JAMIA HAMDARD, NEW DELHI - 110062
Internal Quality Assurance Cell (IQAC)

LEARNING OUTCOMES-BASED CURRICULUM

Master of Physiotherapy (SPORTS)

NAME OF THE SCHOOL: SCHOOL OF NURSING SCIENCES AND ALLIED HEALTH

NAME OF THE DEPARTMENT/CENTRE: DEPARTMENT OF PHYSIOTHERAPY

Vision Statement: To be recognized as one of the leading Physiotherapy institutes of higher learning by providing value-based education, facilitating research and health care services to rural and urban communities, keeping in view the global needs.

Mission Statements:

MS1: Develop competency in the field of Physiotherapy by Imparting and disseminating evidence-based knowledge.

MS 2: Fostering research and development in the emerging areas of Physiotherapy while adhering to the ethical standards.

MS 3: Generating awareness of physiotherapy through outreach programmes.

MS 4: To gain recognition via collaboration in the global arena by providing quality healthcare thus improving quality of Life.

MS 5: Generating opportunities for faculties and students thus keeping pace with the advances related to physiotherapy.

NAME OF THE ACADEMIC PROGRAM: MASTER OF PHYSIOTHERAPY (SPORTS)

QUALIFICATION DESCRIPTORS (QDs)

Upon the completion of Academic Programme (MPT Sports), students will be able to:

QD-1: Acquire systematic, extensive and coherent knowledge and skill in physiotherapy assessment and management of sports injuries and rehabilitation including exercise prescription in different pathological conditions. Application including critical understanding of established theories, principles and concepts, knowledge of advanced and emerging issues, recent advances and research in sports physiotherapy evaluation and treatment procedures pertaining to sports injuries and rehabilitation.

QD-2: Demonstrate comprehensive knowledge and skills required for identifying problems and issues, collection of relevant quantitative and/or qualitative data related to musculoskeletal system, physical fitness parameters, sports injuries and conditions evaluation along with understanding of normal and abnormal biomechanics of sports and sports injuries.

QD-3: Apply knowledge and transferable skills in areas related to sports injuries and rehabilitation, physical fitness parameters evaluation and sports training, identifying problems, collection of relevant quantitative and /or qualitative data, its analysis and evaluation using appropriate methodologies for formulating evidence-based solutions and inferences.

QD-4: Address self-learning needs related to evidence based practice in current and emerging areas of sports physiotherapy and rehabilitation, use research and professional material, apply knowledge to new concepts and unfamiliar areas and seek well defined solutions in real life on-field and off-field situations.

QD-5 Demonstrate empirical and research-based knowledge and transferable skills in the field of sports physiotherapy for athletic injuries management and presenting oneself as an employable candidate in various sports and fitness settings including wellness centres, sports and fitness centres, stadia, sports injury clinics, pain clinics and multi-speciality hospitals and as a team physiotherapist creating employment opportunities for professional learning needs based on research and development work for the community.

Mapping Qualification Descriptors (QDs) with Mission Statements (MS)

	MS-1	**MS-2**	**MS-3**	**MS-4**	**MS-5**
QD-1	3	2	2	1	1
QD-2	3	3	3	3	2
QD-3	3	3	2	3	2
QD-4	3	3	2	2	2
QD-5	3	2	3	3	3

NAME OF THE SCHOOL / DEPARTMENT / CENTRE

NAME OF THE ACADEMIC PROGRAM: MASTER OF PHYSIOTHERAPY (SPORTS)

PROGRAM LEARNING OUTCOMES (PLOs)

After completing this Course, the students should be able to:

PLO-1	Physiotherapy Knowledge	To demonstrate and apply physiotherapy knowledge and skills for the physiotherapeutic management of various sports injuries and conditions including pre and post-surgical management of sports injuries along with exercise prescription in different medical conditions.
PLO-2	Communication Skills	To demonstrate and apply appropriate behavioural skills with humanitarian approach for communication with patients/athletes, relatives, co-professionals and community.
PLO-3	Problem analysis with the development of solution	To demonstrate and apply the physiotherapy evaluation skills by co relating with the clinical subjects/athletes for diagnosis of the patient/athletic problem and design an

		appropriate physiotherapeutic treatment and training strategy.
PLO-4	Evidence-based practice	To demonstrate and apply physiotherapy knowledge and skills based on empirical evidence.
PLO-5	Development of research acumen	To demonstrate ability of critical thinking, define problems, formulate hypotheses and design, execute and report the results of experiments with conclusions.
PLO-6	Individual or teamwork	Demonstrate the ability to work in an efficient manner individually as well as in diverse groups for providing best treatment strategies for the patients and community.
PLO-7	Digital literacy	To demonstrate and apply knowledge of basic computer applications for clinical and research purpose including data management, data storage and generate data bases.
PLO-8	Cross cultural integration	To acquire knowledge of attitudes, beliefs and socio-cultural values relevant to a particular society and nation with global perspectives to engage with diverse groups effectively.
PLO-9	Ethics	To demonstrate moral/ethical values in conduct, awareness of ethical issues related to patient/athlete care, work practices, refraining from malpractice, unethical behaviour, falsification, plagiarism, misinterpretation of data, non-adherence to intellectual property rights, adhering to truthful, unbiased actions in all aspects of work without discrimination based on age, race, gender, sexual preference, disease, mental status, lifestyle, opinions or personal values.
PLO-10	Physiotherapy patient evaluation and management	To select appropriate clinical examination and investigation for common sports injuries and conditions and analyse critically the findings along with planning appropriate rehabilitation goals and designing evidence-based management protocols.
PLO-11	Leadership skills	Students must demonstrate ability for task allocation, organization of task elements, setting direction, formulating an inspiring vision, team building, to achieve a vision, engaging, knowledge and respect individual values and opinions in order to foster harmonious working relationships with colleagues, peers, and patients/athletes.

PLO-12	Life-long learning	Students must demonstrate ability to acquire knowledge and skills through ongoing learning, participation in continuous education programs, engaging in self-paced, self- directed learning aimed at personal development, meeting social and cultural objectives, skill development, adapting to changing environment and workplace requirements and challenges.

PROGRAM SPECIFIC OUTCOMES (PSOs)

After completing this course, the students should be able to:

PSO-1: Demonstrate comprehensive knowledge and skills concerned with sports injuries and conditions evaluation, treatment and sports and fitness evaluation and training enabling judicious treatment related decision making while evaluating the reliability and relevance of evidence.

PSO-2: Express thoughts and ideas effectively in writing and orally, communicate with others using appropriate media, confidently share one's views in a clear and concise manner to different groups.

PSO-3: Demonstrate a sense of inquiry and capability for asking relevant/appropriate questions; the ability to recognise cause-and-effect relationships, define problems, formulate hypotheses, test hypotheses, analyse, interpret and draw conclusions from data; plan, execute and report the results of an experiment or investigation.

PSO-4: Demonstrate ability to work effectively with diverse teams, facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interests of a common cause.

Mapping of Program Learning Outcomes (PLOs) With Qualification Descriptors (QDs)

	QD-1	QD-2	QD-3	QD-4	QD-5
PLO-1	**3**	**3**	**2**	**3**	**3**
PLO-2	**3**	**3**	**2**	**3**	**3**
PLO-3	**2**	**2**	**3**	**3**	**3**
PLO-4	**2**	**3**	**3**	**3**	**3**
PLO-5	**2**	**3**	**3**	**3**	**3**
PLO-6	**2**	**2**	**3**	**3**	**2**
PLO-7	**3**	**3**	**3**	**3**	**3**
PLO-8	**2**	**2**	**3**	**3**	**2**
PLO-9	**3**	**3**	**3**	**3**	**3**

PLO-10	**3**	**3**	**3**	**3**	**3**
PLO-11	**3**	**3**	**2**	**2**	**3**
PLO-12	**3**	**3**	**3**	**3**	**2**

	QD-1	**QD-2**	**QD-3**	**QD-4**	**QD-5**
PSO-1	**3**	**3**	**3**	**3**	**3**
PSO-2	**3**	**3**	**3**	**3**	**3**
PSO-3	**2**	**2**	**3**	**3**	**3**
PSO-4	**2**	**2**	**3**	**3**	**3**

MASTER OF PHYSIOTHERAPY

(SPORTS)

BYE-LAWS

ANNUAL SYSTEM

DEPARTMENT OF REHABILITATION SCIENCES
SCHOOL OF NURSING SCIENCES AND ALLIED HEALTH
JAMIA HAMDARD
(DEEMED TO BE UNIVERSITY)

BYE-LAWS

1. OBJECTIVES

To train Physiotherapists who will be able to:

- Assume leadership roles in field of Physiotherapy.
- Assume enhanced patient care responsibilities.
- Formulate and implement educational programs.
- Analyze and undertake research.

2. THE PROGRAMME

a. Name	Master of Physiotherapy (M.P.T.) **Sports**
b. Nature	Regular and Full time.
c. Duration	Two Years
d. Pattern	Annual system

e.	**Eligibility Criteria for Admission**	Educational: A candidate seeking Admission to the M.P.T. Programme must have a Bachelor's degree in Physiotherapy with a minimum of 50% marks in aggregate.

The Bachelor's degree course should be recognized by the regulatory body and from a University recognized by Jamia Hamdard.

f.	**Commencement**	July/ August of every year.
g.	**Mode of admission**	Written entrance test (as prescribed by the University). Reservation in seats will be as per University norms
h.	**Admission of Foreign Nationals/NRI /Company Sponsored Candidates**	Eligibility same as for general candidates Selection Procedure as prescribed by Jamia Hamdard from time to time.
i.	**Total Seats**	As notified in the Jamia Hamdard Prospectus.
j.	**Span Period**	4 Years
k.	**Teaching days:**	180 days
l.	**Medium of instructions and examination**	English

3. THE CURRICULUM

Master of Physiotherapy (M.P.T.)

Total theory papers:	09
Total Practical:	03
Dissertation Viva voce:	01
Seminars	02

Mode of Curriculum delivery and execution includes classroom teaching, assignments, tests, lab work, project, case studies, participation in relevant events, field visits and educational tour etc.

4. THE COURSE STRUCTURE: M.P.T.

Hours Distribution and marks distribution

First Year

Course Code	Subject	Hours	Marks	IA	EA	Credits
MTS 161	Basic Health Sciences	48	100	25	75	3

MTS 162	Medical and Surgical Management of Sports Injuries	64	100	25	75	4
MTS 163	Advanced Diagnostics and Therapeutics	48	100	25	75	3
MTS 164	Research Methodology, Biostatistics and Computer Application	80	100	25	75	5
MTS 165	Seminars on clinical issues	48	100	100		3
MTS 166	Physiotherapy I- Sports Physical Therapy and Rehabilitation (Theory)	96	100	25	75	6
MTS 167	Physiotherapy I- Sports Physical Therapy and Rehabilitation (Lab hours)	48	100	25	75	3
MTS 168	Exercise Physiology and Sports Nutrition	64	100	25	75	4
MTS 169	Clinical training	704				44
TOTAL		Total hours 1200	Total marks 800			75

Total hours:1200 (Theory hours:400, lab hours:48 hours, Seminars:48 hours, Clinical training:704 hours)

SECOND YEAR

Course code	Subject	Hours	Marks	IA	EA	Credits
MTS 261	Management, Education and ethics	80	100	25	75	5
MTS 262	Biomechanics and Kinesiology (Theory)	96	100	25	75	6
MTS 263	Biomechanics and Kinesiology (Lab hours)	32	100	25	75	2
MTS 264	Seminars on clinical issues	48	100	100		3
MTS 265	Dissertation	208	100		100	13
MTS 266	Physiotherapy II- Sports Physical Therapy and Rehabilitation (Theory)	96	100	25	75	6
MTS 267	Physiotherapy II- Sports Physical Therapy and	48	100	25	75	3

	Rehabilitation (Lab hours)					
MTS 268	Clinical training	592				37
TOTAL		Total hours 1200	Total marks 700			**75**

Total hours: 1200 (Theory hours: 272, Lab hours: 80, Seminars: 48 hours, Dissertation: 208 hours, Clinical training: 592 hours)

5. ATTENDANCE

A. All students must attend every lecture / lab hour held in each subject. However, to account for late joining or other such contingencies the attendance requirement for appearing in the examinations shall be minimum of 75% of the classes actually held from the date of admissions. Each student is also required to participate in educational trips/ tour of the class.

B. In order to maintain the attendance record of a particular subject, a roll call will be taken by the teacher in every scheduled lecture and practical classes.

C. The teacher in -charge will consolidate the attendance record for theory & practical separately for each annual session. Attendance on account of participation in the prescribed functions of NCC, NSS, Inter-University Sports, Educational tours/ Fieldwork, shall be credited to the aggregate, provided the attendance record is duly signed by the Officer in-charge ,is sent to the Dean of the School within two weeks of the function / activity, etc.

D. The statement of attendance of students shall be displayed on the school notice board twice in each annual session. Copies of the same shall be kept in the Office of the Dean of the School/ of the concerned Department for record. Notice displayed on notice board shall be deemed to be a proper notification and no individual notice to students will be necessary.

E. If a student is found to be continuously absent from the classes without information for a period of thirty days, the teacher in-charge shall report it to the Head of Department. The Head will report it to Dean for necessary action.

F. A student with less than 75% attendance in theory and practical of each subject in a session shall be detained from appearing in the Annual Examination of the subject (s) in which the attendance is short. If the student has less than 85% attendance in the clinical practice, he/ she shall be detained from appearing in the practical examination. A 75% attendance is necessary in 'Seminars on Clinical Issues', failing which the marks in this subject will not be forwarded for final result, and the student shall have to reappear in the next academic session. However, the Dean of the School may consider for the condonation of attendance up to 5% on account of sickness or any other extenuating circumstances, provided the application condonation of attendance, duly certified by a Registered Practitioner/supported by documentary evidence has been submitted within seven days from recovery.

G. The students will get half summer and winter breaks only. Students will not get the autumn break. During the working half of summer and winter breaks, the students will continue with their clinical posting for the full day at their respective placements.

6. INTERNAL ASSESSMENT

A. There will be a total of 3 internal assessments in an academic session and best 2 out of 3 will be counted for final assessment. Tests will carry a weightage of 15marks in theory/practical, 5marks for attendance and 5 for assignment. The total weightage of the internal exams will be 25% of total marks in each subject in the Final/annual exams.

B. The Dates of the internal assessment exam will be notified in the academic calendar.

C. The Head of the Dept. shall consolidate the marks of internal assessment tests before forwarding it to the Asst. Registrar (Exam) at the conclusion of each academic session.

D. Sessional exams are to be conducted during the scheduled lecture time of the subject and other classes scheduled for that day are not to be cancelled.

E. A promoted candidate, who has to reappear in the Final/Annual examination of the paper, will retain internal assessment marks of the previous academic session

F. For 'Seminars on Clinical Issues' the marks will be based on presentations done by the students throughout the session. The assessment will be done by teachers of the specialty.

G. In the case of readmission the candidate shall go through the internal assessment process afresh and shall retain nothing of the previous academic session.

H. Missing an examination without prior permission of the competent authority will be counted as an attempt.

I. The marks of the internal assessment as well as the attendance will be notified and the examination answer sheets will be shown to the students and kept in record after receiving their signatures.

J. In exceptionally genuine and deserving cases, additional internal assessment tests may be held at the discretion of the competent authority.

7. ANNUAL EXAMINATIONS AND SUPPLEMENTARY EXAMINATIONS.

Final examination of theory and practical shall be conducted at the end of each session as outlined below.

a. Mode: Theory Papers	Written only
Lab Hours	Written, Demonstration and/ or Viva Voce
Viva Voce	Viva Voce
b. Duration: Theory	3 hours

Practical	Upto one hour per candidate
c. Examiner Theory	01 (from the panel)
Practical	02 (1 internal and 1 external) from the panel

*Panel to be prepared by the department and approved by the Competent Authority.

Viva Voce	02 (1 internal and 1 external) from the panel
d. Moderation of Theory Papers	For papers set by external examiners only. Change cannot be more than 30% by the teacher nominated by the Head.
e. Dissertation evaluation	There will be an internal and an external evaluator for each dissertation. The dissertation will be evaluated by the internal examiner and the viva voce will be conducted by the external examiner.

MINIMUM PASS MARKS

The minimum pass marks in each subject (theory and practical separately) shall be 50% of the maximum marks of the aggregate of Internal Assessment marks and Annual Examination marks. The student will need to obtain 50% of the maximum marks as aggregate of internal and external assessment, and need not obtain 50% of maximum marks in internal and external assessment separately.

8. PROMOTION SCHEME

In order to pass a paper a student has to secure at least 50% marks in paper. A student has to clear theory and practical separately.

(A) From 1st year to 2nd year

A candidate will be promoted from 1st year to 2nd year provided that he/she has passed in atleast 4 papers out of 9 prescribed in the first year in annual/supplementary examinations. If a candidate fails to satisfy the criteria mentioned above, he/she shall be detained in the 1styear.

A candidate failing in any subject will not be required to reappear in the internal assessment. His/her old internal assessment marks will be considered

(B) Second/final year

After having passed all the subjects of first and second year, a candidate shall be eligible for award of degree of Master of Physiotherapy.

A candidate failing in any subject will not be required to reappear in the internal assessment. His/her old internal assessment marks will be considered
Note :A candidate will be permitted to apply for re-evaluation if he /she wishes so.

There will be supplementary examinations within 45 days of declaration of the result of

the annual examination.

9. CLINICAL PRACTICE

Students will engage in clinical practice in Physiotherapy Departments in the Orthopaedics/ Neurology/ Cardiopulmonary/ Sports Medicine setting to enhance their clinical skills and apply theoretical knowledge gained during teaching sessions.

10. AWARD OF DEGREE

A. The candidate shall be awarded a Degree Certificate only on successful completion of the course including clinical practice for both the years.

B. The entire course of study in MPT for both the years must be completed within 4 years of the date of first admission.

11. MINIMUM PASS MARKS

The minimum pass marks in each subject (theory and practical separately) shall be 50%.

12. SPAN PERIOD

The entire course should be completed within a period of 4 years from the date of first admission to the program.

13. PAPER FORMAT

Max marks: 75
Duration: 3 hours

1) Essay type answer (total 30marks)
Attempt any 2 out of 3: each question carries 15 marks
2) Long answer questions (total 20 marks)
Attempt any 2 out of 3: each question carries 10 marks.
3) Short answer questions (25 marks)
Attempt any 5 out of 6: each question carries 5 marks

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COURSE DESIGN

SCHOOL OF NURSING SCIENCES AND ALLIED HEALTH
DEPARTMENT OF PHYSIOTHETARPY

NAME OF THE ACADEMIC PROGRAM: MASTER OF PHYSIOTHERAPY (SPORTS)

COURSE CODE: MTS 161

TITLE OF THE COURSE: BASIC HEALTH SCIENCES (THEORY)

L-T-P 48-0-0 Credits : 3
(L=Lecture hours, T=Tutorial hours, P=Practical hours)

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to:

CLO-1: To comprehend the knowledge of the structure & function of the human body in relevance to sports physiotherapy.
CLO-2: Understand the factors leading to sports injuries and guidelines for assessment.
CLO-3: Correlate and apply the knowledge gained, in understanding and analysing the dysfunction of the human body.

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PSO 1	PSO 2	PSO 3	PSO 4
CLO1	3	2	3	2	3	2	2	2	2	3	2	**3**	**3**	**2**	**3**	**2**
CLO2	3	2	3	2	3	2	2	2	2	3	2	**3**	**3**	**2**	**3**	**2**
CLO3	3	1	3	2	3	2	2	1	2	3	2	**3**	**3**	**1**	**3**	**1**

Detailed Syllabus:

Unit 1 Anatomy (10 hrs)

I. Applied Anatomy and Histology

a) Functional Anatomy of upper limb, lower limb, spine, head, neck and face. 4 hrs
b) Surface Anatomy, Markings and determinations. 2 hrs
c) Pathoanatomy of peripheral nerve injuries, various bone pathologies etc. 1 hr
d) Pathoanatomy of PIVD, hernias, Hand infections, Common dislocations 1 hr
e) General Histology- Anatomy of cell membrane, types of epithelium and its anatomicallocation, histological appearance and fine details of bone, cartilage, muscle, ligament,peripheral nerves and spinal cord 2 hrs

Unit 2 General Physiology (15 hrs)

1. Physiology of Cardiovascular system 5 hrs

a. Physical characteristics of systemic circulation, Pressure pulses
b. Oxygen demand theory of local blood flow circulation,
c. Nervous control of blood circulation, Humoral control of blood circulation, Mechanisms of arterial pulse regulation, Hypertension,
d. Cardiac output and its regulation, Cardiac output in normal stress conditions,
e. Normal coronary blood flow along with variations, Physiological basis of ischemic heart disease, Physiological causes of shock

2. Neuromuscular System 3 hrs

a. Basic physics of membrane potentials
b. Recording of membrane potentials and action potentials with basics of Electromyogram

c. Mechanism of muscle contraction
d. Sources of energy for muscle contraction
e. Neural control of movement

3. Respiratory System **4 hrs**

a. Pulmonary volumes and capacities
b. Transport of gases
c. Regulation of respiration
d. Methods of studying respiratory abnormalities in athletes

4. Endocrine System **3 hrs**

a. Pituitary hormones and their functions
b. Thyroid hormones
c. Adrenocortical hormones
d. Insulin Glucagon hormones
e. Parathyroid hormones

Unit 3 PATHOLOGY and PHARMACOLOGY (15 hrs)

PATHOLOGY **5 hrs**

a. Inflammation and Repair 2 hr
b. Failed Healing Response 1 hr
c. Regional considerations of Inflammation and repair of soft tissue injuries 2 hr

PHARMACOLOGY **10 hrs**

1. Pharmacokinetics 1 hr
2. Anti-Anaemic 1 hr
3. Anti-Coagulants 1 hr
4. Thrombolytic Agents 1 hr
5. CV Drugs 2 hrs
   Cardiac Glycosides Anti-Anginal
   Peripheral Vasodilators Anti-HTN
   Anti-Arrhythmic
   Anti-HyperlipidaemicAndHypocholesterolaemic
6. Drugs Affecting Respiratory System and CNS 2 hrs
7. Hormones 1 hr
   Insulin Steroids
8. Diuretics 1 hr

Unit 4 RADIOLOGY (8 hrs)

I Basics of Imaging Techniques

1. Ultrasonography
2. CT
3. MRI scanning
4. Radionucleotide Scanning
5. Fluoroscopic Examination
6. Bone Scan
7. Dexa Scan

II Imaging in Common Sports Injuries

1. Imaging of the head and neck
2. Imaging of spine.
3. Imaging of pelvis, hip and thigh.
4. Imaging of Patello Femoral Joint & Knee joint.
5. Imaging of the lower leg, foot and ankle.

Reference Books:

1. Milward FJ. Synopsis of Surgical Anatomy. By McGregor Alexander Lee M. Ch. (Edin), F.R.C.S. (Eng) Published by John Wright & Sons, Ltd., Bristol.
2. Standring S, Ellis H, Healy J, Johnson D, Williams A, Collins P, Wigley C. Gray's anatomy: the anatomical basis of clinical practice.2005
3. Grant JCB, Basmajian JV, Slonecker CE, Grants - Methods of Anatomy – A clinical problem solving approach, Williams & Wilkins.
4. Snell RS. Clinical anatomy by regions. Lippincott Williams & Wilkins; 2011 Oct 28
5. Hall JE. Guyton and hall textbook of medical physiology. 13th ed. London, England: W B Saunders; 2015
6. Robbins, Stanley L. 1915-, Vinay Kumar, and Ramzi S. Cotran. *Robbins and Cotran Pathologic Basis of Disease*. 8th ed. Philadelphia, PA: Saunders/Elsevier, 2010.

Teaching-Learning Strategies in brief:

The teaching learning strategies followed are board and chalk teaching, learning through discussion among peer group, learning through case studies, experiential learning, reflective learning, open ended questions by teacher, open ended questions from students.

Assessment methods and weightages in brief:

Assessment is divided into internal assessment and external assessment. Internal assessment is conducted throughout the year. Internal assessment is divided into 3 parts and is for a total of 25 marks of which 5 marks are for attendance, 5 marks are for assignment and 15 marks are for sessional. Three sessionals are conducted of which the average of the best two sessional is calculated. External assessment is for 75 marks conducted at the end of the session

COURSE CODE: MTS 162

TITLE OF THE COURSE: MEDICAL AND SURGICAL

MANAGEMENT OF SPORTS INJURIES (THEORY)

L-T-P 64-0-0 Credits: 4

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to:

CLO-1: Demonstrate adequate knowledge about medical and surgical management of various musculoskeletal/sports injuries and different sports conditions.
CLO-2: Understand the complications associated with various sports injuries and conditions that may require medical or surgical management.
CLO-3: Use this information in planning and tailoring effective, specific, safe physiotherapy treatment programmes.

Mapping of Course Learning Outcomes (CLOs)with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PSO 1	PSO 2	PSO 3	PSO 4
CLO1	3	2	3	2	2	2	2	2	2	3	2	**3**	**3**	**2**	**3**	**2**
CLO2	3	2	3	3	2	2	2	2	2	3	2	**3**	**3**	**2**	**3**	**2**
CLO3	3	3	3	3	3	3	3	3	3	3	3	**3**	**3**	**3**	**3**	**3**

Detailed Syllabus:

By the completion of this chapter, the student will be able to:
1. Demonstrate proficiency in the usage of medical terminology associated with anatomical structures commonly involved with athletic injury and disease.
2. Demonstrate proficiency in understanding medical word components, roots, prefixes and suffixes.
3. Be able to define, spell and pronounce common acute and chronic pathologies associated with athletic injury and disease.
4. Orally demonstrate mastery of medical terminology common to sports medicine.
5. Understand diagnostic procedures and therapeutic nomenclature associated with athletic injuries and common illnesses.
6. Comprehend and use abbreviations common to medical records.

Unit 1 TRAUMATIC MEDICAL CONDITION (24 hours)

Medical Aspects: It is designed to expose the student to the necessary recognition, evaluation and treatment skills needed to assess a variety of medical conditions affecting athletes and physically active individuals. Emphasis will be on developing clinical proficiencies of advanced assessment related to pathologies and disorders affecting the endocrine, exocrine, respiratory and autonomic nervous systems.

1. Standard Nomenclature Etiology and Mechanism of common acute and chronic Athletic Injuries including:
    a. Head & Spine Injuries
    b. Upper Limb Injuries

c. Lower limb Injuries
d. Chest, Abdomen & Thorax Injuries

2. Medical and surgical management of unconscious Athlete
3. Surgical management of common sports injuries, indications, contra-indications for surgery, precautions after surgery.

Unit 2 Non Traumatic Medical Conditions (10 hrs)

1. Female athlete
2. Adolescent athlete
3. Common skin conditions
4. Common GI infections
5. Geriatric disorders
6. Disabled athletes
7. Diabetic athlete
8. Hypertensive athlete
9. Medical syndrome unique to athletes
10. Obesity & athlete

Unit 3 Sports Psychology (30 Hours)

1. **History and current status of Sports Psychology**.

2. **Personality Assessment and Sports personality**.
a. Theories of personality
b. Personality assessment

3. **Attention and Perception in sports**.
a. Attention
b. Perception

4. **Pre-competitive anxiety**.
a. Source of PCA
b. Effect of PCA on performance

5. **Aggression in sports**.
a. Theories of aggression
b. Management of aggression

6. **Eating disorders**.
a. Etiology of eating disorders
b. Types of eating disorders
c. Complications of eating disorders

7. **Role of Psychology in Dealing with Injuries**.

8. Group Behavior and leadership
a. Nature of group behavior and group.
b. Types of group.
c. Educational implication of group behavior.

d. Meaning of leadership, types of leadership quality of leadership, training and functioning of leadership.

9. **Emotion**
a. Meaning of emotion.
b. Characteristics of emotion.
c. Meaning of controlling and training of emotions and its importance.
d. Contribution of sports to emotional health.
e. Meaning of sentiment, its type, importance and formation.

10. **Clinical Training**
a. Students will undergo Field Training with Sportsmen.
b. They will attend Sports medicine clinic.
c. Field Training at various Stadiums of New Delhi.
d. The students will accompany sports teams for National sporting competitions.

11. **Goal setting**

12. **Psychological aspect of doping**

13. **Psychological preparation of elite athletes**
a. Concept of psychological preparation

14. **Biofeedback training**

15. **Mental imagery**

16. **Stress management**
a. Principles of Stress Management
b. Stress Management techniques

17. **Concentration training in sports**.
a. Basic principles of concentration
b. Concentration training
c. Concentration awareness exercises

18. **Motivational orientation in sports**.
a. Athlete's needs of motivation
b. Motivational inhibitors
c. Motivational techniques

19. **Relaxation Training**.
a. Definition
b. Types of relaxation trainings
c. Progressive muscle relaxation
d. Breathing exercises
e. Yognidra
f. Transcendental meditation

Reference Books:

1. Ryan JL, Starkey C. Evaluation of orthopedic and athletic injures. Philadelphia: FA Davis Company. 2002
2. Prentice WE, Arnheim D. Principles of athletic training: A competency-based approach. New York: McGraw-Hill; 2011.
3. Stanley H. Physical examination of the spine and extremities. Appleton-Century-Crofts
4. Konin JG, Wiksten DL, Isear Jr JA, Brader H. Special Tests for Orthopedic Examination.
5. Gylys BA, Wedding ME. Medical terminology systems: a body systems approach. FA Davis; 2017 Mar 20.
6. Kapit W, Elson LM, Elson LM. The anatomy coloring book. New York: Harper & Row
7. Venes D. Taber's cyclopedic medical dictionary. FA Davis; 2017.
8. Mellion MB, editor. Office sports medicine. Hanley & Belfus
9. Craig RF, Birrer RB, O'Connor FG. Sports medicine for the primary care physician. CRC press; 2004
10. Zuluaga M. Sports physiotherapy: applied science and practice. Churchill Livingstone.
11. Brukner P, Brukner KK. Khan's clinical sports medicine: Volume 1 Injuries. North Ryde.2017
12. Reid DC. SportsInjury Assessment and Rehabilitation. New York, NY: Churchill Livingstone.
13. Gould JA, editor. Orthopaedic and sports physical therapy. CRC Press
14. Norris CM. Sports injuries: diagnosis and management. Butterworth-Heinemann; 2004.
15. Morgan CT, King RA, Weisz JR, Schopler J. Introduction to psychology.
16. Suinn RM. Psychology in Sports Methods and Applications. Surjeet publications.
17. Cratty BJ: Psychology in contemporary sports, Prentice Hall
18. Sahni SP: Handbook of Sports Psychology - A comprehensive manual of Mental Training

Teaching-Learning Strategies in brief :

The teaching learning strategies followed are board and chalk teaching, learning through discussion among peer group, learning through case studies, experiential learning, reflective learning, open ended questions by teacher, open ended questions from students.

Assessment methods and weightages in brief:

Assessment is divided into internal assessment and external assessment. Internal assessment is conducted throughout the year. Internal assessment is divided into 3 parts and is for a total of 25 marks of which 5 marks are for attendance, 5 marks are for assignment and 15 marks are for sessional. Three sessionals are conducted of which the average of the best two sessional is calculated. External assessment if for 75 marks conducted at the end of the session

COURSE CODE: MTS 163

TITLE OF THE COURSE:ADVANCED DIAGNOSTICS AND THERAPEUTICS (THEORY)

L-T-P 48-0-0 Credits : 3
(L=Lecture hours, T=Tutorial hours, P=Practical hours)

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to:
CLO-1: Understand theoretical concepts and physiological effects of electrotherapeutic modalities at cellular level.
CLO-2: Identify recent advances in pain models.
CLO-3: Apply recent knowledge and skill related to exercise therapy interventions and electrotherapeutic modalities in different sports injuries and conditions for patient/athlete recovery or return to sport.

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PSO 1	PSO 2	PSO 3	PSO 4
CLO1	3	1	3	2	2	1	1	1	1	3	1	**2**	**3**	**1**	**3**	**1**
CLO2	3	1	3	2	3	1	1	1	1	3	1	**2**	**3**	**1**	**3**	**1**
CLO3	3	3	3	3	3	3	3	3	3	3	3	**3**	**3**	**3**	**3**	**3**

Detailed Syllabus:

UNIT 1 14 Hours.

1. Human performance analysis

- Body composition, strength, agility, endurance and performance testing
- Basic principles, procedure and clinical implications of Body Composition analysis
- Muscle strength -Physiological, biochemical and biomechanical Parameters for assessment of Muscle strength
- Dynamometry-Hand held dynamometer, back and leg dynamometer, Hand grip measurement, 1 R M measurement
- Instrumentation, Procedure of data measurement and Role of Isokinetic dynamometer in Rehabilitation
- Endurance testing; muscle and cardiovascular endurance testing
- Assessment of muscle damage and fatigue
- Assessment of Jointproprioception, Balance, Coordination and Agility

2. Applied movement analysis

- Introduction to two and three dimensional movement analysis
- Instrumentation and Methods of movement analysis
- Electro goniometry and accelerometer, Inclinometer, Pressure transducers and Force plate

3. Electromyography and N C V in Rehabilitation

- Electrophysiology of nerve and muscles
- EMG;-Basic principles, , Processing ,Recording, Normal and Abnormal Potentials, single fibers and macro EMG, Reporting Results, Clinical implications of EMG test, Kinesiological E M G
- N C V (M N C V and S N C V) Basic concepts and methods of recording and interpretation, Clinical implication in various musculoskeletal and neuromuscular conditions
- Basics of E CG waves-Normal and Abnormal interpretation

UNIT 2 - 14 Hours

- Evidence based Role of Exercise therapy intervention and practice in: Pain management, Endurance impairment, impaired mobility, impaired neuromuscular control, impaired joint sense, Impaired Gait and posture
- Specific Exercise Interventions: Isokinetic, Plyometric, Pilates, Open and closed kinetic chain, PNF, Core Stabilization, Aquatic therapy , Home Programme and its adherence.
- Specific consideration in exercise therapy: Female, Pediatric, Amputation, geriatric patients
- Evidenced based role of Electrotherapy intervention and Practice in- Spasm management. Healing and Wound management, Oedema management, Muscular impairment
- Evidenced based role of Microwave diathermy, Shortwave diathermy, Ultra violet radiation therapy and Ultrasound Therapy in physiotherapy.
- Special consideration for electrotherapeutic modalities: Pregnant women, Menstruating women, Pediatric, Geriatric, Neurologically impaired, mentally impaired people.

UNIT 3 - 14 Hours

- Introduction, basic principles, techniques of application, indications, contraindications and evidenced based role of the following in Rehabilitation:
    - Neuromuscular Electrical Stimulation (NMES)
    - Russian and Interferential and H V P G Currents
    - Functional electrical stimulation (FES)
    - Extra corporeal Shock wave therapy (ESWT)
    - E M G Biofeed back
    - Microcurrents.
    - LASER
    - Virtual reality.

UNIT 4 - 14 Hours

- Basic molecular biology of pain
- Electrophysiology of peripheral and central aspect of pain
- Pain measurement tools and physiotherapy management strategy
- Role of different electrotherapeutic modalities in management of pain and healing

Reference Books:

1. Sheila K, Sarah B. Electrotherapy: Evidence-Based Practice. Churchill Livingstone, 2002.
2. Low JL, Reed A. Electrotherapy explained: principles and practice. Elsevier Health Sciences; 2000.
3. Penrose HW. Electrical Motor Diagnostics. Success by Design; 2015.

Teaching-Learning Strategies in brief:

The teaching learning strategies followed are board and chalk teaching, learning through discussion among peer group, learning through case studies, experiential learning, reflective learning, open ended questions by teacher, open ended questions from students.

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COURSE CODE: MTS 164

TITLE OF THE COURSE: RESEARCH METHODOLOGY, BIOSTATISTICS AND COMPUTER APPLICATION (THEORY)

L-T-P 80-0-0 Credits: 5

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to:
CLO-1: Enumerate the steps of research process and be able to design the different research methods.
CLO-2: Acquire skills to critically review literature, formulate problems, writing and publishing conducted research.

CLO-3: Apply basic biostatistics in research and analytical statistical tests to analyse the result of research.
CLO-4: To Analyse Recent Advances in Research Methodology and Biostatistics and to understand and familiarize the student with different softwares and resources used in statistical analyses of research data.

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PSO 1	PSO 2	PSO 3	PSO 4
CLO1	3	3	3	2	3	3	3	2	2	2	2	**3**	**3**	**3**	**3**	**3**
CLO2	3	3	3	3	3	3	3	2	2	2	2	**3**	**2**	**3**	**3**	**3**
CLO3	2	3	2	2	3	2	3	1	1	1	1	**3**	**1**	**2**	**1**	**2**
CLO4	1	1	3	3	3	2	3	1	1	1	1	**3**	**1**	**3**	**3**	**1**

Detailed Syllabus:

To enhance the ability of the Physiotherapist to conduct scientific studies thereby addressing the concerns of a commitment to inquiry , knowledge development &responsible (knowledge based) clinical practice & to construct valid & reliable assessment tools capable of yielding data of scientific value.

UNIT 1-Concepts of Research Methodology **24 Hours**

- An introduction to research methodology 2 Hours
- Defining the research problem 2 Hours
- Review of literature/use of IT & Database for ROL 2 Hours
- Research Design –Experimental & Non-experimental 4 Hours
- Measurement and scaling techniques 2 Hours
- Reliability and validity 2 Hours
- Variables and operational definition 2 Hours
- Methods of data collection 2 Hours
- Sampling and sample size calculation. 1 Hour
- Level of evidence 1 Hour
- Research ethics, Informed Concent , Plagerism 2 Hours
- Writing proposal 1 Hour
- Use of animals and Human Subjects in research 1 Hour

UNIT 2**: Applications of Research Methodology (17 Hours)**

- Choosing & Developing Research question
- Critiquing a published article
- Presenting research Proposal
- Applying for research funding
- Writing in scientific style-Research Paper,Book review, Thesis,Project Report
- Referencing, citation, Indexing and impact factor
- Presenting research
- Preparing a conference poster
- Research in rehabilitation

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UNIT 3: Concepts in Biostatistics (25 Hours)

- **Introduction to Biostatistics (4 Hours.)**
  a. Definition, concept, function and limitation
  b. Measures of central tendency (Mean, mode and median) and dispersion (absolute and relative measure)
  c. Rate, ratio, proportion, incidence and prevalence, Point prevalence.

- **Sampling &Assignment (5 Hours)**
  a. Methods of sampling-Probabilistic and non-probabilistic Sampling
  b. Methods of Assignment

- **Basic probability distribution and sampling distributions:(6 Hours)**
  a. Concept of probabilityand probability distribution.
  b. Normal,Binomial distribution, Standard error and confidence intervals, Skewness and kurtosis.

- **Tests of Significance :(10Hours)**
  a. Basic of Testingof hypothesis-Null and alternate hypothesis. 2. TypeIand typeIIerrors.
  b. Level of significance, p value.
  c. Parametric test, non-parametric test, correlation and regression
  d. Concept of t test, f test and chi square

UNIT 4: Computer application in research and Biostatistics(14 Hours.)

- Overview of available software used in analysis and research-SPSS, STATA etc
- Procedure of preparation of Master chart in Excel sheet
- Procedure of representation of data, Result and descriptive statistics with table, Graph, Pie chart, scatter diagram, pictograph etc.

Reference Books:

1) Christopher Bork: 1992: Research in physical therapy
2) Domholdt E. Physical therapy research. Principles and applications. 1993.
3) Hicks CM. Research methods for clinical therapists: applied project design and analysis. Elsevier Health Sciences; 2009 Aug 7.
4) Swisher LL, Page CG. Professionalism in physical therapy: History, practice, and development. Elsevier Health Sciences; 2005 Feb 15.
5) Mahajan BK. Methods in Biostatistics For Medical Students & Research Workers, Jaypee Brothers Medical publishers (P) Ltd. New Delhi, India. 1991.

Teaching-Learning Strategies in brief:

The teaching learning strategies followed are board and chalk teaching, learning through discussion among peer group, learning through case studies, experiential learning, reflective learning, open ended questions by teacher, open ended questions from students.

Assessment methods and weightages in brief:

Assessment is divided into internal assessment and external assessment. Internal assessment is conducted throughout the year. Internal assessment is divided into 3 parts and is for a total of 25 marks of which 5 marks are for attendance, 5 marks are for assignment and 15 marks are for sessional. Three sessionals are conducted of which the average of the best two sessional is calculated. External assessment if for 75 marks conducted at the end of the session

COURSE CODE: MTS 165

TITLE OF THE COURSE: SEMINARS ON CLINICAL ISSUES

L-T-P 0-0-48 Credits: 4

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to:
CLO-1: The student should be able to demonstrate adequate knowledge and skill in evidence-based seminar presentation on topic allocated to him/her pertaining to sports injury rehabilitation, health, fitness and various disorders
CLO-2: The student should be able to develop presentation skills while developing persuasive speech.
CLO-3: the student should be able to present information in a compelling, well-structured and logical sequence, respond respectfully to opposing ideas, show depth of knowledge and develop ability to synthesize, evaluate and reflect on information.

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PSO 1	PSO 2	PSO 3	PSO 4
CLO1	3	3	3	3	3	3	3	1	1	3	3	**3**	**3**	**3**	**3**	**3**
CLO2	1	3	3	3	3	1	3	1	1	1	3	**3**	**1**	**3**	**3**	**2**
CLO3	1	3	3	3	3	3	3	3	1	1	3	**3**	**1**	**3**	**3**	**3**

Detailed Syllabus:

These will serve as a platform for students to integrate various components of patient or athletic injuries management and debate contentious issues in the efficacy of sports physiotherapy techniques. Students will give presentations on topics provided to them.

Teaching-Learning Strategies in brief:

The teaching learning strategies followed are board and chalk teaching, learning through discussion among peer group, learning through case studies, experiential learning, reflective learning, open ended questions by teacher, open ended questions from students.

Assessment methods and weightages in brief:

Assessment is in form of internal assessment which is of 100 marks. The student will present seminars on topics allocated to them and will be marked on the basis of their presentation skills, information presented, ability to defend their argument and answering the questions put up.

COURSE CODE: MTS 166

TITLE OF THE COURSE: PHYSIOTHERAPY I - SPORTS PHYSICAL THERAPY AND REHABILITATION (THEORY)

L-T-P 96-0-0 Credits: 6

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to:

CLO-1: Describe anatomical, physiological and biomechanical basis of various sports injuries.
CLO-2: Describe the pathophysiology, aetiology, clinical features and impairments of different sports injuries.
CLO-3: Rationalise various assessment techniques and provide a more functional and comprehensive approach to manage sports injuries
CLO-4: The student should be able to compare & contrast the outcome of various manual and mechanical therapy approaches.
CLO-5: To practice different joint mobilization and soft tissue mobilization techniques for sports rehabilitation.
CLO-6: Formulate a differential diagnosis and deliver appropriate sports physiotherapy management protocols.

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PSO 1	PSO 2	PSO 3	PSO 4
CLO1	3	1	1	1	1	1	1	1	1	2	1	**3**	**1**	**1**	**1**	**1**
CLO2	3	1	1	1	1	1	1	1	1	2	1	**3**	**1**	**1**	**1**	**1**
CLO3	3	1	2	3	3	1	2	1	1	3	1	**3**	**3**	**1**	**2**	**1**
CLO4	3	2	3	3	3	1	3	1	1	3	1	**3**	**3**	**1**	**3**	**1**
CLO5	3	3	3	3	3	3	3	3	3	3	3	**3**	**3**	**3**	**3**	**3**
CLO6	3	3	3	3	3	3	3	3	3	3	3	**3**	**3**	**3**	**3**	**3**

Detailed Syllabus:

Objectives: After completion, the student will be able to …

- Evaluate; treat; instruct; monitor & provide corrective or positive feedback; reassess; and progress an athlete through the rehabilitative process from initial injury to return to play.
- Describes and demonstrate the appropriate selection and application of therapeutic exercises taking account for the body's physiological response to injury; immobilization or activity; age; disease; and adaptations along with the psychological necessities demonstrated by the athlete.
- Describe the indications, contraindications, theory, and principles for the incorporation and application of various contemporary therapeutic exercises.

Unit 1: Evaluation & Assessment (20 hours)

a. Importance of evaluation & assessment (1)

b. Methods of evaluation- interview, clinical examination, field test, reliability & validity of each test &investigative procedure (2)

c. Evaluation of physical fitness (4)

d. Pre-participation Exam (1)

e. On-Field and Off-Field Evaluation Process (1)

f. Documentation in Rehabilitation (1)

Regional Evaluation: Evaluation & assessment of

Shoulder, Elbow, Wrist, Fingers, (3)

Hip, Groin, Thigh, Knee, Lower Leg, Ankle (3)

Chest, abdomen and spine (3)

Unit 2: Rehabilitation of Sports Injuries (12 hours)

Common acute and overuse injuries of:

- Shoulder girdle, Arm, Elbow, Forearm, Wrist & hand (3)
- Pelvis, hip, thigh, knee, leg, ankle & foot (3)
- Spine (2)
- Head (2)
- Injuries to Athletes in various age groups (2)

Unit 3: Therapeutic Exercise & Techniques (48 hours)

1. Neuromuscular Control, Balance, and Postural Equilibrium (2)

a. The Physiology of Mechanoreceptors
b. Postural Control System
c. Assessment of Neuromuscular Control versus Balance versus Postural Equilibrium
d. Injury and Balance, Neuromuscular Control, and Postural Equilibrium

2. Restoring Range-of-Motion and Improving Flexibility (2)

a. Importance of Flexibility and ROM
b. Anatomical Factors that Limit Flexibility
c. Neurophysiological Basis of Stretching
d. Types of stretching

3. Open-Kinetic-Chain versus Closed-Kinetic-Chain Exercises (2)

a. Concept of the Kinetic Chain
b. Biomechanics of Open- versus Closed-Kinetic Chain Activities for both the Lower and Upper Extremity

4. Training for Strength and Endurance (2)
a. Types of Skeletal Muscle Contraction and Physiology of Strength Development
b. Factors that Determine Levels of Muscular Strength, Endurance, and Power
c. Resistance Training Differences between Male &Female and between Child & Adult

5. Cardiorespiratory Endurance Training: Principles, techniques, advantages and disadvamtages (2)

6. Plyometric Exercise (2)

a.Biomechanical and Physiological Principles of Plyometric Training
b. Plyometric Program Guidelines, Precautions, Development, Design, and Implementation

7. Functional Training and Functional Progression: Principles, techniques, advantages and disadvamtages (2)

8. Isokinetics in Rehabilitation (2)
a. Isokinetic testing and training
b. Isokinetics in management of sports injuries

9. Aquatic Therapy in Sports: Principles, techniques, indications, contraindications, advantages and disadvantages (2)

10. Manual Therapy Techniques in Rehabilitation and their rationale (30 hours)

a) Mulligan (3)

b) Mckenzie (3)

c) Maitland (3)

d) Kaltenborn(2)

e) Proprioceptive Neuromuscular Facilitation Techniques (3)

f) Soft tissue Manipulation and soft tissue release (3)

g) Sports massage (3)

h) Neural Mobilisation – Butler (3)

i) Positional Release (3)

j) Muscle Energy Techniques (3)

11. **Telerehabilitation-Definition**, Modes of Delivery, Evidence based Practice, Status and Practice in India 2 hrs

Unit 4: Exercise Programming for Special Populations (16 hours)

Students study the rationale and principles of exercise programming

forpopulations with special needs :

- Cardiovascular disease (2)
- Pulmonary disease, (2)
- Diabetes,(2)
- Obesity, (2)
- Older adults (2)
- Children (2)
- Pregnancy (2)
- Disabled athlete(2)

Reference Books:

1. Prentice WE. Rehabilitation techniques in sports medicine. McGraw-Hill Companies
2. Gray GW. Lower extremity functional profile. Wynn Marketing, Incorporated
3. Prentice WE, Quillen WS, Underwood FB. Therapeutic modalities for allied health professionals. McGraw-Hill Companies.
4. Norkin CC, White DJ. Measurement of joint motion: a guide to goniometry. FA

Davis; 2016.
5. Dvir Z. Isokinetics: muscle testing, interpretation, and clinical applications. Elsevier Health Sciences; 2004.
6. Reid DC. SportsInjury Assessment and Rehabilitation. New York, NY: Churchill Livingstone.
7. Rucker KS. Handbook of sports medicine: a symptom-oriented approach. Butterworth-Heinemann Medical.
8. Baker CL. The Hughston Clinic Sports Medicine Field Manual. Lippincott Williams & Wilkins
9. Sinha AG. Principles and practice of therapeutic massage. Jaypee Brothers Medical Publishers; 2018
10. Basmajian JV, Wolf SL, editors. Therapeutic exercise. Williams & Wilkins.
11. Werner K. Physical Therapy for Sports, W.B. Saunders.
12. Bates A, Hanson N. Aquatic exercise therapy. WB Saunders Company
13. Hartley A. Practical Joint Assessment: A Sports Medicine Manual. Mosby Elsevier Health Science.
14. Kennedy R. Mosby's sports therapy taping guide. Mosby Incorporated.
15. Howard PD. ORTHOPEDIC AND SPORTS PHYSICAL THERAPY. ED. 3. Edited by Terry R. Malone, Thomas G. McPoil, and Arthur J. Nitz. St. Louis, Mosby-Year Book
16. Albert M. Eccentric muscle training in sports and orthopaedics. Churchill Livingstone.
17. Voss DE. Proprioceptive neuromuscular facilitation patterns and techniqes. 3ED Harper and Row.

Teaching-Learning Strategies in brief:

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COURSE CODE: MTS 167

TITLE OF THE COURSE: PHYSIOTHERAPY – I SPORTS PHYSICAL THERAPY AND REHABILITATION (LAB HOURS)

L-T-P 0-0-48 Credits: 3

COURSE LEARNING OUTCOMES (CLOs)

After completing this course, the students should be able to:

CLO-1: Ability to analyse the multifaceted aspects of the sports injuries and rehabilitation process and appreciate a multifaceted approach to evaluation and treatment based on sound clinical reasoning.

CLO-2: Ability to identify different treatment and training approaches and their appropriate match with clinical problems.

CLO-3: Recognise the role of the sports physiotherapist in helping the patient/athlete to reach his or her optimal level of functional independence within their environment or to return to their designated sport as soon as possible

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

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CLO1	3	3	3	3	3	3	2	2	2	3	2	**3**	**3**	**3**	**3**	**2**
CLO2	3	3	3	3	3	3	3	2	3	3	2	**3**	**3**	**3**	**3**	**2**
CLO3	3	3	3	2	2	3	2	3	3	3	3	**3**	**3**	**3**	**3**	**3**

Detailed Syllabus:

Students will be instructed via demonstrations, hands on techniques, field visits and case conferences on specific techniques used in management of patients with sports injuries. Students will draw on their experiences at the clinical postings to formulate a treatment plan for cases presented at the case conference.

Reference Books:

1. Prentice WE. Rehabilitation techniques in sports medicine. McGraw-Hill Companies
2. Gray GW. Lower extremity functional profile. Wynn Marketing, Incorporated
3. Prentice WE, Quillen WS, Underwood FB. Therapeutic modalities for allied health professionals. McGraw-Hill Companies.
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14. Kennedy R. Mosby's sports therapy taping guide. Mosby Incorporated.
15. Howard PD. ORTHOPEDIC AND SPORTS PHYSICAL THERAPY. ED. 3. Edited by Terry R. Malone, Thomas G. McPoil, and Arthur J. Nitz. St. Louis, Mosby-Year Book
16. Albert M. Eccentric muscle training in sports and orthopaedics. Churchill Livingstone.
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COURSE CODE: MTS 168

TITLE OF THE COURSE: EXERCISE PHYSIOLOGY AND SPORTS NUTRITION (THEORY)

L-T-P 64-0-0 Credits: 4

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to:

CLO-1: Describe various physiological/systemic changes that occur during exercise.
CLO-2: Describe various types, principles and application of different types of exercise training methods.
CLO-3: Apply the principles of diet and nutrition in exercise prescription
CLO-4: Assess and prescribe exercise protocol in special populations like Geriatrics, athletes', obese, pregnancy and in various systemic conditions like hypertension and respiratory conditions.
CLO-5: Describe the process of body's acclimatization to various environmental conditions.

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO 1	**PLO 2**	**PLO 3**	**PLO 4**	**PLO 5**	**PLO 6**	**PLO 7**	**PLO 8**	**PLO 9**	**PLO 10**	**PLO 11**	**PLO 12**	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**
CLO1	3	2	2	2	2	2	2	1	1	3	1	**3**	**3**	**2**	**3**	**1**
CLO2	3	2	2	2	2	2	2	1	1	3	1	**3**	**3**	**2**	**3**	**1**
CLO3	3	2	2	2	2	2	2	1	1	3	1	**3**	**3**	**2**	**3**	**1**
CLO4	3	2	2	2	2	2	2	1	1	3	1	**3**	**3**	**2**	**3**	**1**
CLO5	3	2	2	2	2	2	2	1	1	3	1	**3**	**3**	**2**	**3**	**1**

Detailed Syllabus:

Unit 1: Sports Nutrition (16 HOURS)

1. Optimal Nutrition for exercise and Physical Performance.
2. Carbohydrate Requirement &Glycemic Index
3. Carbohydrate: Needs of Strength & Endurance Athletes
4. Pre & Post Exercise Carbohydrate Intake
5. Protein and fats requirement and needs of Athlete
6. Water and Electrolyte Loss and Replacement in Exercise
7. Pre competition Meal and Carbohydrate Loading
8. Vitamins and exercise performance
9. Minerals and exercise performance: Mineral Loss in sweat, trace minerals and exercise

Unit 2: Exercise Physiology (21 HOURS)

1. Energy Transfer for Physical activity: (4 HOURS)

a. Energy transfer in exercise.

c. Energy expenditure during various activities.

d. Fatigue.

2.Cardio Vascular System and Exercise: (4 HOURS)

a. Cardio Vascular adaptations to sustained aerobic exercises.

b. Athletes Heart and Sudden cardiac death in sports.

3. Exercise and Respiratory System: (4 HOURS)

a. Regulation of Respiration during exercise

b. Athletes Lung.

c. Physiological consequences of valsalvamaneuver.

4. Skeletal System: (4 HOURS)

a. Growth and Exercise.

b. Repair and adaptation during exercise.

c. Training for Muscular Strength and Endurance.

5. Gastrointestinal Tract and Endocrine system: (5 HOURS)

a. Effect of Sports on GIT and Liver.

b. Exercise and Menstrual Cycle.

c. Effects of exercise on various Hormones in the body.

Unit 3: Applied Exercise Physiology (19 HOURS)

1. Body Composition- Anthropometry (5 HOURS)

a. Somatotyping and Techniques of Body Composition Analysis.

2. Aging and Exercise (4 HOURS)

a. Exercise, Longevity and aging

b. Coronary Heart Disease and Exercise.

c. Exercise Stress Testing

3. Temperature Regulation (4 HOURS)

a. Heat Balance.

b. Temperature Regulation. and Exercise

c. Acclimatisation.

d. Heat illness

e. Exercises in heat and Exercise in cold.

4. Physiological Basis and Principles of Training and Conditioning (6 HOURS)

a. Principles of endurance and strength training

b. Fundamentals that aid training and performance

i. Warm up and Cool down

ii. Flexibility and stretching

iii. Missing workouts

iv. Overtraining

Unit 4: Misc. Topics (8 HOURS)

a. High Altitude Training. 2 HOURS

b. Special Aids to Athletic Performance: - MORA, Oxygen Inhalation, and Sleep. 2 HOURS

c. Exercise for mood enhancement & anxiety. 1 HOUR

d. Doping in sports 3 HOURS

Reference Books:

1) McArdle WD, Katch FI, Katch VL. Essentials of exercise physiology. Lippincott Williams & Wilkins; 2006.
2) Hale T. Exercise physiology: a thematic approach. John Wiley & Sons; 2004 .
3) Clarke D. Exercise physiology. Prentice-Hall.
4) Wolinsky I, editor. Nutrition in exercise and sport. CRC press.
5) Brooks GA, Fahey TD, White TP. Exercise physiology: human bioenergetics and its applications. Mayfield publishing company.
6) Åstrand PO, Rodahl K, Dahl H, StrÃ SB. Textbook of work physiology: physiological bases of exercise. Human kinetics; 2003.
7) Fox EL, Bowers RW, Foss ML. The physiological basis of physical education and athletics. William C Brown Pub.
8) Eston RG, Reilly T, editors. Kinanthropometry and exercise physiology laboratory manual: exercise physiology. Taylor & Francis; 2009.
9) Rowland TW. Developmental exercise physiology. Human Kinetics Publishers.

Teaching-Learning Strategies in brief:

The teaching learning strategies followed are board and chalk teaching, learning through discussion among peer group, learning through case studies, experiential learning, reflective learning, open ended questions by teacher, open ended questions from students.

Assessment methods and weightages in brief:

Assessment is divided into internal assessment and external assessment. Internal assessment is conducted throughout the year. Internal assessment is divided into 3 parts and is for a total of 25 marks of which 5 marks are for attendance, 5 marks are for assignment and 15 marks are for sessional. Three sessionals are conducted of which the average of the best two sessional is calculated. External assessment if for 75 marks conducted at the end of the session

COURSE CODE: MTS 169

TITLE OF THE COURSE: CLINICAL TRAINING

L-T-P - 0-0-704 Credits : 44

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to:

CLO-1: Understanding of normal and sports injury biomechanics
CLO-2: Understanding the on-field and off-field assessment of an athlete and his/her management
CLO-3: Understanding of role of different members of the sports rehabilitation team.
CLO-4: Understanding the basic knowledge of various exercise and electrotherapeutic modalities and its implementation in assessment and management of various sports injuries/conditions
CLO-5: Understanding basic knowledge of exercise prescription in different medical conditions and different age groups
CLO-6: Understanding the recent advance techniques in sports injuries rehabilitation, fitness assessment and sports training and its application

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PSO 1	PSO 2	PSO 3	PSO 4
CLO1	1	3	2	1	1	3	1	3	3	1	3	**1**	**1**	**3**	**3**	**3**
CLO2	3	3	3	3	3	3	3	3	3	3	3	**2**	**3**	**3**	**3**	**3**
CLO3	2	2	1	1	1	3	1	1	1	1	1	**1**	**1**	**2**	**1**	**3**
CLO4	2	2	1	1	1	3	1	1	1	1	1	**1**	**1**	**2**	**1**	**2**
CLO5	3	3	3	3	3	3	2	2	2	3	2	**3**	**3**	**3**	**3**	**2**
CLO6	3	2	3	3	3	2	2	1	2	3	2	**3**	**3**	**2**	**3**	**2**

Detailed Syllabus:

Students will engage in clinical practice in Physiotherapy departments in the Sports Physiotherapy settings to enhance their clinical skills and apply contemporary knowledge gained during teaching sessions.

Teaching-Learning Strategies in brief:

The teaching learning strategies followed are board and chalk teaching, learning through discussion among peer group, learning through case studies, experiential learning, reflective learning, open ended questions by teacher, open ended questions from students.

SECOND YEAR SYLLABUS

COURSE CODE: MTS 261

TITLE OF THE COURSE: MANAGEMENT, EDUCATION AND ETHICS (THEORY)

L-T-P 80-0-0 Credits: 5

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to:

CLO-1: The student should be able to demonstrate adequate knowledge and skill in ethical principles of physiotherapy
CLO-2: Be aware of legal rights and duties as per the laws of Physiotherapy Governing bodies.
CLO-3: Apply managerial skills in planning, implementation and administration of clinical activities.
CLO-4: To document comprehensive and accurate health records.
CLO-5: To be able to understand and apply different teaching – learning methods for imparting physiotherapy education.

CLO-6: Describe the concept of learning evaluation and curriculum development

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PSO 1	PSO 2	PSO 3	PSO 4
CLO1	1	2	2	1	1	1	1	1	3	1	2	**2**	**1**	**2**	**2**	**1**
CLO2	1	2	2	1	1	1	1	1	3	1	2	**2**	**1**	**2**	**2**	**1**
CLO3	1	2	3	2	1	3	3	3	1	1	3	**2**	**1**	**3**	**1**	**3**
CLO4	1	1	1	1	1	1	3	1	1	1	1	**1**	**1**	**3**	**1**	**1**
CLO5	3	3	3	3	2	3	2	2	2	2	3	**2**	**3**	**3**	**3**	**3**
CLO6	1	2	2	1	1	2	2	1	1	1	2	**1**	**1**	**1**	**1**	**2**

Detailed Syllabus:

UNIT 1: MANAGEMENT (40 Hours)

To enhance the ability of the Physio Therapist to implement the principles of management & administration in the context of increasing interaction between the Health – care facility & the community.

1.Health care delivery system (including in health prevention and promotion)
Hospital: types and functions; clinical, supportive &ancillary services of a hospital
2. Facility planning
designing values based faciltity, strategic planning , design decisions
planning steps & process
planning for growth
(Acute care, rehabilitation center , school system , adult day care , long – term care , home care and private practice , community care , industrial set-up , .Hospice)

3. Organizing & engaging people in work setting
concept of productivity
organizational leadership : roles , responsibilities & competencies.
management styles
work teams
organizational performance improvement (quality & service improvement)

1. Dealing with differences(values , diversity concerns)
Conflicting values& motivations
Organizational, personal & professional guidance (organizational self-veiw, fundamental documents

2. Organizational structure & control for business success
characteristics of business structures
(legal structure, tax status, operating structure)
Organizational structure
(organizational chart, hierarchy in organizations, organizational patterns)
product strategy decisions
policies & procedures
re-organization
human resource management in relation to the operating structure.

3. Recruitment (personnel & entry level students)

4. Directing and controlling

5. Monitoring and evaluation

9. Information management
   management & flow of information in an organization
   use of data
   documentation (personnel , technological , financial considerations & realistic expectations)

6. Outcome management

11.Quality management- basis of quality management , quality assessment/control (audit), quality assurance, international quality system

12.Risk management

13. Financial management (fiscal management & cost accounting)

14. Marketing
   market orientation , segmentation , consumer behaviour, consumer research
   basics of marketing
   marketing plan
   marketing strategies in health care/ rehabilitation services.
   promotional considerations (communication methods & media , the marketing campaign)

15. Consultancy

16. Entrepreneurship : ownership & private practice

UNIT 2 :PEDAGOGY in PHYSICAL THERAPY EDUCATION (30 Hours)

To enhance the potential of the Physical Therapist to become effective communicators especially in the context of education

1. Introduction to Education and emerging issues in education (5 Hours)
   a) Meaning, functions and aims of education
   b) Agencies of education
   c) Formal , informal & non – formal education
   d) Current issues & trends in higher education
      i. Issue of quality in higher education
      ii. Autonomy & accountability
      iii. Privatization of education

iv. Professional development of teachers
v. Education of persons with disabilities

e) Philosophy of Education
i. Need for educational philosophy
ii. Some major philosophies (Idealism, Naturalism, Pragmatism) & their implications for education.

2. Concepts of teaching & learning (3 Hours)
a) Meaning need & scope of educational psychology
b) Meaning & relationship between teaching & learning
c) Learning theories
d) Dynamics of behavior
e) Individual differences

3. Curriculum (4 Hours)
a) Meaning & Concept of Curriculum
b) Basis for curriculum formulation/development.
c) Framing objectives for a curriculum
d) Process of curriculum development (including field work)
e) Factors affecting curriculum development
f) Evaluation of curriculum

4. Planning for teaching (3 Hours)
a) Bloom's taxonomy of instructional objectives
b) Writing instructional objectives in behavioral terms
c) Unit Planning & Lesson Planning
d) Preparation of unit plan & lesson plan
e) Concept of Microteaching

5. Teaching Methods (6 Hours)
a) Lecture, lecture – demonstration, discussion, seminar, assignment, project method and case study method

6. Teaching aids (2 Hours)
a) Types of teaching aids
b) Principles of selection
c) Preparation and use of audio – visual aids

7. Measurement & Evaluation (4 Hours)
a) Nature of educational measurement : meaning , process & types of testing
b) Construction of an achievement tests & its analysis.
c) Standardized tests

d) Introduction of some standardized tools and important tests of intelligence, aptitude and personality
e) Continuous & comprehensive evaluation.

8. Guidance & counselling (1 Hour)
   a) Meaning & concepts of guidance & counselling
   b) Principles of guidance & counseling services for students & faculty members
   c) Faculty development & development of personnel for physiotherapy services

9. Clinical Education (2 Hours)
   a) Awareness & guidance to the common people about health & disease and available Professional services.
   b) Patient education
   c) Education of health care practitioners
   d) Use of media in clinical education

UNIT 3: **Legal Professional and Ethical Issues (10 hours)**

a. Physiotherapy: Definition and Development.

b. The Implications & Conformation To The Rules Of Professional Conduct.

c. Legal Responsibility For Their Actions In The Professional Context And Understanding The Physiotherapist's Liability And Obligations In The Case Of Medical Legal Action.

d. Code of Ethics

e. A Wider Knowledge of Ethics Relating To Current Social And Medical Policy In The Provisions Of Health Care.

f. Functions of The Relevant Professional Associations Education Body And Trade Union.

g. The Role of The International Health Agencies Such As The World Health Organizations.

h. Standards of Practice For Physiotherapists

i. Current Issues.

Reference Books:

1) Chandra SS, Sharma RK. Principles of education. Atlantic Publishers & Dist; 2004.
2) Srinibas Bhattacharya(2002) Philosophical Foundation of Education
3) Bhattacharya S. Sociological Foundation of Education. Atlantic Publishers & Dist; 2006.
4) kotler P. From mass marketing to mass customization. Planning review. 1989.
5) Chandra SS, Sharma RK. Principles of education. Atlantic Publishers & Dist; 2004.

Teaching-Learning Strategies in brief:

The teaching learning strategies followed are board and chalk teaching, learning through discussion among peer group, learning through case studies, experiential learning, reflective learning, open ended questions by teacher, open ended questions from students.

Assessment methods and weightages in brief:

Assessment is divided into internal assessment and external assessment. Internal assessment is conducted throughout the year. Internal assessment is divided into 3 parts and is for a total of 25 marks of which 5 marks are for attendance, 5 marks are for assignment and 15 marks are for sessional. Three sessionals are conducted of which the average of the best two sessional is calculated. External assessment if for 75 marks conducted at the end of the session

COURSE CODE: MTS 262

TITLE OF THE COURSE: BIOMECHANICS AND KINESIOLOGY (THEORY)

L-T-P 96-0-0 Credits : 6

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to:

CLO-1: To apply the knowledge of biomechanical and kinesiological principles for assessing the physiotherapeutic requirement of the patient/athletes

CLO-2: To apply the knowledge of joint biomechanics, pathomechanics in evaluation and treatment of patients/athletes.

CLO-3: To understand and apply the applications of movement dysfunction into therapeutic exercise prescription

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PSO 1	PSO 2	PSO 3	PSO 4
CLO1	3	2	3	3	3	2	2	2	2	3	1	**3**	**3**	**2**	**3**	**2**
CLO2	3	2	3	3	3	3	2	3	3	3	2	**3**	**3**	**2**	**3**	**3**
CLO3	3	2	3	3	3	3	2	3	3	3	3	**3**	**3**	**3**	**3**	**3**

Detailed Syllabus:

Injury occurs from mechanical overload of tissue. This simple tenet is often overlooked by those responsible for injury prevention and rehabilitation of those already injured. This subject fills the current need for a resource that synthesizes the links between tissue properties, skeletal architecture, applied loads and injury. This subject will provide the mechanical bases of musculoskeletal injury to better understand causal mechanisms, the effect of injury on

musculoskeletal tissues, and how our current knowledge of biomechanics can contribute to injury prevention. The subject will include comprehensive information on

- The basic biomechanical concepts of force, stress and strain, stiffness, and elasticity;
- The mechanics of joints that are subject to disabling injury;
- The structure of connective tissues (bone, cartilage, tendons, and ligaments), which are most often involved in musculoskeletal injuries; and
- Factors such as age, gender, nutrition, and exercise, which affect the musculoskeletal system's response to force.

UNIT 1: Biomechanical Concepts (6 Hours)

- Mechanical principles of Materials
- Kinematics
- Kinetics
- Fluid Mechanics
- Material Mechanics
- Biomechanical Modeling and Simulation

UNIT 2: Tissue Biomechanics and Adaptation (12 Hours)

- Bone Biomechanics (2 hours)
- Articular Cartilage Biomechanics (2 hours)
- Tendon and Ligament Biomechanics (4 hours)
- Skeletal Muscle Biomechanics (2 hours)
- Biomechanics of Joint (2 hours)

UNIT 3: Mechanisms of Injury (06 Hours)

- Overview of Injury Mechanisms
- Principles of Mechanical Loading
- Principles of Injury
- Tissue Injury
- Compartment and Entrapment Conditions
- Joint Injury

UNIT 4: Kinesiology of upper limb, lower limb spine and cardiopulmonary mechanics (40 Hours)

- Shoulder complex (4 hours)
- Elbow and forearm complex (4 hours)
- Wrist and Hand (2 + 4 = 6 hours)
  Spine (10 hours)
- Hip (4 hours)
- Knee (4 hours)

- Ankle and Foot (5 hours)
- Cardiopulmonary Mechanics(3hours)

UNIT 5: Gait Analysis (10 Hours)

- Fundamentals: Gait Cycle, Phases of Gait, Basic Functions
- Normal Gait: Ankle Foot Complex, Knee, Hip, Head, Trunk and Pelvis, Arm, Total Limb Function
- Pathological Gait: Pathological Mechanisms, Ankle and Foot Gait Deviations, Knee Abnormal Gait, Hip Gait Deviations, Pelvis and Trunk Pathological Gait, Clinical Examples
- Gait Analysis Systems: Motion Analysis, Dynamic Electromyography, Ground Reaction Forces and Vectors, Stride Analysis, Energetic

UNIT 6: Measurement Instruments (11 Hours)

- Goniometer (1 hour)
- Accelerometer (1 hour)
- Photo Optical Devices (2 hour)
- Pressure Transducers & Force Plates (2 hour)
- Gait Analyzer (2 hour)
- Isokinetic Device (3 hours)

UNIT 7: EMG (5 Hours)

- Electrophysiology Of Muscle Contraction
- Recording
- Processing
- Relationship between EMG and Biomechanical Variables

UNIT 8: Biomechanical consideration for Orthoses & Prosthesis (06 Hours)

Reference Books:

1) Winter DA. Biomechanics of human movement. Biomechanics. 1979.
2) Levangie PK, Norkin CC. Joint structure and function: a comprehensive analysis. FA Davis; 2011 .
3) Nordin M, Frankel VH, editors. Basic biomechanics of the musculoskeletal system. Lippincott Williams & Wilkins; 2001.
4) Kapandji IA. Physiology of the Joints E-Book: Volume 2 Lower Limb. Elsevier Health Sciences; 2016 .
5) Soderberg GL. Kinesiology: application to pathological motion. Lippincott Williams & Wilkins; 1997.
6) Smith LK, Weiss L, Lehmkuhl LD. Brunnstrom's clinical kinesiology

Teaching-Learning Strategies in brief:

The teaching learning strategies followed are board and chalk teaching, learning through discussion among peer group, learning through case studies, experiential learning, reflective learning, open ended questions by teacher, open ended questions from students.

Assessment methods and weightages in brief:

Assessment is divided into internal assessment and external assessment. Internal assessment is conducted throughout the year. Internal assessment is divided into 3 parts and is for a total of 25 marks of which 5 marks are for attendance, 5 marks are for assignment and 15 marks are for sessional. Three sessionals are conducted of which the average of the best two sessional is calculated. External assessment if for 75 marks conducted at the end of the session

COURSE CODE: MTS 263

TITLE OF THE COURSE: BIOMECHANICS AND KINESIOLOGY

(LAB HOURS)

L-T-P 0-0-32 Credits : 2

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to:

CLO-1: To understand and apply knowledge of movement dysfunction into therapeutic expression.
CLO-2: To demonstrate skills and techniques used in biomechanics and kinesiology
CLO-3: To demonstrate upper and lower limb joints biomechanics in evaluation and treatment of patients.
CLO-4: Apply the knowledge of biomechanics in exercise prescription sports training with clinical reasoning.
CLO-5: Analyse kinetics and kinematics of all joints & its application in body movements.
CLO-6: Apply the principles of biomechanics in prosthetics, orthotics & mobility aids.
CLO-7: Prescribe ergonomic alterations at workplace using biomechanical principles.

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PSO 1	PSO 2	PSO 3	PSO 4
CLO1	3	1	3	3	2	2	2	2	2	3	2	**2**	**3**	**1**	**2**	**1**
CLO2	3	2	3	3	3	2	2	2	2	3	2	**2**	**3**	**2**	**3**	**2**
CLO3	3	3	3	2	3	2	2	2	2	3	2	**3**	**3**	**3**	**3**	**3**
CLO4	3	2	3	3	3	2	2	2	2	3	2	**3**	**3**	**2**	**3**	**3**
CLO5	3	3	3	2	3	2	2	2	2	3	2	**2**	**3**	**2**	**3**	**2**
CLO6	3	1	2	2	2	2	2	2	2	3	2	**3**	**3**	**1**	**3**	**2**
CLO7	3	3	3	3	3	3	3	3	3	3	3	**3**	**3**	**3**	**3**	**3**

Detailed Syllabus:

This involves application of above topics via demonstrations, field visits and case presentations

Reference Books:

1)Winter DA. Biomechanics of human movement. Biomechanics. 1979.
2) Levangie PK, Norkin CC. Joint structure and function: a comprehensive analysis. FA Davis; 2011 .
3) Nordin M, Frankel VH, editors. Basic biomechanics of the musculoskeletal system. Lippincott Williams & Wilkins; 2001.
4) Kapandji IA. Physiology of the Joints E-Book: Volume 2 Lower Limb. Elsevier Health Sciences; 2016 .
5) Soderberg GL. Kinesiology: application to pathological motion. Lippincott Williams & Wilkins; 1997.
6) Smith LK, Weiss L, Lehmkuhl LD. Brunnstrom's clinical kinesiology.

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Assessment methods and weightages in brief:

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COURSE CODE: MTS 264

TITLE OF THE COURSE: SEMINARS ON CLINICAL ISSUES

L-T-P 0-0-48 Credits : 3

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to:

CLO-1: The student should be able to demonstrate adequate knowledge and skill in evidence-based seminar presentation on topic allocated to him/her pertaining to sports injuries rehabilitation, health, fitness, sports training and exercise prescription in different disorders

CLO-2: The student should be able to develop presentation skills while developing persuasive speech.

CLO-3: the student should be able to present information in a compelling, well-structured and logical sequence, respond respectfully to opposing ideas, show depth of knowledge and develop ability to synthesize, evaluate and reflect on information

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PSO 1	PSO 2	PSO 3	PSO 4
CLO1	3	3	3	3	3	3	3	1	1	2	3	**2**	**3**	**3**	**3**	**3**
CLO2	3	3	3	3	3	3	3	1	1	2	3	**2**	**3**	**3**	**3**	**3**
CLO3	3	3	3	3	3	3	3	1	1	2	3	**2**	**3**	**3**	**3**	**3**

Detailed Syllabus:

These will serve as a platform for students to integrate various components of patient management and debate contentious issues in the efficacy of Physiotherapy techniques. Students will give presentations on topics provided to them.

Teaching-Learning Strategies in brief:

The teaching learning strategies followed are board and chalk teaching, learning through discussion among peer group, learning through case studies, experiential learning, reflective learning, open ended questions by teacher, open ended questions from students.

Assessment methods and weightages in brief:

Assessment is in form of internal assessment which is of 100 marks. The student will present seminars on topics allocated to them and will be marked on the basis of their presentation skills, information presented, ability to defend their argument and answering the questions put up.

COURSE CODE: MTS 265

TITLE OF THE COURSE: DISSERTATION

L-T-P 208-0-0 Credits: 13

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to:

CLO-1: Students should be able to develop a research project and conduct the dissertation writing independently in physiotherapy.
CLO-2: Engage in systematic discovery and critical review of appropriate and relevant information sources.
CLO-3: appropriately apply qualitative and /or quantitative evaluation process to original data, understand and apply ethical standards of conduct in the collection and evaluation of data and other resources.

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PSO 1	PSO 2	PSO 3	PSO 4
CLO1	2	3	3	2	3	2	3	1	1	2	2	**2**	**2**	**3**	**3**	**1**
CLO2	2	3	3	2	3	2	3	1	1	2	2	**2**	**2**	**3**	**3**	**1**
CLO3	2	3	3	2	3	2	3	1	3	2	2	**2**	**2**	**3**	**2**	**3**

Detailed Syllabus:

As part of the requirement for the Master's degree the student is required to undertake a research study under the guidance of faculty/guide/clinician qualified for the purpose as recommended by the council/university. The student is supposed to do a research in the field of sports physiotherapy in his/her area of interest. The research will involve making a research proposal, conduct of the work as per the documented methodology, statistical analyses and dissertation writing. After finishing the study he/she has to submit the dissertation which will be scrutinized by the examiners for acceptance.

Teaching-Learning Strategies in brief:

The teaching learning strategies followed are learning through discussion among peer group, learning through case studies, experiential learning, reflective learning, open ended questions by teacher, open ended questions from students.

Assessment methods and weightages in brief:

Assessment is in form of external assessment which is of 100 marks. The student will conduct research, have it analysed , write it in proper format and present it .He/She will be marked on the basis of their presentation skills, information presented, ability to conduct research and presenting it in proper format , defend their argument and answering the questions put up to them.

COURSE CODE: MTS 266

TITLE OF THE COURSE: PHYSIOTHERAPY II - SPORTS PHYSICAL THERAPY AND REHABILITATION (THEORY)

L-T-P 96-0-0 Credits : 6

COURSE LEARNING OUTCOMES (CLOs)

After completing this course, the students should be able to:

CLO-1: Determine the need and channels of rehabilitation of patients with sports injuries and movement disorders
CLO-2: Develop assessment and management program for various sports injuries and movement disorders that may lead to deterioration of the sports performance, general health or physical fitness parameters.
CLO-3: Pre and post-surgical evaluation and treatment in sports injury conditions
CLO-4: To study recent advances in physiotherapeutic in sports rehabilitation

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PSO 1	PSO 2	PSO 3	PSO 4
CLO1	3	2	2	2	2	1	1	1	1	3	1	**3**	**3**	**2**	**2**	**1**
CLO2	3	2	2	2	2	1	1	1	1	3	1	**3**	**3**	**2**	**2**	**3**
CLO3	3	2	2	2	2	1	1	1	3	3	1	**3**	**3**	**2**	**2**	**3**
CLO4	3	2	3	3	3	3	3	1	2	3	2	**3**	**3**	**3**	**3**	**3**

Detailed Syllabus:

Objectives: After completion, the student will be able to:

Evaluate; treat; instruct; monitor & provide corrective or positive feedback; reassess; and progress an athlete through the rehabilitative process from initial injury to return to play. Describes and demonstrate the appropriate selection and application of therapeutic exercises taking account for the body's physiological response to injury; immobilization or activity; age; disease; and adaptations along with the psychological necessities demonstrated by the athlete. Describe the

indications, contraindications, theory, and principles for the incorporation and application of various contemporary therapeutic exercises. Other important and advanced topics in sports rehabilitation have also been included.

Unit 1: Sports Biomechanics (22 hours)

1. Aspects of biomechanical analysis of sports movements. (4)
    a. Movement descriptors.
    b. Structural analysis of movements, temporal and phase analysis.

2. Sports Bio Mechanics: Basic principles of biomechanics are reinforced with added emphasis on the changes in biomechanical function and their subsequent effect on the potential and influence on overuse injuries including path kinesiology
    - Running (3)
    - Throwing (3)
    - Jumping (3)
    - Swimming (3)
    - Cycling (3)
    - Tennis (3)

Unit 2: Sports Injuries (10 hours)

Physiotherapy management of injuries related to specific sports this includes the application of the above two sections to specific sports like the following:

- Injuries related to cricket (2)
- Injuries related to judo (2)
- Injuries related to Football (2)
- Injuries related to Badminton (2)
- Injuries related to Gymnastics (2)

Unit 3: Sports Training – Parameters and Methods (22 hours)

Sports Training

Importance and definition of sports training: Aims and objectives of sports training Characteristics of sports training, principles of sports Training (4 hours)

Parameters and Methods of Sports Training

a) Training Load, Adaptation and Recovery: Relationship of load and recovery, physiotherapeutic and psychological means of Recovery, Variables of Training: Volume, Intensity, Density, Complexity (3)
b) Relationship between volume and intensity (2)
c) Fatigue and overtraining: Diagnosis, Monitoring and preventing overtraining. (3)
d) Training Methods: Interval training, Continuous training, Circuit training, Fartlek training, Weight training, Plyometric method, Cross training (6)
e) Periodization in sports (2)
f) Precision heart rate training (2)

Unit 4: Sports Ergonomics (18 hours)

A study of the sporting environment and its effect on injury mechanism, prevention and rehabilitation. The principles of injury pathomechanics, tissue responses to loading and the role of sports equipment in sports injury prevention and rehabilitation. The following specific areas will be studied.

- Equipment design and injury - sports engineering. (4)
- Mechanical support to the body – bandaging, taping and bracing (6)
- Protective equipment - body padding, mouthguards, helmets, headgear,etc., Sport-specific problems. (4)
- Shoe-surface interaction (Athletic Shoes) - footwear design, surface characteristics, traction, various modifications and adaptations in shoes for specific situations and conditions. The evaluation of shoes and shoe prescription. (4)

Unit 5: Advances in Exercise & Sports Rehabilitation (18 Hours)

1. Introduction to Dry Needling in Sports Rehabilitation. (3)
2. Concepts of segmental stabilization in spine. (3)
3. Clinical reasoning & decision making. (3)
4. Deep-Sea Diving; Effect of high partial pressures of gases on the body (3)
5. Physiologic adaptations to microgravity, Physiologic responses to space

Flight (3)
6. Time zone shift and sleep deprivation problems (3)

Unit 6: Sports Emergency and Medical Planning (6 hours)

1. Sporting emergencies & first Aid. (3)
2. Emergency medical planning & cover for sporting events. (3)

Reference Books:

1. Prentice WE. Rehabilitation techniques in sports medicine. McGraw-Hill Companies
2. Gray GW. Lower extremity functional profile. Wynn Marketing, Incorporated
3. Prentice WE, Quillen WS, Underwood FB. Therapeutic modalities for allied health professionals. McGraw-Hill Companies.
4. Norkin CC, White DJ. Measurement of joint motion: a guide to goniometry. FA Davis; 2016.
5. Dvir Z. Isokinetics: muscle testing, interpretation, and clinical applications. Elsevier Health Sciences; 2004.
6. Reid DC. SportsInjury Assessment and Rehabilitation. New York, NY: Churchill Livingstone.
7. Rucker KS. Handbook of sports medicine: a symptom-oriented approach. Butterworth-Heinemann Medical.
8. Baker CL. The Hughston Clinic Sports Medicine Field Manual. Lippincott Williams & Wilkins
9. Sinha AG. Principles and practice of therapeutic massage. Jaypee Brothers Medical Publishers; 2018
10. Basmajian JV, Wolf SL, editors. Therapeutic exercise. Williams & Wilkins.
11. Werner K. Physical Therapy for Sports, W.B. Saunders.
12. Bates A, Hanson N. Aquatic exercise therapy. WB Saunders Company
13. Hartley A. Practical Joint Assessment: A Sports Medicine Manual. Mosby Elsevier Health Science.
14. Kennedy R. Mosby's sports therapy taping guide. Mosby Incorporated.
15. Howard PD. ORTHOPEDIC AND SPORTS PHYSICAL THERAPY. ED. 3. Edited by Terry R. Malone, Thomas G. McPoil, and Arthur J. Nitz. St. Louis, Mosby-Year Book
16. Albert M. Eccentric muscle training in sports and orthopaedics. Churchill Livingstone.
17. Voss DE. Proprioceptive neuromuscular facilitation patterns and techniqes. 3ED Harper and Row.

Teaching-Learning Strategies in brief:

The teaching learning strategies followed are learning through discussion among peer group, learning through case studies, experiential learning, reflective learning, open ended questions by teacher, open ended questions from students.

Assessment methods and weightages in brief:

Assessment is divided into internal assessment and external assessment. Internal assessment is conducted throughout the year. Internal assessment is divided into 3 parts and is for a total of 25 marks of which 5 marks are for attendance, 5 marks are for assignment and 15 marks are for sessional. Three sessional exams are conducted of which the average of the best two sessional is calculated. External assessment if for 75 marks conducted at the end of the session

COURSE CODE: MTS 267

TITLE OF THE COURSE: PHYSIOTHERAPY II - SPORTS PHYSICAL THERAPY AND REHABILITATION (LAB HOURS)

L-T-P 0-0-48 Credits : 3

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to:

CLO-1: Take appropriate patient/athlete history in the prescribed format and select an appropriate outcome measure and correlate patient examination findings.
CLO-2: Use appropriate Physiotherapeutic Technique / approaches to treat patients/athletes and for physical fitness assessment and sports training.
CLO-3: Discuss the recent management approaches for common conditions and deliberate on best practice model for patient/athlete cantered care
CLO-4: To interpret the differential diagnosis of various sports injuries and conditions.
CLO-5: To apply the various therapeutic techniques for the management of sports injuries

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7	PLO 8	PLO 9	PLO 10	PLO 11	PLO 12	PSO 1	PSO 2	PSO 3	PSO 4
CLO1	3	3	3	3	2	3	2	2	2	3	3	**3**	**3**	**3**	**3**	**3**
CLO2	3	3	3	3	2	3	2	2	3	3	3	**3**	**3**	**3**	**3**	**3**
CLO3	3	3	3	3	3	3	3	3	3	3	3	**3**	**3**	**3**	**3**	**3**
CLO4	3	3	3	3	2	3	2	2	2	3	3	**3**	**3**	**3**	**3**	**3**
CLO5	3	3	3	3	3	3	3	3	3	3	3	**3**	**3**	**3**	**3**	**3**

Detailed Syllabus:

Students will be instructed via demonstrations, hands on techniques, field visits and case conferences on specific techniques used in management of patients with sports injuries. Students will draw on their experiences at the clinical postings to formulate

a treatment plan for cases presented at the case conference. There will be hands on training of the techniques mentioned above.

Reference Books:

1. Prentice WE. Rehabilitation techniques in sports medicine. McGraw-Hill Companies
2. Gray GW. Lower extremity functional profile. Wynn Marketing, Incorporated
3. Prentice WE, Quillen WS, Underwood FB. Therapeutic modalities for allied health professionals. McGraw-Hill Companies.
4. Norkin CC, White DJ. Measurement of joint motion: a guide to goniometry. FA Davis; 2016.
5. Dvir Z. Isokinetics: muscle testing, interpretation, and clinical applications. Elsevier Health Sciences; 2004.
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11. Werner K. Physical Therapy for Sports, W.B. Saunders.
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13. Hartley A. Practical Joint Assessment: A Sports Medicine Manual. Mosby Elsevier Health Science.
14. Kennedy R. Mosby's sports therapy taping guide. Mosby Incorporated.
15. Howard PD. ORTHOPEDIC AND SPORTS PHYSICAL THERAPY. ED. 3. Edited by Terry R. Malone, Thomas G. McPoil, and Arthur J. Nitz. St. Louis, Mosby-Year Book
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Teaching-Learning Strategies in brief:

The teaching learning strategies followed are learning through discussion among peer group, learning through case studies, experiential learning, reflective learning, open ended questions by teacher, open ended questions from students.

Assessment methods and weightages in brief:

Assessment is divided into internal assessment and external assessment. Internal assessment is conducted throughout the year. Internal assessment is divided into 3 parts and is for a total of 25 marks of which 5 marks are for attendance, 5 marks are for assignment and 15 marks are for sessional. Three sessional exams are conducted of which the average of the best two sessional is calculated. External assessment if for 75 marks conducted at the end of the session

COURSE CODE: MTS 268

TITLE OF THE COURSE: CLINICAL TRAINING (PRACTICAL)

L-T-P 0-0-592 Credits: 37

COURSE LEARNING OUTCOMES (CLOs)

After completing this Course, the students should be able to:

CLO-1: Understanding of normal and sports injury biomechanics
CLO-2: Understanding the on-field and off-field assessment of an athlete and his/her management
CLO-3: Understanding of role of different members of the sports rehabilitation team.
CLO-4: Understanding the basic knowledge of various exercise and electrotherapeutic modalities and its implementation in assessment and management of various sports injuries/conditions
CLO-5: Understanding basic knowledge of exercise prescription in different medical conditions and different age groups
CLO-6: Understanding the recent advance techniques in sports injuries rehabilitation, fitness assessment and sports training and its application

Mapping of Course Learning Outcomes (CLOs) with Program Learning Outcomes (PLOs) and Program Specific Outcomes (PSOs)

	PLO 1	**PLO 2**	**PLO 3**	**PLO 4**	**PLO 5**	**PLO 6**	**PLO 7**	**PLO 8**	**PLO 9**	**PLO 10**	**PLO 11**	**PLO 12**	**PSO 1**	**PSO 2**	**PSO 3**	**PSO 4**
CLO1	1	3	2	2	2	3	2	3	2	1	3	**1**	**1**	**3**	**2**	**3**
CLO2	3	3	3	3	3	3	1	3	2	3	3	**2**	**3**	**3**	**3**	**3**
CLO3	1	3	2	1	1	3	1	1	1	1	1	**1**	**1**	**3**	**1**	**3**
CLO4	3	1	3	3	3	2	2	1	1	2	1	**1**	**1**	**1**	**1**	**1**
CLO5	3	3	3	3	3	3	2	2	2	3	2	**2**	**3**	**3**	**3**	**2**
CLO6	3	3	3	3	3	3	3	1	1	3	2	**1**	**3**	**3**	**3**	**3**

Detailed Syllabus:

Students will engage in clinical practice in Physiotherapy departments in the Sports Physiotherapy settings to enhance their clinical skills and apply contemporary knowledge gained during teaching sessions.

Teaching-Learning Strategies in brief:

The teaching learning strategies followed are learning through discussion among peer group, learning through case studies, experiential learning, reflective learning, open ended questions by teacher, open ended questions from students.
