JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
MS SPORTS TECHNOLOGY & HEALTH SCIENCES
SEMESTER 1
1.BASIC MEDICAL SCIENCES

Unit 1: General Anatomy and Radiology:

Anatomy of the Musculoskeletal system, Axile Skeletal system, Anatomy of Cardio Pulmonary system., Anatomy of CNS and Spinal Cord, Nerve Injuries: Anatomical and Physiological loss resulting from nerve injury.. Peripheral nerve entrapment
Basics of Imaging Techniques: X-Ray ,Fluoroscopic Examination, CT Scan, Radionuclide Scanning MRI, Ultrasonography, Bone Scan, Dexa Scan
Imaging in Common Sports Injuries: Head and Neck. Spine, Pelvis, hip and thigh, Knee joint, Lower leg, foot and ankle

Unit 2: General Physiology:

1. Blood: The various components of blood. Viscosity correlation. Oxy hemoglobin Dissociation curves. Inter relationship 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: Central Nervous System, Autonomic Nervous System, Basic physics of membrane potentials, Recording of membrane potentials and action potentials with basics of Electro myogram, Mechanism of muscle contraction d. 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. Regulation of body temperature
6. Endocrine System Pituitary hormones and their functions, Thyroid hormones Adrenocortical hormones. Insulin Glucagon hormones, & Parathyroid hormones

Unit 3: Bio Chemistry:

Introduction to biochemistry, water and Mineral metabolism, water and fat soluble vitamins & minerals. Introduction to Human Nutrition, Carbohydrates, proteins Lipids, BMR, Metabolism of Carbohydrates, proteins & fats.PH, Acid Base Balance.

Unit 4: Microbiology:

Introduction to Micro Biology. Classification of Bacteria(Gram Positive and Gram negative), RNA and DNA Viruses, Common Cold,
History of immunology, Immunity, classification of Immunity, Differences between active and passive Immunity, Immune system, antigen and antibodies, Classification of Immunoglobins,

Unit 5: Pharmacology :

introduction of Pharmacology: Principles of drug action. Basic pharmacokinetics and Pharmacodynamics. The use of drugs in various musculoskeletal disorders. Emergency medicines for athletes. Doping drugs and Banned items in sports (Anabolic steroids, peptide Hormones, Growth related substances, some Diuritics Banned(masking agents like epi testosterone, stimulants and Narcotics, Cannabinoids), Hormone antagonist and modulators. etc.

LABS:

Laboratory-1 Upper Limb Bones, Lower Limb Bones, Skull and Spinal Vertebrae
Laboratory-2: Soft tissue observation and System wise study
Laboratory -3: X- Ray Reading, Ultra sound and Scan as well as MRI reading.

REFERENCE BOOKS:

1. Gray's Anatomy,
2.Principles of Anatomy by Gerard J. Tortora, and Bryan H. Derrickson,
3. Cunningham Manuals 1-3,
4.Introduction to Poditr Neale's disorders of the foot- diagnosis and management, Editor Donold L. Lorimer, Gwen French.3
5. X- Ray Reading books

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
MS SPORTS TECHNOLOGY & HEALTH SCIENCES
SEMESTER 1
2. EXERCISE PHYSIOLOGY

Unit 1:Cardio Vascular System and Exercise:

General functions of the cardiovascular system. Stroke volume, systolic Pressure, mean arterial pressure, Ventricular Diastole, Ventricular systole, Cardiac Cycle, Pressure Changes during Cardiac Cycle, Coordinated control of the heart, Coordinated control of the heart, Control of cardiac output (HR), Control of cardiac output (SV), Control of cardiac output (venous return), Hemodynamics, Changes in oxygen delivery to muscle during exercise, Redistribution of blood flow during exercise, Regulation of blood flow at the local level, Regulation of cardiovascular function, Cardiovascular changes with isometric exercise, Cardiac changes following training, hypertrophic Cardiomyopathy, VO_2 and Ficks equation. Athletes Heart, Cardio Vascular adaptations to sustained aerobic exercises. Lipids- coronary heart disease. exercise and optimization of lipid profile, Regulation of circulation during exercise, Sudden cardiac death in sports,

Unit 2: Respiratory System:

Structure of the Lung and Broncho Pulmonary segments, Pulmonary ventilation , Diffusion of oxygen and carbon dioxide between the alveoli and the blood Transport of oxygen and carbon dioxide in the blood and body fluids and to and from the cells Regulation of ventilation and other aspects of respiration, maintains homeostasis. Air Conditioning., Second Wind., Oxygen Debt, Breathe Holding, High Pressure Ventilation. Scuba Diving, Athletes Lung. Regulation of Respiration during exercise.

Unit 3:Musculo Skeletal System:

Functions of Muscle tissue, Excitability, Neurotransmitters: Acetylcholine (ACh) stimulates skeletal muscle to contract, Nerve and blood supply, Motor units, Neuromuscular junction. Physiology of Contraction, Muscle Metabolic Systems During Exercise, Post exercise Recovery, Oxygen debt, Recovery of muscle glycogen post exercise, Electrical stimuli- Applying electrical stimuli between cardiac and smooth muscle cells causes the muscles to contract. Contractility – Ability to shorten , Extensibility – Ability to stretch without damage , Elasticity – Ability to return to original shape after extension

Evidence for complex system integration and dynamic neural regulation of skeletal muscle recruitment during exercise in humans, Training for Muscular Strength and Endurance. Exercise induced free radicals cause muscle damage.

Unit 4: Gastrointestinal Tract and Endocrine system:

Effect of Sports on GIT and Liver, Hormone regulation of fluid and electrolytes during exercise, Exercise and Menstrual Cycle, Stress Hormones in Exercise. Effects of exercise on various Hormones in the body, Runners High. Neurobiological effects of physical exercise

Unit 5 :Energy Transfer for Physical activity:

Energy transfer in Body, Energy transfer in exercise, Energy expenditure during various activities, Fatigue, Biochemical responses to endurance training. Neuromuscular system: Basic physics of membrane potentials, Recording of membrane potentials and action potentials with basics of, Electro myogram, Mechanism of muscle contraction, Sources of energy for muscle contraction, Neural control of movement.

LABS:

Laboratory-1 PFTs
Laboratory-2 Urine test for Drugs, ECG Readings, EMG Readings, Cardiac Monitoring
Laboratory-3 ICU Observation, Breath Alcohol Test, Blood test for Drugs, CPR techniques

REFERENCE BOOKS:

1. Text Book of Physiology, by Guyton
2. Physiology by Ganong,
3. Physical Exercise and Medicine, author Andrew M. Jones,
4.Exercise Physiology by Mc Ardle,

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
MS SPORTS TECHNOLOGY & HEALTH SCIENCES
SEMESTER 1
3. BIOSTATISTICS & EPIDEMIOLOGY

Unit 1: Biostatistics Introduction, Definition, Data Definition, Types, Survey methods, Data Collection, Measures of central tendencies, Measures of dispersion, Moments, Skewness, Kurtosis, Probability

Unit-2: Random variable, df, d.F, 2D, R.V.Binomial, Poisson, Uniform, Normal, Exponential problems.Correlation,Curve fitting (Straight line & Second Degree) and Regression Analysis.

Unit-3: Sampling Survey, Methods of Sampling, Design of Experiments, replication and randomization, One way Classification , Two way classification, ANOVA tables.

Unit-4: Large sample tests, means, Exact samples distribution Chi square test, t-test, F-test, Hypothesis testing, Non- parametric tests, run, sign, median, mannwhitney. proportions problems.

Unit 5: Epidemiology Introduction and definition, Physical activity in Public Health, Pilot study of the epidemiology of sports injuries and exercise-related morbidity Participation of sporting activity in different schools and Universities to study the Injury, Injury in different games and study of the cause and prevention. Sport, age, and sex specific incidence of sports injuries in Our Universities a Pilot study. Effectiveness of an injury prevention program for adult male amateur game specific players, a cluster-randomised controlled trial.

LABS:

Laboratory-1 Use SPSS / STATA Package/Excel

Laboratory-2 Perform two sample comparisons of means and create confidence intervals for the population mean differences and Compare proportions amongst two independent populations

Laboratory-3 Interpret output from the statistical software package STATA related to the various estimations and Hypothesis testing procedures covered in the course.

REFERENCE BOOKS

1. Biostatistics by Arora
2. Basic Bio Statistics for Public Health Practice By B Burt Gers
3. Bio statistics for Health and Life Sciences by Surya.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
MS SPORTS TECHNOLOGY & HEALTH SCIENCES
SEMESTER 1
4. SPORTS NUTRITION & ERGOGENIC AIDS

Unit 1 : Introduction to Sports Nutrition Energy: Basal metabolism, factors influencing BMR, Energy balance. Digestion and absorption, carbohydrates Proteins, Fat/Lipids - Dietary composition vitamins – fat soluble vitamins & water soluble vitamins, antioxidants, Minerals, Hydration and Dehydration, seven rules of hydration, Water and Electrolyte Loss and Replacement in Exercise.

Unit 2: Energy Expenditure, Energy Expended in Movement, Measure of Body Composition, sports drinks, The Female Athlete, The Aging Athlete, Pre competition Meal and Carbohydrate Loading. Water intoxication.

Unit 3: Factors affecting nutritional needs in athlete, nutritional plans for various sports, nutritional strategies for specific sports, Energy and fluid intake. weight loss and disorderd eating. Fuel Usage, *Fuel usage (light exercise), Fuel usage (moderate exercise)., Fuel usage (strenuous exercise) Fuel usage in individuals who are unfit,* Eating disorders in athletes. Deal with cramps while running,

Unit 4: Ergogenic Aids and Ergolytic Aids, categories of ergogenic aids, banned ergogenic aids. Metabolism: Postprandial, Post absorptive, and Exercise Metabolism, Nutritional Ergnogenic Aids and Supplements.

Unit 5 : Nutrition in Sports: Food : The ultimate food, Energy requirement, Weight Loss & Weight Gain, Carbohydrate Requirement & Glycemic Index, Carbohydrate: Needs of Strength & Endurance Athletes, Pre & Post Exercise Carbohydrate Intake, Protein requirement and needs of Athlete, Fats requirement and needs of Athlete, , Vitamins are Athletes Needs, Megavitamin & Antioxidants, , Sports Specific Nutrition: Sprinting, Distance Running, Cycling, Swimming, Weight Lifting & Power Sport and team Sport, Fluid and energy replacement in prolonged exercise.

LABS:

Laboratory-1 Estimation of Energy requirements for various Sports, Nutritional need in special environment

Laboratory-2 Sport-specific strategies to enhance performance : endurance and endurance trained sports, strength and power sports.

Laboratory-3 Sport-specific strategies to enhance performance : winter sports , weight-restricted and weight-conscious sports

REFERENCE BOOKS:

1. Sports and Exercise Nutrition William D Mcardle.
2. Practical application in Sports Nutrition Heather Hedrick
3. Nutritional Application in Exercise and Sports Ira Wolinsky and James F. Hickson, Jr.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
MS SPORTS TECHNOLOGY & HEALTH SCIENCES
SEMESTER 1
5. SPORTS TECHNOLOGY & BASIC ENGINEERING

Unit1: Electrical Engineering:

Electrical Wiring and Basic Concept, electrical fuses, Earthing and purpose of earthing, Electrical shock, normal domestic lighting, Illumination & Types of illumination, Green Energy initiative, Types of meters and measuring instruments, types of currents AC & DC, Circuits and types of circuits, resistance, Capacitors, Inductors, Transformers ,Insulators, Semiconductors, Condenser, fuse and importance Electronic Engineering: Devices, Circuits, Cathode Ray Oscillo scope, measuring instruments etc.,

Unit 2: Sports Injury Treatment equipment:

Ultrasound, Inter Ferential Therapy (Four electrodes and two strengths of power is used with the facility of adjustable voltage.), Short wave diathermy therapy, Micro wave diathermy therapy , Traction Tables and how to use them, Electrical stimulators, TENS, Instrumentation: pulse oxymeter, EEG, EMG, TMT, routine blood check up, Parafin Wax treatment for deeper tissue stimulation, Hydro Therapy instrument, Whirlpool, Underwater Massager, Infra red and Ultraviolet lamps.

Unit 3 :Sports Technology & Science of Sports Materials

Meaning, definition, purpose, advantages and applications, General Principles and purpose of instrumentation in sports, Workflow of instrumentation and business aspects, Technological impacts on sports. Adhesives- Nano glue, nano moulding technology, Nano turf. Foot wear production, Factors and application in sports, constraints. Foams- Polyurethane, Polystyrene, Styrofoam, closedcell and open-cell foams, Neoprene, Foam. Smart Materials – Shape Memory Alloy (SMA), Thermo chromic film, High-density modeling foam. PPE of each sport,

Unit 4:Surfaces of Playfields & Modern equipment

Modern surfaces for playfields, construction and installation of sports surfaces.Types of materials – synthetic, wood, poly urethane. Artificial turf .Modern technology in the construction of indoor and outdoor facilities. Technology in manufacture of modern play equipments. Use of computer and software in Match Analysis and Coaching. Playing Equipments: Balls: Types, Materials and Advantages, Bat/Stick/ Racquets: Types, Materials and Advantages. Clothing and shoes: Types, Materials and Advantages. Measuring equipments: Throwing and Jumping Events. Protective equipments: Types, Materials and Advantages. Sports equipment with nano technology, Advantages.

Unit 5: Training Gadgets

Basketball: Ball Feeder, Mechanism and Advantages. Cricket: Bowling Machine, Mechanism and Advantages, Tennis: Serving Machine, Mechanism and Advantages, Volleyball: Serving Machine Mechanism and Advantages. Lighting Facilities: Method of erecting Flood Light and measuring luminous. Video Coverage: Types, Size, Capacity, Place and Position of Camera in Live coverage of sporting events.

LABS:

Laboratory-1 Nano Products and its importance in sporting goods
Laboratory-2 Foot ware Modifications.
Laboratory-3 Training Machines and Gadgets.

REFERENCE BOOKS:

1. Electronic devices and Circuits by Millman and Halkieas.
2. Basic Electrical Engineering by Deltoro and Naidu and Kamakshiah.
3. Managing Sports Organizations- Ruben Acosta Hernandez
4. Contemporary Sports management- Janet.B. Parks & Jerome Quarterman (Publishers Human Kinetics),
5. Managing Sporting Events – Jerry Solomon (Human kinetics)
6. Sports Journalism – Philip Andrews (Sage Publication

----------END OF FIRST SEMESTER----------

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
MS SPORTS TECHNOLOGY & HEALTH SCIENCES
SEMESTER 2
1.SPORTS BIOMECHANICS

Unit1: Human movements & terminologies, Principles of Bio-mechanics, Force, Newton's laws, forces effecting movements, Work, Power & energy relationships. Equilibrium & Human Movement-Equilibrium (Torque, Resultant, joint torques, levers).

Unit2: Principles of balance and stability, motion & levers, Applications of bio-mechanical principles of activity (a) Normal walking and gait (b) Abnormal walking and gait (c) Normal running and gait (d) Abnormal running and gait (e) Buoyancy, swimming, propelling forces, Resistive forces, Gait- General features, kinematics, energy requirements, kinetics, stair & running gaits, joint motion & muscle activity in running gait, effect of age, disease, injury & malalignments. Gait analysis

Unit3- Low back pain and mechanism of injury, Common sports injuries and defective bio-mechanics, Muscular balance and imbalance, Assessment of Bio-mechanical inadequacies.

Unit4: Disability and games, Muscle tension measurement in the presence of Neuro muscular impairment, Gymnastics, Center of gravity, Stability & Balance. Arthro and oestio Kinetics and Kiniomatics, Prosthesis,

Unit5: Posture-Introduction, External & internal forces, optimal posture, Analysis of posture Effect of age, pregnancy, Occupation & Recreation on posture. 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.

LABS:

Laboratory-1 Goniometry & range of Motion of Upper Limb, Goniometry & range of Motion of Lower Limb
Laboratory-2 Assessment of Normal Gait, Assessment of Abnormal Gait, Joint Function
Laboratory-3 Agonistic contraction, Antagonistic contraction, Analysis of Posture

REFERENCE BOOKS:

1. The Basics Optimis, Author: Anthony J. Blazevich,
2. Introduction to Sports Biomechanics, Author: Roger Bartlett
3. Basic Biomechanics 4th edition, Susan J. Hall , MCGRAW Hill
4. Cynthia C. Norkin, Pamela K. Levangie: Joint structure & function -A comprehensive analysis and 2nd edition, F.A. Davis company philadelphia.
5.Joseph Hamill, Kathleen M. Knutzen. Biomechanical Basis of Human Movement

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
MS SPORTS TECHNOLOGY & HEALTH SCIENCES
SEMESTER 2
2.SPORTS KINESIOLOGY

Unit 1: Introduction & Mechanical Principles: Kinematics

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.

Unit 2:Mechanical Principles: Kinetics

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.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.

Unit 3: 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.

Unit 4: Aspects of Muscle Physiology

Physical Properties of bone, cartilage and muscle and functional adaptation under pathological conditions.Origin, insertion, nerve supply and action of all important muscles related to human movement.

Unit 5: Biomechanical Analysis & Techniques – Isokinetic dynamometer, Kinesiological EMG, Electronic goniometry, Force platform, Videography.

LABS:

Laboratory-1 Assessment of Biomechanical Kinesiological Inadequacies.
Laboratory-2 Biomechanical Measurements.
Laboratory-3 Gait analysis , Joint moments

REFERENCE BOOKS:

1. Clinical Kinesiology Brunnstrom
2. Kinesiology – Scientific Basis of Human Motion, Brown & Benchmark
3. Analysis of Sports Motion: Anatomic and Biomechanics perspectives Northrip et al
4. Kinesiology and applied anatomy Rasch and Burk.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
MS SPORTS TECHNOLOGY & HEALTH SCIENCES
SEMESTER 2
3.PHYCIAL MEDICINE & REHABILITATION

Unit1: Rehabilitation and Therapeutic Exercises:

Define Rehabilitation, Goals and Objectives of Rehabilitation in Sports, Clinical Evaluation phases of rehabilitation. (Multidisciplinary approach). Prehabilitation, Definition, details of effects and uses of therapeutic exercises. Dynamic Exercises , Plyometric Exercises, Isokinetic Exercises Kinetic chain exercises Functional Bandages and Orthotic Aids & Protective Equipment in Sports History and uses of functional bandages, classification according to the time of application, types of bandages, Bandaging techniques and bandaging material, Indications, contraindications, Taping Techniques , athletic shoes and modifications, common orthotic aid and protective equipments in Sports

Unit2: Massage:

Historical development. Definition and classification of massage techniques, Physiological effects of massage, Description of the techniques of the classical massage. Connective tissue massage and myofascial release, physiological basis of sports massage and various categories, underwater massage, mechanical devices of massage, therapeutic applications and contraindications of massage. 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.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. Health club & fitness: Concept, group therapy

Unit3: Heat Therapy1. Production, Physiological effects, indications, contraindications and specificuses in sports of the following: Infrared rays, Paraffin Wax Bath, Steam Bath, Sauna Bath, Moist Heat Pack,Fluidotherapy, Mud Bath and Pelloids.Hydrotherapy History & Introduction .Physiological Effects &Techniques. Use of Hydrotherapy in Sports. Various Types of baths. 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.

Unit4: 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, Traction ,Neural mobilization, Trigger point therapy and Muscle energy techniques

Unit5: Electrotherapy:

Principles underlying the application of following modalities with reference to their production, biophysical and therapeutic effects, indications and contraindications. Clinical Implication and the technique of application with specific uses in Sports Physiotherapy. Low Frequency Current, Direct Current, Modified Direct Current, Alternative Current, Diadynamic Current, Iontophoresis, TENS, High Voltage, Pulsed Galvanic Stimulation. Medium Frequency Current, IFT, Russian Currents, High Frequency Currents, SWD, MWD, Ultrasound, Pulsed Electromagnetic Energy, Radiations: LASER, UVR. Electro diagnosis and its implications to Sports Physiotherapy.

LABS :

Laboratory-1 Tapping Techniques. Athletic Taping , Rigid Taping, kineso Taping
Laboratory-2 Handling of Therapeutic Equipment
Laboratory-3 Mobilization Techniques.Neural Mobilization, Muscle Energy Release.

REFERENCE BOOKS:

1. Principle and Practices of Therapeutic Massage Sinha A.G
2. Therapeutic Exercise Basmajian John V
3. Muscle Testing and Function Kendall's
4. Physical Therapy in sports Werner Kuprain
5. Sports Therapy Taping Guide Kennedys

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
MS SPORTS TECHNOLOGY & HEALTH SCIENCES
SEMESTER 2
4.SPORT INJURIES PREVENTION & MANAGMENT

Unit1: Definition of prevention, prevention is the best cure, Pre-participation examination evaluation fitness injuries, athletic injuries, Prevention of soft tissue injuries, prevention of joint injuries, prevention of fractures, Prevention of apposition physical attacks.

Unit2: Protective Equipments: Principles of protective equipment, Protective Equipment for: Head & Face, Upper & Lower Extremity. Orthosis in the prevention and rehabilitation of injuries.

Unit3: Preventive measures by exercising, prevention by nutrition deficiency, prevention by environmental causes. Prevention of Emotional causes, Psychological stress and Sports Injuries.

Unit4: Prevention of stress factors, Emotional abused, discriminative, Negligence by higher management, Criticism by media. Care & Prevention of Athletic Injuries- Minimum content requirements: prevention, evaluation, treatment, and rehabilitation of athletic injury; Taping and bracing techniques, emergency care.

Unit5: Prevention in Different Games and Sports: Common Diseases in athletes: Common Cold, Diarrhea, Dysentery, Typhoid, Cholera, Amoebiasis, Food Poisoning, Tuberculosis, Malaria, Hepatitis, AIDS in sports people, etc.

1. Cricket Injuries and prevention
2. Basketball Injury Prevention
3. Football Injury Prevention
4. Gymnastics Injury Prevention
5. Running Injury Prevention
6. Soccer Injury Prevention
7. Swimming Injury Prevention
8. Tennis Injury Prevention
9. Volleyball Injury Prevention
10. Wrestling Injury Prevention

LABS:

Laboratory-1 Taping
Laboratory-2 Bracing in prevention and rehabilitation of sports injuries
Laboratory-3 Orthosis in sports

REFERENCE BOOKS

1. Handbook of Sports Medicine and Science, Sports Injury Prevention by Roald Bahr (Editor), Lars Engebretsen
2. Sports Injuries Guidebook by Robert S. Gotlin
3. Clinical Guide to Sports Injuries by Roald Bahr, M.D., Sverre Maehlum

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
MS SPORTS TECHNOLOGY & HEALTH SCIENCES
SEMESTER 2
5.SPORTS EMERGENCY & MANAGEMENT

Unit1: Understanding of sports injuries, Specific injuries and types of injuries, Terminology and classification of common sports soft tissue injuries, Pathological changes in sprains, Spasms, cramps and contusion and their management. Regional injuries and their management- injuries of head, ears, eyes, nose, back, shoulders, elbows, hand, abdomen, thighs, knee, leg and ankle
Causes & Mechanism of Sports Injury and, common injuries in athletes: sprains and strains, blisters, abrasion, contusion and laceration, nerve and muscular injuries, fractures and hyperextension injuries, Exercise induced asthma. exercise induced head ache, lower leg and ankle injuries, compartmental syndrome. Athelets foot, Flat foot, Diabetic foot, fungal foot diseases, Common acute and overuse injuries of: Shoulder girdle, Arm, Elbow, Forearm, Wrist & hand, Pelvis, hip, thigh, knee, leg, ankle & foot, Spine, Head, Injuries to Athletes in various age groups.

Unit 2: Specific known Sports injuries : Concussion, Traumatic brain injuries, Facial trauma, soft tissue injuries, Facial Injuries, bone fractures, dental injuries, Eye and nose injuries. Cervical spine injuries:(Acute cervical spine syndrome, Acute cervical sprain, Acute cervical disc herniation, cervical spine fractures, Shoulder injuries (shoulder separation, shoulder dislocation) Elbow and forearm injuries, Hand and wrist injuries, Lower back injuries, Hip injuries, Knee injuries, Ankle and foot injuries.

Unit 3 : Assessment, Management, Emergency procedure in Sports CPR and Basic life support, 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. Factors associated with Training injuries (a) Intrinsic (b) Extrinsic,

Unit 4: Common sports injuries, Preventive conditioning exercises; yoga in Sports & Back to sports, Protective gear in sport; taping in injuries. Complete Understanding of the Head Injuries, Abdominal Injuries in the sport. Fractures in the sports, Injuries that result from a fall on a hard surface that causes outer layers of skin to rub off. Achilles tendon Rupture. Ankle Sprains Anterior Cruciate Ligament (ACL) Injuries Blisters, Clavicle Fractured (Broken Shoulder) Delayed-Onset Muscle Soreness

Unit 5: Illness, Infections, Hypertension, Urine abnormalities; Venereal Diseases; Exercise induced Asthma; Anaemia, Delayed onset muscle soreness (DOMS), Runner's high & exercise addiction. G.I.T. Diseases, Exercises and congestive heart failure, exercise for post coronary & bye-pass patients, exercise for diabetics. Diagnosis and management of skin conditions of Athletes, Bacterial infections, Fungal infections, Viral infections, boils and cellulites. Sports Common Diseases: Common Cold, Diarrhoea, Dysentery, Amoebiasis, Food Poisoning, Hepatitis etc. AIDS in sports people. Treatment of collapsed athlete, severe head injury, The athlete with spinal injury, Chest injuries, Abdominal injuries, Injuries to the extremities, Causes of Collapse. Geriatric disorder: Older Athletes. Osteoarthritis and other geriatric conditions. Sudden deaths in the sporting persons, 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 like

a. Individual events: Field & Track
b. Team events: Hockey, Cricket, and Football
c. Contact and Non-contact sports
d. Water sports

LABS:

Laboratory-1 Management of Concussion Patient
Laboratory-2 CPR & Basic Life support.
Laboratory-3 First Aid & Casting

REFERENCE BOOKS:

1. Evidence-based Emergency Medicine BRIAN H. ROWE
2. Tintinalli's Emergency Medicine A Comprehensive Study Guide, 8E
3. The IOC Manual of Emergency Sports Medicine
4. Oxford handbook of emergency Medicine JP Wyatt

----------END OF SECOND SEMESTER----------

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
MS SPORTS TECHNOLOGY & HEALTH SCIENCES
SEMESTER 3
1. FITNESS, HEALTH & SPORT

Unit1: Definitions of physical activity, exercise, fitness etc. :
Components of health related fitness (a)Cardio-respiratory endurance and evaluation methods (b) Implications of CRE and health (applied) (c) Musculo-skeletal fitness (d) Flexibility and ROM (Range of motion) (e) Concept of the body composition., Skilled related fitness, Human growth and development, Physical fitness and exercise objectives, Effects of inactivity, Principles of exercise prescription, Physical fitness, mental fitness, Neurological development and fitness methods, Fitness and nutrition, Sleep Vs Fitness

Unit 2: Physical Fitness Tests & Anthropometric and Aerobic-Anaerobic Tests:
Physical Fitness Test: AAHPERD Health Related Fitness Battery (revised in 1984), ACSM Health Related Physical Fitness Test, Roger's physical fitness Index. Cardio vascular test; Harvard step test, 12 minutes run / walk test, Multi-stage fitness test (Beep test) Physiological Testing: Aerobic Capacity: The Bruce Treadmill Test Protocol, 1.5 Mile Run test for college age males and females. Anaerobic Capacity: Margaria-Kalamen test, Wingate Anaerobic Test, Anthropometric Measurements: Method of Measuring Height: Standing Height, Sitting Height. Method of measuring Circumference: Arm, Waist, Hip, Thigh. Method of Measuring Skin folds: Triceps, Sub scapular, Supra iliac.

Unit 3: Motor Fitness Tests & Skill Tests :
Meaning and Definition of Motor Fitness. Test for Motor Fitness; Indiana Motor Fitness Test (for elementary and high school boys, girls and College Men) Oregon Motor Fitness Test (Separately for boys and girls) - JCR test. Motor Ability; Barrow Motor Ability Test –Newton Motor Ability Test – Muscular Fitness – Kraus Weber Minimum Muscular Fitness Test.Specific Spots Skill Test: Badminton: Miller Wall Volley Test. Basketball: Johnson Basketball Test, Harrison Basketball Ability Test. Cricket: Sutcliff Cricket test. Hockey: Friendel Field Hockey Test, Harban's Hockey Test, Volleyball, Russel Lange Volleyball Test, Brady Volleyball Test. Football: Mor-Christian General Soccer Ability Skill Test Battery, Johnson Soccer Test, Mc-Donald Volley Soccer Test. Tennis: Dyer Tennis Test.

Unit4: Train ability of children and adolescents, Identification of performance potential, Somatic development in children; growing height & weight, growth of body and extremities, development of abilities for performance.

Unit 5: Female Specific Problems:
Sports Female athlete triad, Energy Deficit/Disordered Eating, Menstrual Disturbances/Amenorrhea, Bone Loss/Osteoporosis Physical Health of the Female Athlete: Observations, Effects, and Causes of Reproductive Disorders,. Exercise and pregnancy. Lower prevalence of breast cancer and cancers of the reproductive system among athletes compared to non-athletes. The effects of intense exercise on the female reproductive system (Hypothalamic dysfunction associated with strenuous exercise,and disturbance of GnRH Pulsatility)

Diabetes and exercise: Exercise as a method of control of diabetes
Exercise and Common Pulmonary Conditions: Exercise induced bronchial obstruction, Exercise in chronic airway obstruction, Air pollution and exercise.
Exercise and Cardiac Conditions: Exercise prescription for heart disease, Exercise in primary prevention in ischemic heart disease, Exercise for secondary prevention of ischemic heart disease.
Diabetes and Exercise: Exercise in diabetic patients, Exercise as a method of control of diabetes.
Exercises for special categories: Child and adolescent athlete's problems, Special problems of older athletes. Special concerns for Physical Challenged or Disabled athletes

LABS:
Laboratory-1 Body composition Assessment, Endurance and Strength Assessment
Laboratory-2 Bruce Protocol, Field test for Aerobic Capacity
Laboratory-3 Skin folds Callipers, Flexibility Assessment, Physical fitness Assessment

REFERENCE BOOKS:
1. Resistance Training for Special Populations Quick Reference Guide Author: Ann Marie Swank,
2. Ergonomics in Sport and Physical Activity, Author: Thomas Reilly,
3.ACSM's Resources for The Personal Trainer, Author: Walter R. Thompson, Barbara A. Bushman, Julie Desch, Len Kravitz.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
MS SPORTS TECHNOLOGY & HEALTH SCIENCES
SEMESTER 3
2.SPORTS ADMINISTARTION & MANAGEMENT ETHICS

Unit1: Sports Management

History of Sports, Sports and Recreational Events, Financial and Corporate Management in Sports – clubs, Events Marketing and Management, International Relations and Business, Organizational Behavior and Culture, Sports Economics

Unit 2: Administration

Functions of management, Fundamentals of hospital administration,
Management Process – Planning, Organization, Direction, Controlling, Decision Making
Personnel Management – Staffing, Recruitment Selection, Performance appraisal, Collective bargaining, Job Satisfaction.

Unit3: Total Quality management – basics, quality control, quality assurance programme in hospitals and medical audit, International Quality System, Six Sigma approach, Just in Time approach.

Unit 4: Ethics & Legal Issues

Rules of Professional conduct, Legal responsibility, Code of ethics, Role of International health agencies, Liability and obligations in the case of medical legal action, Law of disability and discrimination, Confidentiality of the Patient's status, Consumer Protection Law, Health law, MCI, DCP

Unit5: Sports media, sports laws and risk management, sports sponsorship and funding in sports, sports journalism, event management. Duties of sports team member:Sports team Doctor, Sports Physiotherapist. Sports team coach. Event management and manager.Sports management and manager., logistic manager & public relation officer. Sports Nutritionist.

LABS :

Laboratory-1 Visit to sports clinic
Laboratory-2 Fitness assessment, Practical anthropometry, Examination methods and practice, Taping, Blood Alcohol testing,
Laboratory-3 Urine drug testing, Case recording and data collection, Analysis, Presentation, Publication of collected data and report writing

REFERENCE BOOKS:

1. The Management of Clubs, Recreation and Sports: Concepts and Applications - Thomas H Sawyer
2. Managing Sport, Fitness and Recreation Programs: Concepts and Practices - William F Stier Jr
3. Contemporary Sport Management - Janet B Parks
4. Principles and Practice of Sport Management - Lisa Pike, Masteralexis, Carol A Barr, Mary A Hums
5. Economics in Sports - Michael A Leeds, Peter von Allmen

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
MS SPORTS TECHNOLOGY & HEALTH SCIENCES
SEMESTER 3
3.NEURO SCIENCE IN SPORTS

Unit 1: Human Neuro Anatomy and the Sympathitic Nervous system a s they relate to watching the sport, The Physiology of excitement- Sports- Spectating. The Synapse – Brainspotting, Exercise for Migraines, and Learning Motor Skills
Quantum Consciousness & Cognition in Sport
Biological foundation of Cognition
Exercise and Children Intelligence and Cognition

Brain Health:social and physical activities, nutrition, and other Lifestyle modifications will boos the cognitive function, how the lifestyle decisions may affect the longterm brain health.
Neurophysiologic basis of the EEG and epilepsy,

Unit 2: cognitive Functions Vs sport medicine, What happens in the brain when we watch and play sports? What is the impact of concussions, and how do our brains recover? From the psychology of sports fans to the cognitive benefits of team sports to understanding the impact of repetitive brain injury, illustrate the significance of the cognitive system in sport expertise. Consideration of visual-perceptual abilities, along with cognitive factors and their relationship with sport expertise, suggest that level of sport performance can be reliably differentiated on several cognitive dimensions. Information is given concerning the cognitive requirements of sports skills, cognitive factors are essential for sport expertise.

Unit 3: Injury and your Brain at Risk: the nature and prevalence of traumatic brain injury in professional and college athletes . What symptoms that the professionals of the sports medicine look for in diagnosing concussion and onsite assessment.

Unit 4: Role of the hypothalamus in homeostatic functions of neuroendocrine regulation, water/osmolar balance, temperature regulation, food intake/energy. Major nuclei of the thalamus and their roles in sensory, motor and cognitive functions.Structures and mechanisms involved in arousal and sleep, memory, language.Cortical functions related to motor and sensory functions, to the special senses, and to higher cognitive functions and behaviors.

Unit 5: Applied Research: on bio Mechanics and cognitive functions of the brain.Cognitive Training for Athlete.Fundamentals of the localization and diagnosis of neurological lesions. Neuroimaging in the detection and diagnosis of major neurological disorders, Clinical abnormalities in the structure and function of cerebral cortical systems, Role of the hypothalamus in homeostatic functions of neuroendocrine regulation, water/osmolar balance, temperature regulation, food intake/energy

LABS:
Laboratory-1.concentration by meditation Techniques.
Laboratory-2.Functional analysis of Cognition in archery Players
Laboratory-3. Concussion and its Patho Physiological process effects in Brain- A case study

REFERENCE BOOK

1. Daube, J. "Medical Neurosciences: An Approach to Anatomy, Pathology, and Physiology by Systems and Levels".
2. Heimer, L. "The Human Brain and Spinal Cord".
3. Purves, D.et. al. "Neuroscience" 2nd edition.
4. Steward, O. Functional Neuroscience. Springer-Verlag. 2000.
5. Gilman, S."Manter and Gatz's Essentials of Clinical Neuroanatomy and Neurophysiology"
6. Siegal A.and Siegal, H. "Neuroscience: PreTest Self-assessment and Review,

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
MS SPORTS TECHNOLOGY & HEALTH SCIENCES
SEMESTER 3
4.SPORTS JOURNALISM & MASS MEDIA

Unit 1: Introduction
Meaning and Definition of Journalism, Ethics of Journalism – Canons of journalism- Sports Ethics and Sportsmanship – Reporting Sports Events. National and International Sports News Agencies.

Unit 2: Sports Bulletin
Concept of Sports Bulletin: Journalism and sports education – Structure of sports bulletin – Compiling a bulletin – Types of bulletin – Role of Journalism in the Field of Physical Education: Sports as an integral part of Physical Education – Sports organization and sports journalism – General news reporting and sports reporting.

Unit 3: Mass Media
Mass Media in Journalism: Radio and T.V. Commentary – Running commentary on the radio – Sports expert's comments. Role of Advertisement in Journalism. Sports Photography: Equipment- Editing – Publishing.

Unit 4: Report Writing On Sports
Brief review of Olympic Games, Asian Games, Common Wealth Games World Cup, National Games and Indian Traditional Games. Preparing report of an Annual Sports Meet for Publication in News paper. Organization of Press Meet.

Unit 5: Journalism
Sports organization and Sports Journalism – General news reporting and sports reporting. Methods of editing a Sports report. Evaluation of Reported News., Interview with and elite Player and Coach., media role in improving sport in India,

LABS:
Laboratory-1 Paper Writing on sports rules and games
Laboratory-2 Article Writing on covering sports
Laboratory-3 Covering sports and games

REFERENCE BOOKS :
1. An introduction to sports Journalism Phil Andrews
2. sports journalism an inside track James Toney
3. sports Journalisn Rob Steen
4. Race, Racism and sport Journalism Ameer Sahid, Daniel Kilvingston

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
MS SPORTS TECHNOLOGY & HEALTH SCIENCES
SEMESTER 3
5. SPORTS PSYCHOLOGY

Unit1: History and current status of Sports Psychology. Personality Assessment and Sports personality, Theories of personality, Personality assessment,

Attention and Perception in sports.
- a. Attention
- b. Perception

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

Aggression in sports.
- a. Theories of aggression
- b. Management of aggression

Eating disorders.
- a. Etiology of eating disorders
- b. Types of eating disorders
- c. Complications of eating disorders

Unit 2: Behavior and leadership, Nature of group behavior and group, Types of group. Educational implication of group behavior., Meaning of leadership, types of leadership quality of leadership, training and functioning of leadership.

Units3: 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

Unit 4: Stress , Principles of Stress Management, Stress Management techniques, Role of Psychology in Dealing with Injuries., Concept of psychological preparation, Mental imagery, Stress management, Psychological aspect of doping, Psychological preparation of elite athletes

Unit 5: Goal Setting,, Concentration training in sports., Basic principles of concentration, Concentration training, Concentration awareness exercises, Motivational orientation in sports. Athlete's, needs of motivation, Motivational inhibitors, Motivational technique

LABS:

Laboratory-1Objective and subjective assessment of stress, Anxiety
Laboratory-2 Practicing Visualization, Imaginary, Meditation By
Laboratory-3 Stress Assessment

Reference Books

1. Introduction to Psychology Morgan and King
2. Psychology in Sports: Methods and applications Suinn
3. Psychology in contemporary sports Grafiti
4. Handbook of Sports Psychology – A comprehensive manual of Mental Training Sanjiv P. Sahni

Fourth Semester
PROJECTS &RESEARCH METHODOLOGY

1.Research Fundamentals

- Define measurement
- Measurement framework
- Scales of measurement
- Pilot study
- Types of variables
- Reliability & Validity
- Drawing tables, graphs, master chart etc.

2. Writing a research proposal, critiquing a research article

- Defining a problem
- Review of literature
- Formulating a question, operational definition
- Inclusion and Exclusion criteria
- Forming groups
- Data collection & analysis
- Results, Interpretation, Conclusion, Discussion
- Informed consent Limitations

3. Research Design

- Principle of designing
- Design, instrumentation & analysis for qualitative research
- Design, instrumentation & analysis for quantitative research
- Design, instrumentation & analysis for quasi-experimental research Design models utilized

4. Research Ethics

- Importance of Ethics in Research
- Main ethical issues in human subjects' research
- Main ethical principles that govern research with human subjects
- Components of an ethically valid informed consent for research

REFERENCE BOOKS

1.Hand book of Research Methods Sproull
2.Introduction to Research in Health sciences Polgar S
3.Physical Therapy Research Domholdt