training and injury management.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in different sport sports psychological and nutritional basis of athletic training and injury management.

I Prevention and Response to Injury

Muscle trauma, contusions, strains & rupture, effects immobilization & detraining, bone trauma, ligament & tendon injuries, structure, mechanical properties & injury to articular cartilage, relationship between injury & nervous tissues, DOMS.

Risk factors in sports (intrinsic& extrinsic)

Strategies of injury prevention

III Nutrition in Sports

Requirements of athletes: Diet planning and nutritional needs for individual sports,

Carbohydrates Loading, Bicarbonate Loading

Carbohydrate Requirement & Glycemic Index, Carbohydrate: Needs of Strength & Endurance Athletes, Pre & Post Exercise Carbohydrate Intake, Protein and fats requirement and needs of Athlete, Water and Electrolyte Loss and Replacement in Exercise, Pre competition Meal

Measurement of Human Energy Expenditure: Energy produced by the body, Indirect and direct calorimetry, Respiratory quotient for CHO, protein, lipid and mixed diet, Respiratory Exchange Ratio. Nutrition And Performance, Nutritional Ergogenic Aids and Supplements, Sports Specific Nutrition: Sprinting, running, cycling, swimming, weight lifting, power sports and team Sports, Eating disorders and management : Anorexia and bulimia Nervosa, Binge eating disorder

IV Fitness testing & its analysis

Testing of Health and Skills testing to evaluate Flexibility, endurance, strength, power and agility, their defects & correction. Strength training for children & adolescent

V Assessment, Diagnosis and Physiotherapy Management of Traumatic and Regional Conditions of Athletes

Upper Limb: Conditions of Shoulder, Elbow, Wrist, Hand and Fingers (including arm and forearm)

Lower Limb: Conditions of Hip, Knee, ankle and foot (including thigh and leg)

Head, neck and face, Thorax, spine and pelvis

VI Diagnosis & management of skin and common conditions of athletes: fungal infections, boils, cellulitis, sun burns etc.

Common diseases: Common cold, fever, diarrhea, dysentery amoebiasis, sore throat, stress, ulcers, skin infection, boils, cellulitis, sun burns etc.

Essential reading:

1. Physical Therapies in Sport and Exercise; Gregory Kolt, Lynn Snyder-Mackler
2. Athletic and Sport Issues in Musculoskeletal Rehabilitation; David J. Magee, James E.
3. Zachazewski, William S. Quillen, Robert Manske
4. Sports physical therapy; BarbaraSanders
5. Brukner& Khan's Clinical Sports Medicine: Injuries, Fifth Ed; Peter Brukner, KarimKhan

Suggested reading:

1. Orthopedic and Sports Physical Therapy; Terry Malone, Thomas G. McPoil, Arthur J.Nitz
2. Managing Sports Injuries : a guide for students and clinicians; Christopher M Norris
3. Evidence-Based Sports Medicine; DomhnallMacAuley, Thomas Best

COMPUTER SKILL PROGRAMING
MPTS 303T

Course Objectives:
The students will be able to appreciate the role of Computer technology. The course has focus on computer organization, computer operating system and software, and MS Windows, word processing, excel data worksheet and PowerPoint presentation.

Module I
Introduction to computer: Introduction, characteristics of computer, block diagram of computer, computer languages.

Module II
Input output devices: Input devices (keyboard, point and draw devices, data scanning devices, digitizer, electronic card reader, voice recognition devices, vision input devices), output devices (monitors, pointers, plotters, screen image projector, voice response systems).

Module III
Processor and memory: The central Processing Unit CPU, Main memory.

Module IV
Introduction of Operating System: introduction, operating system concepts, types of operating system. History of Windows, features, desktop, taskbar, icons on the desktop, operation with folder, creating shortcuts, operation with windows opening, closing, moving, resizing, minimizing and maximizing etc. and install different software.

Module V
Introduction to MS Word: Complete menu of the MS-word, Basic shortcut keys for MS- Word

Module VI
Introduction to excel: Introduction, about worksheet, entering information, saving workbooks and formatting, printing the worksheet, creating graphs, macron, tables, basic formulas/ Functions (Sum, count, average, logical operators), forting and filteration, Gridlines, Merge, basic short cut keys for MS- Excel.

Module VII
Introduction to PowerPoint: Introduction, creating and manipulating presentation, views, formatting and enhancing text slide with graphs.

Module VIII
Internet and its applications: Definition, brief history, basic services email, File transfer protocol, telnet, the World Wide Web (WWW), www browsers, use of the internet. Computer networks: introduction, types of network (LAN, MAN, WAN, Internet, Intranet), network topologies (star, ring, bus, mesh, tree, hybrid), components of network.

Reference Books:
1. Fundamentals of computer by V. Rajaraman, Neeharika Adabala
2. Computer Fundamentals by Anita Goel
3. Introduction to computer Science: a textbook for beginners in informatics by Gilbert Brands

CLINICAL NUTRITION
MPTS 304T

Course objectives: Upon completion of the course the student shall be able to understand the need and importance of proper nutrition. The student will have better understanding of biochemical and clinical manifestations, preventive and therapeutic measures of the nutrition related disorders.
Course outcomes: The students will be able to identify wrong nutrition prescription if any. The students will have increased knowledge regarding the care needed to prevent or treat the disease condition.

Module I: Introduction to Nutrition:

- Food Groups 1.2Food Pyramid
- Fundamentals of Meal Planning 1.4Concept of Food Exchange List
- Assessment of Nutritional Status

Module 2: Therapeutic adaptations and types of diets

- Therapeutic adaptations of a normal diet and modes of feeding.
- Different types of diets and methods of feeding patients
- Enteral Feeding-Indications for use and complications of enteral feeding.
- Parenteral Feeding- Indications for use, advantages and complications.

Module 3: Etiology, Prevention and Dietary Management in Disease of Cardio-vascular system:

- Atherosclerosis
- Hyperlipidemia
- Hypertension
- Ischemic Heart Disease

Module 4: Etiology, Prevention and Dietary Management in Metabolic Disorders:

- Diabetes:
    - Incidence and predisposing factors
    - Symptoms-types and tests for detection
    - Metabolism in diabetes
- Dietary treatment & meal management

- Uric Acid Metabolism:
- Gout
- Metabolism in Gout
- Signs and Symptoms

- Dietary Treatment and Management
- Errors of Metabolism: Metabolic defect, symptoms and management:
- Gluten Enteropathy
- Lactose Intolerance
- Phenylketonuria
- Homocystineuria

Text Books/References Book:

1. Robinson & Lawler, 1986, Normal and Therapeutic Nutrition, 17th edition, Mac Millan Publishers.
2. Mahtab S. Bamji, N Prahlad Rao, Vinodini Reddy, 2017, Text Book of Human Nutrition, 2nd edition, Oxford & IBH Publishing Co. Pvt. Ltd
3. B Srilakshmi, 2017, Dietetics, 7th edition, New Age International Publishers
4. Kumud Khanna, Sharda Gupta, Santosh Jain Passi, Rama Seth, Ranjana Mahna & Seema Puri, 2016, Textbook of Nutrition and Dietetics,2nd edition, Phoenix Publishing House (P) Ltd.

Fundamentals of Sports and Training

MPTS 301 P

Subject Code	Subject	Hrs/Week		Credits	Total Teaching hours	Examination (Marks)		
		Th	Pr			Internal	External	Th
MPTS 301 P	Fundamentals of Sports and Training		2	1	32	10	40	50

Course Description: The course covers topics related to Practical aspects and applied advanced and recent techniques and updates in physiotherapy treatment with respect to ill or injured athlete. Course enables the student to critically think for of all aspects of nutrition, psychology and doping procedures in rehabilitating the athlete.

Course Objective: The course should enable the student to acquire in-depth knowledge in practical scientific basis of athletic training development and implementation.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in scientific basis of athletic training development to injury prevention and management and implementation for practical.

Student must be able to skillfully tell about the following:

1. Advanced training methods like plyometrics, circuit and interval training and their implementation on injury management.
2. Strength, endurance and power training techniques must be demonstrated to the students where they can implement the physiotherapeutic techniques due to injuries of the trainings.

Rehabilitation in Sports

MPTS 302 P

Subject Code	Subject	Hrs/Week		Credits	Total Teaching hours	Examination (Marks)		
		Th	Pr			Internal	External	Th
MPTS 302 P	Rehabilitation in Sports		4	2	64	20	30	50

Course Description: The course covers topics related to Practical aspects and applied advanced and recent techniques and updates in physiotherapy treatment with respect to ill or injured athlete. Course enables the student to critically think for of all aspects of nutrition, psychology and doping procedures in rehabilitating the athlete.

Course Objective: The course should enable the student to acquire in-depth knowledge in practical scientific basis of athletic training development and implementation.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in scientific basis of athletic training development to injury prevention and management and implementation for practical.

1. HIIT
2. Sports drinks
3. Fitness Testing and Analysis
4. Demonstration of various games to understand the field injuries. (Educational Visit)

Evaluative Clinical Practice- III

MPTC 305 P*

Subject Code	Subject	Hrs/Week		Credits	Total Teaching hours	Examination (Marks)		
		Th	Pr			Internal	External	Th
MPTS 305 P*	Evaluative Clinical Practice- III** (Based on Viva, Case presentation from clinical postings)		18	9	288	50	50	100

Course Description: The course covers topics related to assessment, diagnosis and management of upper quadrant neuro-muculoskeletal sports injuries. The student will make a case presentation amongst the cases he would have seen during clinical/ ground postings.

Course Objective: The course should enable the student to acquire in-depth understanding and skill in assessment, diagnosis and management of upper quadrant neuro-musculoskeletal sports injuries

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in assessment, diagnosis and management of upper quadrant neuro-muculoskeletal sports injuries

Case presentation on the basis of patient seen during clinical postings

Introduction to Research Dissertation

MPTS 306 P*

Subject Code	Subject	Hrs/Week		Credits	Total Teaching hours	Examination (Marks)		
		Th	Pr			Internal	External	Th
MPTS 306 P*	Introduction to Research Dissertation		6	3	96	10	50	100

Course Description: The course covers topics related to scientific writing.

Course Objective: The course should enable the student to acquire in-depth understanding and skill in scientific writing.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in writing and scientific writing. They should be able to prepare the review of literature of the dissertation work. The student will be able to:

Seminar on Scientific Writing Based on Literature Search of given Project Work to

1. Identify the specific headings
2. Create theoretical frame work of area of study
3. Maintain details of available information of area of study
4. Learn referencing styles
5. Learn reference managing soft wares
6. Learn to avoid Plagiarism

4th Semester

Bioethics and Administration

MPTS 401 T*

Course Description: The course covers topics related to physiotherapy ethics, clinic management.

Subject Code	Subject	Hrs/Week		Credits	Total Teaching hours	Examination (Marks)		
		Th	Pr			Internal	External	Th
MPTS 401 T*	Bioethics and Administration	4	-	4	64	20	80	100

Course Objective: On completion of the course the student should be able to understand the basic issues of physiotherapy management & administration and practice as an informed professional on Legal & ethical issues.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in physiotherapy Ethics and clinic management.

I. Administration

1. Functions ofmanagement
2. Fundamentals of hospitaladministration
3. Management Process – Planning, Organization, Direction, Controlling, Decisionmaking
4. Personnel Management – Staffing, Recruitment Selection, Performanceappraisal, Job satisfaction.
5. Total Quality management – basics, quality control, quality assurance

II. Hospital management

1. History of hospital Administration, Planning and designing supportiveservices
2. Planning and designing ancillary and medicalservices
3. Financial / Management of ahospital
4. Planning and designing administrativeservices
5. Marketing of ahospital
6. Management of thehospital
7. Planning and developing a hospital (emphasis on physiotherapydepartment)
8. Administrative running of ahospital
9. Organization of ahospital

III. Bioethics & legal issues

1. Rules of Professionalconduct
2. Legalresponsibility
3. Role of International healthagencies
4. Standards of practice forPhysiotherapists
5. Liability and obligations in the case of medical legalaction
6. Law of disability anddiscrimination

7. Confidentiality of the Patient'sstatus
8. Consumer Protection Law, Health law, MCI,DCPTOT
9. Regulations of State Professional Councils (DCPTOT,MCPTOT, HCPTOT, GCPTOT and CGCPTOT)

Essential Readings:

1. Human Resource Management by NKSingh
2. Public Power & Administration by Wilenski, Hale &Iremonger
3. Physical Therapy Administration & Management by Hickik RobertJ
4. Medical ethics & consumer protection act by S KSinghal

Suggested Readings:

1) Managerial accounting for hospital by American HospitalAssociation
2) Hospital: planning, design & management by G DKunders

PEDAGOGY
MPTS 402T

COURSE OBJECTIVES AND OUTCOMES:

To instil pedagogy skills in Physical Therapist to effectively conduct teaching learning and clinical based education and training

Course Outcome: This course will enhance the ability of the Physiotherapist to implement the principles of management & administration in the context of increasing interaction between the Health – care facility & the community and also instil pedagogy skills in the student.

Course Description:

MODULE I

Pedagogy

a) **Introduction to Education and Emerging Issues in Education**

b) **Concepts of Teaching & Learning**

- Meaning need & scope of educational psychology
- Meaning & relationship between teaching & learning
- Learning theories
- Dynamics of behaviour, Individual differences
- Bloom's taxonomy of instructional objectives
- Preparation of unit plan & lesson plan
- Concept of Microteaching

c) **Curriculum**

- Meaning & Concept of Curriculum
- Basis for curriculum formulation/development.
- Framing objectives for a curriculum
- Process of curriculum development (including field work)
- Factors affecting curriculum development
- Evaluation of curriculum

d) **Teaching Learning Methods** :

- Lecture, lecture – demonstration, discussion, seminar, assignment, project methodand case study method
- Introduction and brief on Blended Teaching Learning methods, SAMR model withapplication to online platform and tools.

e) **Teaching Aids**

- Types of teaching aids
- Principles of selection
- Preparation and use of audio – visual aids

f) Continuous & Comprehensive Evaluation:

- Nature of educational measurement : meaning , process & types of testing

- Construction of an achievement tests & its analysis, Standardized tests, Introductionof some standardized tools and important tests of intelligence, aptitude and personality
- Diagnostic, Formative and comprehensive evaluation.

ENTREPRENEURSHIP
MPTS 403T

COURSE OBJECTIVES AND OUTCOMES:

This course will help a student to develop knowledge and skills for Commercialisation and Entrepreneurship as a whole for health related enterprise and personnel training and resource allocation, investment, venture and innovation and to be able to
provide rational justification for equity centred national development to demonstrate effective citizenship.

Course Outcome: To enhance the potential of the Physical Therapist to become effectivecommunicator especially in the context of education.

Module I

Theories and models of health care improvements, innovation and entrepreneurship foridea development and idea feasibility analysis

a. Healthcare economics and reimbursement, Behavioural economics
b. Advances in digital health and health information technology.
c. Accelerators, incubators, and other startup resources, Role of angel, seed, and venturecapital investors
d. Patents and the fundamentals of intellectual property
e. Inter-professional collaboration and teamwork, Change management and Diversity
f. Application of TOMA (Top of the mind awareness)
    - Awareness & guidance to the common people about health & disease and availableProfessional services.
    - Patient education and Education of health care practitioners
    - Use of media in clinical education

Suggested Reading

1. Basic Management. Trivedi
2. Principles of Marketing : Philip Kotler
3. Human Resource Management by NK Singh
4. Public Power & Administration by Wilenski, Hale & Iremonger
5. Physical Therapy Administration & Management by Hickik Robert J
6. Principles of Education – Soti Shivendra Chandra and Rajendra K. Sharma
7. Philosophical Foundation of Education – Srinibas Bhattacharya
8. Sociological Foundation of Education – Srinibas Bhattacharya
9. Revitalizing classroom Entrepreneurship Education: Adopting a critical appr oach in theedited by Karin Berglund, Karen Verduyn
10. Entrepreneurs: Talent, Temperament and Opportunity: John Thompson
11. Handbook of clinical teaching- Watts naney, Churchill Livingstone.
12. Pedagogy Physiotherapy Education: CS Ram
13. Communication skills in Clinical Practice- Sethuraman K.R.
14. Developing a Pedagogy of Teacher education: Understanding teaching and learning aboutteaching by J. John Laughran
15. Handbook of Technological pedagogical content knowledge (TPCK) for educators byMary c. Herring
16. Language, Culture and community in Teacher education by Maria Estela Brisk.

Dissertation

MPTS 404 P*

Subject Code	Subject	Hrs/Week		Credits	Total Teaching hours	Examination (Marks)		
		Th	Pr			Internal	External	Th
MPTS 404 P*	Dissertation	-	18	9	288	60	140	200

Course Description: The course covers carry out an independent research, which will involve conducting of the work as per the documented methodology, data collection, statistical analysis, dissertation writing. The work will build on the knowledge acquired through study of research methodology and biostatistics.

Course Objective: The course should enable the student to acquire in-depth knowledge and skill in independent dissertation writing.

Course Outcome: Students should be able to develop a research project and conduct the dissertation writing independently in physiotherapy.

The student will submit the synopsis/ proposal duly signed by the guide.
The student will have to submit the progress report time to time as notified by the School.
Once the permission is taken from the guide the student will have to submit the copies (notified by the department in the prescribed formats with all relevant documents and soft copy in CDs.)
After the submission the student will undergo the final viva except in unusual conditions.

Evaluative Clinical Practice- IV

MPTS 405 P*

Subject Code	Subject	Hrs/Week		Credits	Total Teaching hours	Examination (Marks)		
		Th	Pr			Internal	External	Th
MPTS 405 P*	Evaluative Clinical Practice- IV** (Based on Viva, Case presentation from clinical postings)	-	18	9	288	20	80	100

Course Description: The course covers topics related to assessment, diagnosis and management of lower quadrant neuro musculoskeletal sports injuries and athletic training planning.

Course Objective: The course should enable the student to acquire in-depth understanding and skill in assessment, diagnosis and management of lower quadrant neuro-musculoskeletal sports injuries and athletic training planning.

Course Outcome: The student should be able to demonstrate adequate knowledge and skill in assessment, diagnosis and management of lower quadrant neuro-musculoskeletal sports injuries and athletic training planning.

Case presentation on the basis of patient seen during clinical postings