Mahatma Gandhi University

Of

Medical Sciences & Technology, Jaipur

Syllabus

M.Sc. Sports Medicine

(2 Years Degree Course +

1 Year Internship)

Notice

1. Amendments made by the University in Rules / Regulations of the Courses shall automatically apply.
2. The University reserves the right to make changes in the syllabus/books/ guidelines, fee structure or any other information at any time without prior notice. The decision of the University shall be binding on all.
3. The Jurisdiction of all court cases shall be Jaipur Bench of Hon'ble Rajasthan High Court only.

M.Sc. Sports Medicine ( )

(2 Years Degree Course + 1 Year Internship)

Rules & Regulations

1. TITLE OF THE COURSE

The title of the course shall be **"**M.Sc. Sports Medicine".

2. DURATION OF COURSE/TRAINING

The course shall be of two years duration and one year internship from the date of commencement of academic session.

3. MEDIUM OF INSTRUCTION

English shall be the medium of instruction

4. **ELIGIBILITY FOR ADMISSION**:

Candidate should have passed the Bachelor's Degree in Science with Sports Medicine as one of the main subjects.

5. CRITERIA FOR ADMISSION

Selection shall be done by an Admission Board of the University strictly on merit. It will consist of two-step process –Written Entrance Examination followed by Counseling/Personal Interview (PI).

6. RESERVATION POLICY

Reservation shall be applicable as per policy of the State Government.

7. ENROLMENT

Every candidate who is admitted to M.Sc. Course in Mahatma Gandhi Medical College & Hospital shall be required to get himself/herself enrolled with the Mahatma Gandhi University of Medical Sciences & Technology after paying the prescribed eligibility and enrolment fees.

A candidate shall deposit enrolment fees along with tuition fees at the time of his/her admission to the course. Such a candidate who fails to submit, through the college Principal, duly filled enrolment form along with original documents including migration certificate required for enrolment within two months of his/her admission or up to November 30 of the year of admission whichever is later, he/she will have to pay late fee prescribed by the University

8. MIGRATION RULES

No student, once admitted to the course and enrolled by the University, will be permitted to migrate to any other Course/ University.

No student will be admitted to the Course on migration from any other Course/ University.

9. ATTENDANCE

Minimum 75% attendance in each year, both for theory and practical classes separately. Student with deficient attendance will not be permitted to appear in University examination.

10. TRAINING:

1. The period of training for M.Sc. shall be of two years from the date of admission.
2. Part – I and Part – II of the course shall be of one-year duration each.
3. The candidate will undertake the post graduate training as a full time post graduate in the department concerned.
4. The students will be required to complete the prescribed period of study and fulfill the requirement of attendance before they are allowed to appear in the University examination.

11. EXAMINATION AND ASSESSMENT

1. The examination of Part I shall consists of three theory papers and internal assessment and practical & viva-voce examination.
2. The examination of Part II shall consist of three theory papers & internal assessment and practical in the opted specialization.
3. A candidate shall be permitted a maximum of 4 years from the year of admission to complete the course and pass the examination failing which, the candidate will have to leave the course.
4. Only those candidates will be allowed to appear at Part II examination, who have passed Part –I examination completely.
5. Degree of M.Sc. Medical Physics will be awarded to a candidate only after his successful completion of one year compulsory internship.

12. CONDUCTION OF THE UNIVERSITY EXAMINATION:

University examination shall be conducted twice in a year; that is Main and Supplementary Examination. Supplementary examination shall be conducted after 2-4 months of the main examination.

13. SCHEME OF EXAMINATION

The Examination in Part I shall consist of:

Paper	**Marks**
Theory	
Paper I - **Basis Medical Sciences : Sports**	100 Marks
Paper II - **Research Methodology**	100 Marks
Paper III - **Basic and Applied Sports Sciences**	100 Marks
Internal Assessment	100 Marks
Practical & Viva Voce Examination	100 Marks
Total Marks	**500 Marks**

Notes:

1. Each theory paper shall be of 3 hours duration.
2. Each paper will be set by the External Examiner of the subject concerned and will be assessed by the internal examiner of the subject concerned.

Pattern of questions to be set and answered shall be as follows:

Paper	No. of questions to be set	No. of questions to be answered
Paper I	4	4
Paper II	4	4
Paper III	4	4

3. In order to pass the University Examination, the candidate must secure a minimum of 50% marks in each theory paper including internal assessment and 50% marks in practical and viva-voce examination separately.
4. A candidate who has failed in one or more theory paper of Part-I Examination must appear in that theory paper in supplementary examination which will be conducted by university within 2 – 4 months.

The Examination in of Part II shall consist of:

Paper	Marks
Theory	
Paper I - Clinical Sports Medicine	100 Marks
Paper II - Sports Physical Therapy	100 Marks
Paper III - Current Concepts, and Fundamentals of HealthCare management	100 Marks
Internal Assessment	100 Marks
Practical & Viva Voce Examination	100 Marks
Total Marks	500 Marks

Notes:

1. Each theory paper shall be of 3 hours duration.
2. All papers shall be set by the External Examiners.
3. Paper I will be assessed by the External Examiner and Paper II will be assessed by the Internal Examiner viz. Head of the Department of subject concerned. Paper III will be assessed by Professor / Associate professor / Assistant professor

Pattern of questions to be set and answered shall be as follows:

Paper	No. of questions to be set	No. of questions to be answered
Paper I	4	4
Paper II	4	4
Paper III	4	4

4. Practical examination shall be conducted by one Internal, one External Examiner which will be appointed by the university.
5. In order to pass the examination the candidate must secure a minimum of 50% marks in Theory papers including internal assessment and 50% marks in practical and viva-voce examination separately.
6. In case a student passes either in Theory or in Practical only, the student shall be considered to fail in the whole examination and he will have to appear in both the Theory and Practical in the subsequent examination.

14. APPOINTMENT OF EXAMINER AND PAPER SETTERS

a) All the examiners, paper setters, theory examination answer books evaluators, Internal and External Examiners for Practical examinations shall be appointed by the President of the University.
b) Qualification of the Paper setter / Examiner: Assistant Professor and above.
c) Paper setter can be an examiner

15. GRACE MARKS

No grace marks will be provided in M.Sc. Examination

16. REVALUATION / SCRUTINY

No Revaluation of answer books shall be permitted in M.Sc. Examination. However, the candidate can apply for scrutiny of marks as per University Rules.

Curriculum Outline

Distribution of Teaching hours

1ST Year M.Sc. Sports Medicine

Course Title	Hours
Applied General Clinical Anatomy	160
Applied General Physiology, Pathology, Pharmacology, Radiology	160
Research Methodology	120
Assessment, Kinanthrometry and Biomechanics Kinesiology	150
Biomechanics	110
Exercise Physiology and Nurtition.	100
Total Theory Hours	800
Practical	400
Total Hours :	1200

2nd Year M.Sc. Sports Medicine

Course Title	Hours
Non Traumatic Medical Conditions	180
Sports Traumatology	200
Physical Medicine	140
Sports Physical Therapy	200
Current Concepts, and Fundamentals of HealthCare management	80
Total Theory Hours	800
Practical	400
Total Hours :	1200

SYLLABUS

M.Sc. Sports Medicine ( )

(2 Years Degree Course + 1 Year Internship)

Goals:

1. To estimate the baseline physical fitness of the sporting population and designing programmes for various sports depending upon the fitness level of the individuals based on the exercise physiology principles.
2. To use Kinathroprometric principles for designing and recommending games to the young children so that they can excel according to their genetic and physical characteristics.
3. To evaluate the age of the sporting individual for sports which are compartmentalised according to age.
4. To do a complete psychological analysis and using the principles of psychology for relaxation and peeking.
5. To use biomechanical; principles for prevention and rehabilitation of sporting injuries.
6. To give advice on ergogenic procedures and spots nutrition for performance enhancement.
7. To Utilize a thorough knowledge and understanding of Sports Medicine and relevant applied sciences to maintain standards of best practice in prevention and treatment of sports related injuries.

Specific Learning Objectives

Knowledge

1. Utilize know how of relevant aspects of musculo-skeletal medicine in prevention and treatment of sports related injuries
2. Integrate and apply thorough knowledge and understanding of applied anatomy, sports bio-mechanics and relevant kinesiology to clinical Sports Medicine practice.
3. Utilize advanced clinical competency and expertise, including clinical reasoning, in assessment and treatment of sports related injuries

Skills

1. Design, implement, evaluate and modify programs specifically related to prevention and management of sports injuries.
2. Perform detailed and relevant musculo-skeletal assessment, which are specific to athlete.
3. Demonstrate oral and written communication skills and critical thinking at masters level of competency

4. Communicate effectively and appropriately with athletes, coaches and health professionals in maintaining standards of best practice in Sports Medicine

Attitude

1. Should have an evidence based approach. This will help to interpret and utilize published literature using analytical and critical approach
2. Have ability to conceptualise and write a research proposal

FIRST YEAR

PAPER I: Basis Medical Sciences:Sports

Applied Basic Medical Sciences

Applied General Clinical Anatomy

1. Anatomy of the Nerve Injuries
    - Anatomical and Physiological loss resulting from nerve injury.
    - Relaxation of nerves
    - Peripheral nerve entrapment
2. Bodily Habitus
    - Characteristics and its correlation to anatomy
3. Anatomical Angles and stiff joints
    - Anatomical Angles
    - Optimal attitude for stiff joints
    - Snapping joints
4. The pathology of nerve, bones in terms of anatomy
    - Anatomical facts regarding bones
    - Pathological facts
    - Anatomical disturbances in various bone pathologies
5. Anatomical basis of clinical tests
    - All clinical tests associated to sports medicine
6. Anatomy of certain diseases
    - Headache
    - Infections of the hand
    - Common dislocations
    - Lesions of supraspinatous and subdeltoid bursae
    - Hernias associated with sports persons
    - Low back pain
    - Sciatica
    - Lesions of inter-vertebral disk
    - Abscesses of Spine

Applied General Physiology

1. Blood
    - The various components of blood
    - Viscosity correlation
    - Oxyhemoglobin Dissociation curves
    - Interrelationship between pressure flow and resistance

- Pressure volume curves
- Stress relaxation of vessels

2. Cardiovascular system
    - Physical characteristics of systemic circulation
    - Pressure pulses
    - Oxygen demand theory of local blood flow circulation
    - Nervous control of blood circulation
    - Humorous control of blood circulation
    - Mechanisms of arterial pulse regulation
    - Hypertension
    - Cardiac output and its regulation
    - Cardiac output in normal stress conditions
    - Methods of measuring cardiac output
    - Normal coronary blood flow along with variations
    - Physiological basis of ischemic heart disease
    - The cardiac reserve
    - Physiological causes of shock
3. Neuromuscular System
    - Basic physics of membrane potentials
    - Recording of membrane potentials and action potentials with basics of Electromyogram
    - Mechanism of muscle contraction
    - Sources of energy for muscle contraction
    - Neural control of movement
4. Respiratory System
    - Review of mechanics of respiration
    - Pulmonary volumes and capacities
    - Composition of Alveolar air
    - Transport of oxygen in blood
    - Carbon dioxide in blood
    - Regulation of respiration
    - Methods of studying respiratory abnormalities
5. Temperature regulation
    - Regulation of body temperature

6. Endocrine System
    - Pituitary hormones and their functions
    - Thyroid hormones
    - Adrenocortical hormones
    - Insulin Glucagon hormones
    - Parathyroid hormones Applied Para Clinical Sciences .

Pathology •

Inflammation and repair

- "Failed" healing responses
- Regional considerations of Inflammation & repair of soft tissue injuries.

Pharmacology

- Principles of drug action.
- Basic pharmacokinetics and Pharmacodynamics.
- The use of drugs in various musculoskeletal disorders.

Radiology

- Basics of radiology including ultrasonography CT & MRI scanning
- Imaging of the head and neck.
- Imaging of spine.
- Imaging of pelvis, hip and thigh.
- Imaging of Patello Femoral Joint & Knee joint.
- Imaging of the lower leg, foot and ankle

PAPER II – Research Methodology

Research Methodology

1. Introduction
    - Importance of research in clinical practice
    - Scientific approach
    - Characteristics
    - Purposes and limitations.
2. Ethical issues in research.
3. Structure, formulation and implementation of a research project
4. Research questions
    - Selection and statement of problem

- Literature review
- Meta-analysis.

5. Types of research
    - Basic and Applied
    - Qualitative & Quantitative
    - Descriptive & Experimental
    - Longitudinal & Cross-sectional
6. Data Analysis
    - Statistical Tests of significance
    - Correlation
    - Reliability
    - Validity
    - Parametric and Non-parametric statistics
7. Experimental Research
    - Types of Sampling
    - Variables
    - Experimental design
    - Factorial design
8. Survey research
    - Conducting a survey
    - Questionnaires
    - Steps in conducting survey research
    - Epidemiological research
9. Presentation
    - Symposia
    - Seminar
    - Conference
    - Journal
    - Thesis

- Book
- Key element of scientific writing.

10. Presenting Research
    - Writing and submitting papers
    - Strategies of paper writing
    - Design of paper writing
    - Tactics of paper writing
    - Where to publish Poster presentation of a research paper
    - Preamble
    - Poster space
    - Standard format
    - Planning
    - Design
11. Review of an indexed refereed research paper
    - Evaluating paper scientific merit
    - Providing constructive feedback to the author
    - Typical review formats for reviewing a paper
    - Reasons for rejection
12. Oral Presentations at Conferences/Seminars
    - Preparing presentation
    - Duration of presentation
    - What to present Educational Methodology
    - Aim, philosophy and issues in physiotherapy education
    - Principles and methods of teaching with respect to physiotherapy students and client:
    - Strategies and planning of teaching, curriculum development, formation of course objective, time management, role of Audio – visual aids, method of knowledge dissemination.
    - Methods of outcome evaluation

PAPER III – Basic and Applied Sports Sciences

Assessment, Kinanthrometry and Biomechanics Kinesiology

Introduction

- Definition, aims, objectives and role of Kinesiology in sports physiotherapy.
- Review of fundamental concepts (applied aspect), Centre of gravity, Line of gravity, Planes, Lever system in Body, Fundamental starting positions.
- Anatomical Concepts in Kinesiology
- Frame work and joints of the body: Influence of trauma and classification of the muscles, Relation of structure, functions, role of muscles, types of Muscle, contractions (Static, Concentric and Eccentric), Two joint Muscles, Angle of pull, Role of Gravity affecting muscular action.
- Physical Properties of bone, cartilage and muscle and functional adaptation under pathological conditions.
- General features of the following bones: Scapula, Ribs, Vertebrae, Bones of skull, Humerus, Radius, Ulna, Hip bone, Femur, Tibia and Fibula, Bones of hands and feet.
- Joints: Definition and Classification of joints: Shoulder, Elbow, Knee, Ankle, Inter-vertebral joints, wrist joint, small joints of hand and foot.
- Origin, insertion, nerve supply and action of all important muscles related to human movement.
- Motion, type of motion, Distance and speed, Displacement and velocity, Acceleration, Angular distance and Angular displacement, Angular Speed, Angular Velocity, Angular Acceleration, Inertia, mass, weight, Newton's Laws of motion, Units in linear and angular motion.
- Force and its characteristics, internal and external forces, Classification of force system, Composition and resolution of forces. Friction, impact, elasticity, principles of spin and rebound, Eccentric forces. Couple, moment, Principles of Lever, Rotatory force, Gravity, Methods of finding centre of gravity, Principles of Equilibrium, Fluid mechanics, principles of projectile.

Assessment & Evaluation in Sports Medicine

- Importance of assessment & evaluation, Methods of evaluation – Interview, Clinical Examination, Reliability & Validity of the tests, Investigative Procedures, Field Tests.
- Evaluation of Physical Fitness:

  Principles of assessment and prescription of exercise programs

  Evaluation of Physical Fitness

  Preliminary Health Screening and Classification of Risk Factors

  Assessment of Body Composition

Assessment of Flexibility and designing stretching programs

Assessment of cardio-respiratory fitness

Assessing and Managing Stress

Assessing strength and muscular endurance

- Assessment of lower limb complex: Pelvis, hip, thigh, knee, leg, ankle and foot • Assessment of upper limb complex: Shoulder girdle, shoulder, arm, elbow, forearm, wrist and hand.
- Assessment of spinal column: Cervical, thoracic and lumboscaral, Tests of neural tension. • Assessment of Gait deviations
- EMG evaluation, diagnostic and kinesiological
- Pre Participation Evaluation of Participants in Sports Kinanthropometry
- Introduction Significance of kinanthropometric knowledge in sports medicine.
- Age determination i. Skeletal age ii. Dental age • Body measurements i. Gross size and mass ii. Lengths or heights of body parts iii. Circumstances of body parts iv. Skinfold thickness
- Kinanthropometric study group measurements i. Planes of the body ii. Axes of the body iii. Landmarks on the body
- Body proportions i. Body mass index ii. The phantom stratagem iii. The Z – scores iv. The O – scale system
- Body composition

Different Body composition Various methods to estimate body composition

1. Water displacement method
2. Under water weighing methods
3. Kinanthropometric determination of the body composition (skinfold thickness)
4. Application of surface anthropometry (the body profile)
5. Bioelectrical impedance analysis
6. Ultrasound assessment of fat
7. Arm X-ray assessment of fat
8. Computed tomography (CT) assessment of fat
    - Somatotyping Sheldon’s method of somatotyping Critical evaluation of Sheldon’s method of somatotyping Heath – Carter method of somatotyping rating scales Kinanthropometric measurements First, Second and Third Components Somatotyping Somatotype distribution • Growth, maturation and physical performance

Biomechanics

- Nature and importance of Biomechanics in Sports Physiotherapy.
- Principle of Biomechanics.
- Introduction to biomechanical analysis. Recruitment & techniques – Isokinetic dynamometer, kinesiological EMG, electronic goniometer, force platform, videography.
- Biomechanics of shoulder and shoulder girdle motion, elbow motion, wrist and hand motion.
- Biomechanics of pelvic motion, hip motion, knee motion, ankle & foot motion • Biomechanics of spinal motion.
- Gait analysis
- Biomechanics of rowing, throwing, swimming, jumping and landing, running and other sports.

Exercise Physiology and Nurtition.

- Nutrition a.Carbohydrates, Fats, Proteins. b. Vitamins, Minerals and Water. c. Optimal Nutrition for exercise. d. Nutrition for Physical Performance. e. Pre-Game meal, Carbohydrate loading. f. Alcohol, Mega Vitamin Therapy. g. Food for various athletes of different disciplines. h. Fluid and energy replacement in prolonged exercise.
- Energy Transfer for Physical activity: a. Energy transfer in Body. b. Energy transfer in exercise. c. Energy expenditure during various activities. d. Fatigue. e. Biochemical responses to endurance training.
- Cardiovascular System and Exercise: a. Athletes Heart. b. Cardiovascular adaptations to sustained aerobic exercises. c. Lipids and sports, protection from coronary heart disease, exercise and optimization of lipid profile. d. Sudden cardiac death in sports. e. Regulation of circulation during exercise.
- Exercise and Respiratory System: a. Air Conditioning. b. Second Wind. c. Oxygen Debt. d. Breathe Holding, High Pressure Ventilation. Scuba Diving. e. Athletes Lung. f. Regulation of Respiration during exercise.
- Skeletal System: a. Growth and Exercise. b. Repair and adaptation during exercise. c. Pathophysiology of Back. d. Training for Muscular Strength and Endurance.
- Gastrointestinal Tract and Endocrine system: a. Effect of Sports on GIT and Liver. b. Hormone regulation of fluid and electrolytes during exercise. c. Exercise and Menstrual Cycle. d. Stress Hormones in Exercise. e. Effects of exercise on various Hormones in the body. f. Opiods, Runners High. Applied Exercise Physiology
- Body Composition a. Composition of the Human Body. b. Somatotyping. c. Techniques of Body Composition Analysis.

- Aging and Exercise a. Aging and Physiological function. b. Exercise and Longevity. c. Coronary Heart Disease and Exercise. d. Exercise Stress Testing for Diagnosis of CHD. e. Exercise prescription for healthy aged. f. Exercise prescription for sedentary adults. g. Cost and benefits of exercise prescription in Osteoporosis.
- Temperature Regulation a. Heat Balance. b. Methods of Assessing Heat Balance. c. Effects of Climate. d. Effects of Exercise on Temperature Regulation. e. Limit of Tolerance of Heat. f. Acclimatisation. g. Avoidance in Heat illness during exercise. h. Exercises in cold.
- Misc. Topics a. High Altitude Training. b. Sports Diving, Hazards of underwater environment. c. Special Aids to Athletic Performance:- MORA, Oxygen Inhalation, Sleep. d. Sex and performance. e. Assessment of Age. f. Muscle tissue fibre typing and its significance. g. Exercise for mood enhancement & anxiety.

Physiological Basis and Principles of Training and Conditioning

- Principles of endurance and strength training
    1. Recovery training intensities in heart rate
    2. Manipulation of training principles
    3. Training sub-phases
- Fundamentals that aid training and performance i. Warm up and Cool down ii. Flexibility and stretching iii. Missing workouts iv. Overtraining
- Analysis of Training Sports Psychology
- History and current status of Sports Psychology.
- Personality Assessment and sports personality. a. Theories of personality b. Personality assessment • Attention and perception in sports. a. Attention b. Perception
- Concentration training in sports. a. Basic principles of concentration b. Concentration training c. Concentration awareness exercises
- Motivational orientation in sports. a. Athlete’s needs of motivation b. Motivational inhibitors c. Motivational techniques • Pre-competitive anxiety. a. Source of PCA b. Effect of PCA on performance
- Relaxation Training. a. Definition b. Types of relaxation trainings i) Progressive muscle relaxation ii) Breathing exercises iii) Yognidra iv) Transcendental meditation
- Aggression in sports. a. Theories of aggression b. Management of aggression • Role of Psychology in Dealing with injuries.
- Eating disorders. a. Etiology of eating disorders b. Types of eating disorders c. Complications of eating disorders
- Goal setting 1. Psychological aspect of doping a. Psychological preparation of elite athletes b. Concept of psychological preparation c. Biofeedback training d. Mental imagery e.

- Stress management i) Principles of Stress Management ii) Stress Management techniques f. Group Behaviour and leadership a. Nature of group behaviour and group. b. Types of group. c. Educational implication of group behaviour. d. Meaning of leadership, types of leadership quality of leadership, training and functioning of leadership.
- 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.

Practicals:

Students will undergo practical training at Sports Psychology Lab , Exercise Physiology Lab ,and Kinanthropometry equipment for body composition analysis, somatotyping and age determination and on Biomechanical Principles

SECOND YEAR

PAPER I : Clinical Sports Medicine

Non Traumatic Medical Conditions

Illness, Infections, Hypertension, Urine abnormalities; Venereal Diseases; Exercise induced Asthma; Anemia, Delayed onset muscle soreness (DOMS), Runner's high & exercise addiction. G.I.T. Diseases, Exercises and congestive heart failure, exercise for post coronary & byepass patients, exercise for diabetics. Diagnosis and management of skin conditions of Athletes, Bacterial infections, Fungal infections, Viral infections, boils and cellulitis.

- Female Specific problems 1. Sports Amenorrhoea. 2. Injury to female reproductive tract. 3. Menstrual Synchrony. 4. Sex determination. 5. Exercise and pregnancy. 6. Eating disorders in athletes.
- Common Diseases: Common Cold, Diarrhoea, Dysentery, Typhoid, Cholera, Amoebiasis, Food Poisoning, Tuberculosis, Malaria, Hepatitis etc.
- AIDS in sports people.
- Rheumatology & Geriatric disorder 1. Rheumatoid arthritis, SLE and Juvenile Rheumatoid Arthritis. 2. Ankylosing Spondylitis. 3. Rheumatology out patient clinic. 4. Osteoarthrosis and other geriatric conditions.
- Age Specific Problems 1. Issues in the adolescents and children involved in sports 2. Issues in The Geriatric athletes Medical Aspects of Sports Medicine
- Exercise and Common Pulmonary Conditions a. Exercise induced bronchial obstruction b. Exercise in chronic airway obstruction c. Air pollution and exercise
- Exercise and Cardiac Conditions a. Exercise prescription for heart disease b. Exercise in primary prevention in ischemic heart disease c. Exercise for secondary prevention of ischemic heart disease
- Doping in Sports a. List of banned drugs: their effects and side effects b. Guidelines of sample (urine and blood) collection for dope testing c. Methods of Drug testing d. Relevance of Therapeutic use exemption in doping e. Latest trends in doping f. Performance enhancing supplements in sports and international regulations
- Diabetes and Exercise a. Exercise in diabetic patients b. Exercise as a method of control of diabetes
- Exercises for special categories a. Child and adolescent athlete's problems b. Special problems of older athletes c. Special concerns for handicapped athletes
- Misc. Conditions a. Hazards of cold water b. Exercise for mood enhancement c. Vitamins and exercise d. Spinal deformity and sports e. Time zone shift and sleep deprivation problems f. Exercise in pregnancy and post partum Emergency Care and Cardiopulmonary Therapeutics

- Cardio pulmonary Resuscitation 1. Shock management 2. Internal and External bleeding 3. Splinting 4. Stretcher use-Handling and transfer 5. Management of Cardiac arrest 6. Acute asthma 7. Epilepsy drowning 8. Burn 9. Heat stroke and Heat illness
- Health club & fitness Concept, use and misuse of equipment 1. Group therapy 2. Sauna bath 3. Prevention and rehabilitation of heart attack and diabetes, asthma
- Basics of Cardiac Rehab. 1. Administration of gases and gas mixtures 2. Humidity aerosol treatment 3. Oxygen therapy 4. Theory of application of mechanical ventilation 5. Interpretation of Arterial blood gases 6. Description of ventilators and relationship of therapeutic procedures to underlying pathology 7. Cause – effect relationships for acid – base disturbances 8. Basic understanding of invasive monitoring in the intensive care unit setting 9. Knowledge about drugs lowering a. Cholesterol b. Hypertension 10. Knowledge about sedatives

Sports Traumatology

- Pre-participation examination
- Causes & Mechanism of Sports Injuries, prevention of sports injuries
- Common acute and overuse injuries of: a. Shoulder girdle, Shoulder, Arm, Elbow, Forearm, Wrist & hand b. Pelvis, hip, thigh, knee, leg, ankle & foot c. Spine d. Head e.
- Sporting emergencies & first aid and pharmacological treatment of injuries in the athletes
- Cardio pulmonary Resuscitation; Shock management, Internal and External bleeding, Splinting, Stretcher use-Handling and transfer, Management of Cardiac arrest, Acute asthma, epilepsy, drowning, burn, Medical management of mass participation.
- Heat stroke and Heat illness.
- Sports specific injuries, with special emphasis on the specific risk factor, nature of sports, kind of medical intervention anticipated and prevention with respect to individual sports
- Individual events: Field & Track
- Team events: Hockey, Cricket, Football
- Contact and Non-contact sports
- Water sports specific injuries
- Over Use Training in Sports

Physical Medicine

- Rehabilitation and Therapeutic Exercises
    1. Define Rehabilitation, Goals and Objectives of Rehabilitation in Sports, Clinical Evaluation phases of rehabilitation. (multidisciplinary approach)
    2. Prehabiiltation

3. Modern concepts in rehabilitation.
4. Definition, details of effects and uses of therapeutic exercises. a. Dynamic Exercises b. Plyometric Exercises c. Isokinetic Exercises d. Manipulative Techniques e. Kinetic chain exercises

- Mobilization and Strengthening Techniques

  Factors affecting the joint range of motion prevention of stiffness, methods of joint mobilization. a. Testing for tightness and contracture of soft-tissue structures. b. Techniques of mobilizing the various joints of the body. 2. Types of Muscle Contractions and Muscle work, Strength of Muscle Contraction in terms of Motor units, Group action of muscles and its implication in designing an exercise program. a. Causes of muscle weakness. Prevention of disuse atrophy, Principles of treatment to increase muscle strength and function. b. Techniques of strengthening with respect to regional consideration. c. Various methods of progressive resisted exercise. d. Aquatic therapy in sports.

- Neuromuscular Training 1. Neoromuscular control, methods for improving neuromuscular control, proprioception and Kinesthetic sensation following different sport injuries. 2. Principles and application of neuromuscular facilitation techniques including PNF in sports.
- Health club & fitness: Concept, group therapy
- Physical Therapy and law: Medico legal aspects of physiotherapy, liability, negligence, malpractice, licensure, work man compensation
- Morale and Ethics: Ethical Analysis of moral problem, ethical issues in physiotherapy Practicals: The students will undergo clinical training in Departments Orthopaedics , Cardiology, General Medical and Emergency Care

PAPER II: Sports Physical Therapy

Sports Physical Therapy

- Massage Historical development, Definition and classification of massage techniques, Physiological effects of massage, Description of the techniques of the classical massage. Connective tissue massage, physiological basis of sports massage and various categories, underwater massage, mechanical devices of massage, therapeutic applications and contraindications of massage.
- Heat Therapy Production, Physiological effects, indications, contraindications and specific uses in sports of the following: Infrared rays, Parafin Wax Bath, Steam Bath, Sauna Bath, Moist Heat Pack, Fluidotherapy, Mud Bath and Pelloids.
- Hydrotherapy History & introduction, Effects of simple baths, raising temperature baths, baths with additives, Aromatic baths, Mineral baths, physical baths, Hydroelectric baths, Stammer baths, whirl pool bath, showers and steam showers.
- Electrotherapy

- Principles underlying the application of following modalities with reference to their production, biophysical and therapeutic effects, indications and contraindications and the specific uses in Sports Physiotherapy. a. Low Frequency Current: Direct Current, Modified Direct Current, Alternative Current, Diadynamic Current, Iontophoresis TENS, High Voltage, Pulsed Galvanic Stimulation. b. Medium Frequency Current: IFT, Russian Currents. c. High Frequency Currents: SWD, MWD, Ultrasound, Pulsed Electromagnetic Energy. d. Radiations: LASER, UVR Recent Advancement in Electrotherapy, Electrodiagnosis and its implications to Sports Physiotherapy.
- Functional Bandages & Orthotic Aids History and tuses of functional bandages, classification according to the time of application, types of bandages, Bandaging techniques and bandaging material, Indications, contraindications athletic shoes and modifications, common orthotic aid and appliances in Sports.
- Cryotherapy Physiological effects, Use of cold therapy in acute phase, rehabilitative phase, preventive phase of athletic injury, Methods of application, Indications and contraindications
- Manual Therapy Introduction to manual therapy techniques, joint techniques, manual joint therapy, traction, basic principles of manipulation for various disorders of the spine and extremities. Clinical Reasoning and decision making

PAPER III: Current Concepts, and Fundamentals of Health Care management

- Segmental Stabilization Concepts of Spine a. Muscle function in spinal stabilization b. Contribution of various muscles to spinal stabilization c. Local Muscle dysfunction in Low back pain d. Principles of clinical management of deep muscle system for segmental stabilization
- Emergency Medical Planning and cover for Sports Events
- Exercise for growing bones
- Effect of Physical activity intervention in youth
- Precision heart rate training a. Heart rate monitoring and training b. Training in heart zones c. Precision heart rate training for specific sports d. Multi Activity training e. Monitoring of training effects
- Current concepts in obesity management a. Childhood obesity etiology and role of exercise b. Obesity correlation with lipidogram c. Intra-abdominal obesity hazards d. Management of obesity
- Electromyography and Rehabilitation a. Principles of EMG Rehab b. Muscular tone, fatigue and neural influences c. EMG in the evaluation of Sports Trauma
- Current concepts in comprehensive physical examination for the instabilities of knee.
- Current concepts in tendinopathies.
- Foundations and Principles of Healthcare Management

- Health care management a. Definition b. Features c. Functions d. Classification of hospitals • Organization a. Definition b. Hospital Organization c. Formal and Informal Organization • Emergency services and disaster management a. Emergency Services Scope b. Principles of Planning of emergency services c. Emergency departments. d. Problem areas in emergency departments e. Disaster management f. Types of hazards / disasters g. Disaster plan h. Managerial issues in disaster management. •
- Technology in health care Importance and role of modern technology in hospitals and health care systems.
- Records management a. Need and importance of maintaining Medical Records b. Administration of a Medical Record Department c. Issues and problems of records management in a hospital
- International perspective on health care Interrelationship between domestic law and policy and international laws and advocacy.
- Ethics in medical profession a. Rights and Duties of Doctors b. Rights and Duties of Patients c. Professional conduct of the doctors d. Codes of conduct e. Duties of physicians towards each other f. Medical negligence Practical: The students will undergo training in Hospital and Field management

Practicals

- Kinanthropometry and Kinesiology: 80 hours
- Biomechanics: 40 hours Sports Psychology : 40 hours
- Exercise Physiology : 80 hours
- Practicals/ Clinical attachments
- Orthopaedics Department: 180 hours
- Cardiology Department: 60hours
- Physical Therapy: 180 hours
- General Medicine: 60 hours
- Emergency care:30 hours

Desirable

Attachment with sporting teams off and on season and during tournaments and competitions is desirable.

Thesis Objectives

By carrying out a research project and presenting his work in the form of thesis, the student shall be able to: identify a relevant research question conduct a critical review of literature formulate a hypothesis determine the most suitable study design state the objectives of the study prepare a study protocol undertake a study according to the protocol analyze and interpret research data, and draw conclusions write a research paper Guidelines While selecting the topic, following should be kept in mind: the scope of study is limited to enable its conduct within the resources & time available the study must be ethically appropriate the emphasis should be on the process

of research rather than the results the protocol, interim progress and final presentation is made formally to the department only one student per teacher/thesis guide.

Recommended Readings:

- Hospital Organization and Management: Kurt Dorr and Jonathan S. Rakich : Spectrum Publication, New York. 2nd Ed.
- Burke: Precision Heart rate training, Human Kinetics
- William E. Prentice: Therapeutic Modalities in Sports Medicine - Mosby.
- William E. Prentice: Rehabilitation Techniques - Mosby.
- O' Sullivan, Schmitz: Physical Rehabilitation – Assessment and Treatment - F.A. Davis.
- John Low & Reed: Electrotherapy Explained, Butterworth.
- Harrelson and Andrews: Physical Rehabilitation of Injured Athlete.
- Torg, Welsh & Shephard: Current Therapy in Sports Medicine III - Mosby.
- Zulunga et al: Sports Physiotherapy, W.B. Saunders
- Reed: Sports Injuries – Assessment and Rehabilitation, W.B. Saunders.
- Lillegard, Butcher & Rucker: Handbook of Sports Medicine: A symptom – Oriented Approach, Butterworth & Heinemann
- Mohsin S.M.: Research Methods in Behavioral Sciences: Orient Publications.
- Colton: Statistics in medicine, Little Brown Company, Boston.
- Mahajan: Methods in Biostatistics, Jay Pee Brothers.
- Vincent: Statistics in Kinesiology, Human Kinetics.
- 16. Luttgens K., Hamilton N.: Kinesiology – Scientific Basis of Human Motion 9th Edi, 1997, Brown & Benchmark.
- 17. Rasch and Burk: Kinesiology and Applied Anatomy, Lee and Fabiger.
- 18. Nordin & Frankel - Basic Biomechanics of Muscular Skeletal Systm - Williams & Wilkins.
- 19. Ostym, Beunen and Simons: Kinanthropometry II, University Park Press, Baltimore
- 20. Grafiti: Psychology in contemporary sports, Prentice Hall.
- 21. Mc Ardle, Katch, Katch: Exercise Physiology Edition IV.
- 22. Era Volinski: Nutrition and exercise in Sports - CRC Press, New York.
- 23. Astrand & Rodahl: Text Book of Work Physiology, McGraw Hill.
- 24. Rowland - Developmental Exercise Physiology - Human Kinetics.
- 25. Richard B. Birrer: Sports Medicine for the primary care Physician, CRC Press.
- 26. Torg, Welsh & Shephard: Current Therapy in Sports Medicine III - Mosby.
- 27. Brukner and Khan: Clinical Sports Medicine, McGraw Hill.

- 28. Scuderi, McCann, Bruno: Sports Medicine – Principles of Primary Care, Mosby.
- 29. Lars Peterson and Per Renstron: Sports Injuries – Their prevention and treatment, Dunitz.
- 30. Drugs & Doping in sports by O'Leary 2001
- 31. Gould: Orthopaedic Sports Physical Therapy, Mosby.
- 32. D. Kulund: The Injured Athlete, Lippincott. 33. Lee & Dress: Orthopaedic Sports Medicine - W.B Saunders

MODEL PAPER

M.Sc. Sports Med..– I **Short Name**

M.Sc. Sports Medicine
Part-I (Main) Examination month year
Paper I
Basis Medical Sciences:Sports
Time: Three Hours
Maximum Marks: 100

Students shall be allowed to take only one supplementary copy long with one main answer book. All the parts of one question should be answered at one place. Different parts of one question should not be answer at different places in the answer book

Attempt all Questions.

Q.1	Describe anatomy of radial nerve injuries	25
Q.2	Anatomy of shoulder joint	25
Q.3	Long answers Type	
	a) Anatomy of Knee and locking mechanism	12½
	b) Rotator cuff Muscles	12½
Q.4	Short Notes	5x5=25
	a) Ligament of knee joints	
	b) Rotator cuff muscles	
	c) Stabilising factors of shoulder joints	
	d) Anatomy of ACL	
	e) Cartilage	

MODEL PAPER

M.Sc. Sports Med..– I **Short Name**

M.Sc. Sports Medicine
Part-I (Main) Examination month year
Paper-II

Research Methodology

Time: Three Hours
Maximum Marks: 100

Students shall be allowed to take only one supplementary copy long with one main answer book. All the parts of one question should be answered at one place. Different parts of one question should not be answer at different places in the answer book

Attempt all Questions.

Q.1	Level of evidence	25
Q.2	Types of research	25
Q.3	Long answers Type	
	a) Case control studies	12½
	b) Cohart studies	12½
Q.4	Short Notes	5x5=25
	a) Data analysis	
	b) Experimental research	
	c) Types of Survey research	
	d) Seminars	
	e) Steps of framing a Research Questions	

MODEL PAPER

M.Sc. Sports Med.– I **Short Name**

M.Sc. Sports Medicine
Part-I (Main) Examination month year
Paper-III

Basic and Applied Sports Sciences

Time: Three Hours
Maximum Marks: 100

Students shall be allowed to take only one supplementary copy long with one main answer book. All the parts of one question should be answered at one place. Different parts of one question should not be answer at different places in the answer book

Attempt all Questions.

Q.1	Importance of study of biomechanics	25
Q.2	Kinematic chain	25
Q.3	Long answers Type	
	a) Biomechanics of ACL injury	12½
	b) Adaptations in CVS in exercise	12½
Q.4	Short Notes	5x5=25
	a) Principles of strength training	
	b) Concentration training in sports	
	c) Psychological aspects of doping	
	d) Stress management	
	e) Trendelenburg Gait	

MODEL PAPER

M.Sc. Sports Med.– II **Short Name**

M.Sc. Sports Medicine
Part-II (Main) Examination month year
Paper I
Clinical Sports Medicine

Time: Three Hours
Maximum Marks: 100

Students shall be allowed to take only one supplementary copy long with one main answer book. All the parts of one question should be answered at one place. Different parts of one question should not be answer at different places in the answer book

Attempt all Questions.

Q.1	Exercise and cardiac conditions	25
Q.2	Hydrotherapy	25
Q.3	Long answers Type	
	a) Exercise and female gender	12½
	b) Electrotherapy	12½
Q.4	Short Notes	5x5=25
	a) Taping	
	b) Orthopedic braces	
	c) Manual therapy	
	d) Heat therapy	
	e) diabetes and exercise	

MODEL PAPER

M.Sc. Sports Med.– II **Short Name**

M.Sc. Sports Medicine
Part-II (Main) Examination month year
Paper-II
Sports Physical Therapy

Time: Three Hours
Maximum Marks: 100

Students shall be allowed to take only one supplementary copy long with one main answer book. All the parts of one question should be answered at one place. Different parts of one question should not be answer at different places in the answer book

Attempt all Questions.

Q.1	Definition and classification of massage techniques	25
Q.2	Functional Bandages	25
Q.3	Long answers Type	
	a) Physiological effects of massage	12½
	b) Manual Therapy	12½
Q.4	Short Notes	5x5=25
	a) Hydrotherapy	
	b) Mineral baths,	
	c) MFR	
	d) IFT	
	e) Cryotherapy Physiological effects	

MODEL PAPER

M.Sc. Sports Med.– II **Short Name**

M.Sc. Sports Medicine
Part-II (Main) Examination month year
Paper-III

Current Concepts, and Fundamentals of HealthCare management

Time: Three Hours
Maximum Marks: 100

Students shall be allowed to take only one supplementary copy long with one main answer book. All the parts of one question should be answered at one place. Different parts of one question should not be answer at different places in the answer book

Attempt all Questions.

Q.1	Emergency medical planning and cover for sports events	25
Q.2	Exercise for growing bones	25
Q.3	Long answers Type	
	a) Precision heart rate training	12½
	b) Segmental Stabilization Concepts of Spine	12½
Q.4	Short Notes	5x5=25
	a) Current concepts in tendinopathies	
	b) PRP	
	c) Current concepts in obesity management	
	d) Functional bracing	
	e) Electromyography and rehabilitation	