**Haramaya University**

**VICE-PRESIDENT FOR ACADEMIC AFFAIRS**

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**Syllabi for Masters programs**

**Compiled By THE OFFICE OF ACADEMIC ProgramS Directorate**

**May 2020**

**Haramaya University**

***Curriculum of Mater of Science in Sport***

***(Sport Exercise Physiology)***

***(Sport Medicine)***

***(Orthopedic Surgeon) and***

***(Sport Biometry)***

***Course Profile***

The program is divided into two separate of study and would have four semester

### a) Courses Breakdown by Year and Semesters

**Year One (Semester I)**

|  |  |  |  |
| --- | --- | --- | --- |
| No | Course Title | Course Code | Cr. Hrs. |
| 1 | Research Methodology | SPSC 501 | 3 |
| 2 | Essentials of Exercise Physiology | SPSC 511 | 3 |
| 3 | Sport and Exercise Psychology in Practice | SPSC 521 | 3 |
| 4 | Sport Bio - Chemistry | SPSC 531 | 3 |
| 5 | Sport Bio – Mechanics | SPSC 541 | 3 |

### Total = 15

**Year One (Semester II)**

|  |  |  |  |
| --- | --- | --- | --- |
| No | Course Title | Course Code | Cr.Hrs. |
| 1 | Specialization in Exercise Physiology | SPSC 512 | 3 |
| 2 | Physiology of Sport Performance | SPSC 522 | 3 |
| 3 | Clinical Physiology | SPSC 532 | 3 |
|  |  | **Total** | **9** |

**Year Two (Semesters III and VI)**

|  |  |  |  |
| --- | --- | --- | --- |
| No | Course Title | Course Code | Cr. Hrs. |
| 1 | Thesis | SPSC 602 | 6 |

**b. Course Description**

***Minor Course***

### SPSC. 510. Research Methods in Exercise Physiology-------------------------- 3 Cr.Hs

* Design of Research Projects Associated with Sport and Exercise Physiology
* Measurements and Evaluation in Sport and Exercise of various

Anthropometrical analysis and skill Tests related with Games

* Introduction to Statistical analysis of Data and Medical Statistics

**SPSC*. 511***. ***Essentials of Exercise Physiology*** -------------------------------------- 3 Cr.Hrs.  Comprehensive Knowledge and critical understanding of the ***Structure*** and ***Function*** of the main Human Systems during Exercises

* Physiology of Endocrine Glands
* Respiratory Physiology
* Cardiovascular Physiology
* Liver Function (Metabolism, Execratory, Detoxifications) during Exercise  Problems Related to Exercises (Gastrointestinal Problems, Neural, Hormonal, and Enzymatic Control of Digestion, Absorption, and Execration)
* Principles and Function of the Kidney. Importance and Metabolism of Kidney and Nitrogen Balance

**SPSC. 512**. ***Sport and Exercise Psychology in Practice*** --------------------------- 3 Cr.Hrs.

* Psychological Preparations of Athletes for Competitions
* Personality issue in Sports
* Understanding the Dynamics of Motivation and Emotion in Sports and Exercise
* Leadership and Group cohesion in Sport and Exercises
* Evaluation of Specific Psychological Tests in Sport and Exercises

**SPSC. 513**. ***Sport Bio – Chemistry during Exercises*** ------------------------------- 3 Cr.Hrs.

* Homeostasis (Metabolic Responses to exercise)
* Electrolytes Balance, Acid – Base Balance
* Blood and Blood Products during Exercise
* Hematological, Hormonal, and Urine Studies in Athletes during exercises
* Bio – Chemical analysis of Muscles and Muscular - Contraction
* Introduction of an Overviews of nutrients for Anaerobic and Aerobic Exercises and Micro, Macro, and Antioxidant (Photochemical, Intestinal

Bacteria Flora of nutrition’s in sports and exercises

* Metabolic Process, (General Nutritional Requirements for Athletes (Pre – Events and after – Events)
* Blood Transfusion
* Methods of Preparing Menus of Athletes for performances Training and Competitions

**SPSC. 514**. ***Sport Bio – Mechanics and Exercises*** ----------------------------------- 3 Cr.Hrs

* Introduction and Analysis of different Movements
* Bio – Mechanics of Humane Performance
* Bio – Mechanics of Neuromuscular Development
* Application of Newton Law of Motion (Linear, Angular, Rotary, and others)
* Current Issues in Bio – Mechanics related to Exercise Physiology
* Bio – Mechanical Analysis and Evaluations of Movement (Tension Dynamometer, Cinematography, Speed Photo – Meter and others) ***Major Courses***

**SPSC. 521**.  ***Applied Exercise Physiology***--------------------- 3 Cr.Hrs.

* Historical Perspectives and Roots
* The Exercise Response, Exercise Modalsits, Exercise Intensity, Characteristics of the Exerciser, Exercise Task (or Test) Used, Exercise Responses Comparison
* Introduction to Anatomical Terms in relations to Exercise Performances
* Introduction to Structure, Function, and Duties of Skeletal Muscles, Tissues, Joints, Cardiac Muscle, and Smooth Muscles with a particular emphasis to plasticity and Adaptive Response to Exercises
* Physiological Evaluations and demands of Various Games and Sports to

Fitness

* Talents Spotting on the basis of Physical Growth
* Anthropometrical Investigation, Evaluation of Muscles, Bones, and Fat Masses to exercises and Physical Fitness

**SPSC. 522**. ***Physiology of Sport Performance*** ------------------------------------- 3 Cr.Hrs.

* The Effects of Activity and Environment on Bio Energy, Fatigue, and Recovery
* Chronic Physiological Adaptations to Training
* Pathos Physiology of Different Diseases and Sport
* Hormonal Responses to Exercise
* Detailed Evaluation of Contemporary Exercise Testing and Prescription Methods
* Types of Conditioning and Exercise in Relation to the Physiology Backgrounds
* Training Muscle and Force Production
* Training Circulation and Oxygen Consumption
* Training Methodology (Strength, Endurance, Flexibility, Speed, and

Power)

**SPSC. 523**. ***Clinical Exercise Physiology***---------------------------------------- 3 Cr.Hrs.

* Cardiovascular Physiology and Pharmacology in Exercise
* Testing, Prescription, and Application of Training
* Pathos Physiology Perspective in different Clinical Population
* Fundamentals of Immunology and Exercise
* Evaluation of the Contribution of Exercise Testing to diagnosis and

Prognosis for different Chronic and Acute Conditions

* Ergogenic Practice and Nutritional Manipulation in Sport and Exercise

### Practical Skills including

#### a) 12 – Lead ECG Reading and Interpretation

1. Echocardiography
2. Phlebotomy, Basic life support and Exercise Prescription

**SPSC. 610*. Thesis in Exercise Physiology*** --------------------------------------- 6 Cr.Hrs.

* The Master Thesis is expected to contain data of a quality that makes international publication possible, and
* The Master Thesis aims to develop an understanding of how to apply research into a range of professional contexts associated with Sport and

Exercise Science solving “Real Problems of the country” problems in a reliable and valid manner.

# *MSc Program in Sport Medicine Doctors*

### Courses Breakdown by Year and Semesters Year One (Semester I)

|  |  |  |  |
| --- | --- | --- | --- |
| No | Course Title | Course Code | Cr. Hrs. |
| 1 | Research Methodology in Sport Medicine | SPSC 501 | 3 |
| 2 | Introduction to sport Medicine | SPSC 511 | 3 |
| 3 | General Theory and Methods of Training | SPSC 521 | 3 |
| 4 | Exercise Physiology | SPSC 551 | 3 |
|  |  | Total | 12 |

**Year One (Semester II)**

|  |  |  |  |
| --- | --- | --- | --- |
| No | Course Title | Course Code | Cr.Hrs. |
| 1 | Clinical Medicine in sports | SPSC 512 | 3 |
| 2 | Introduction to Orthopedic Surgeon | SPSC 522 | 3 |
| 3 | Therapy Science | SPSC 532 | 3 |
| 4 | Sport Nutrition | SPSC 542 | 3 |

**Total 12**

**Year Two (Semesters III and VI)**

|  |  |  |  |
| --- | --- | --- | --- |
| No | Course Title | Course Code | Cr. Hrs. |
| 1 | Thesis and Internship | SPSC 602 | 6 |

## Course Description

***Minor Courses***

### SPSC 501. Research Methods in Sport Medicine and Orthopedic Surgeon-----3 Cr.Hrs

* Design an in – depth knowledge of planning and designing Research studies Associated to Medicine and Orthopedic Surgeon
* Quantitative Research Techniques, Methods of Data Analysis, Ethical

Considerations in Research to Sports Medicine

* Skills in Presenting Research Findings and Internship

***SPSC. 511. Overview of Sport Medicine***---------------------------------- 3 Cr.Hrs.

* Introduction to Pharmacy and Sport Medicine Terminology
* General Medical Care of Athletes
* Medical Evaluation of Athletes
* Types of Common Injuries in Sports and their Prevention
* Drug Trials on Treatment of Injuries

### SPSC. 521. General Theory and Methods of Training ------------------------ 3 Cr.Hrs

* Performance Diagnostics
* Nurturing Sport Talent
* Fitness Norms
* Methods of Training
* Motor Development
* Training Process

***SPSC. 551. Exercise Physiology*** ----------------------------------------------- 3. Cr. Hrs.

* Introduction to the Structure and Function of Muscles to Exercise with a particular emphasis to Plasticity and Adaptive Response to Load and Intensity
* Measurement analysis of Physiological Function of Sportsmen
* Physiological Demands in Various Games and Sports
* Talent Spotting on the Basis of Physical Growth
* Chronic Physiological Adaptation and Sport Performances

***Major Courses***

***SPSC.521. Clinical Medicine in Spo*rts** ---------------------------------------------3 Cr.Hrs

* General Consideration and Clinical Examination of Respiratory

System, Cardiovascular System, Investigation in Cardiology,

Musculoskeletal and Locomotor System (Rheumatology), Hematology System, Endocrinology, Neurology, Clinical Examination and diseases of Dermatology, Psychiatry, Ophthalmology, and others

* Typical Sport Injuries Diagnose, Treatment, and Prevention of Injuries that occur during Sports and other Physical Activities
* Preventing and Care for Sport Related Injuries
  1. Proper evaluation, treatment, and rehabilitation techniques for common sports injuries
  2. Methods and tools, such as taping, applying heat, or cold packs and the use of pads
  3. Health professions including protecting against diseases, blood born pathogens, and like others
* Talent Spotting on the Basis of Physical Growth
* Ergogenic Aids in Sports and their applicability
* Ethical and Health Related Issues
  1. Mechanisms and Efficiency of a range of Nutritional and Pharmacological Supplements
* Emergency Sport Injuries and their Treatments
* Clinical Placement

SPSC. 522. Introduction to Orthopedic Surgeon Operating Theater Sessions--3 Cr.Hrs

* Acute Injuries (such as ankle sprain, muscle strains, knee and shoulder injuries and fractures)
* Overuse Injuries (such as tendonitis, stress fractures)
* Mild Traumatic Brain Injury and other Head Injuries
* Musculoskeletal Trauma
* Orthopedic Sport Medicine
* Surgical Sport Medicine
* Orthopedic Trauma

### SPSC. 523. Therapy and Rehabilitation Sciences --------------------------------- 3 Cr.Hrs

* Cardiac /Pulmonary Rehabilitations Therapy
* Occupational/ Manual Therapy
* Physical / Dance Therapy
* Massage Therapy and Physiotherapy
* Nutritional / Sport Dietetics Therapy
* Exercise Therapy and Rehabilitations psychology.
* Mechanisms of Diseases and Principles of Chemotherapy and Radiology

***SPSC. 524. Sport Nutrition*** -------------------------------------------- 3 Cr. Hrs.

* General Principle of Nutrition
* Fuels Sources for Muscle and Exercise Metabolism
* Energy and Measuring of energy Content of food
* Nutritional Needs and Balanced foods in Sports
* Water Requirement, Macronutrients, Antioxidants, Fluid Balance in Athletes of Different Types
* Nutrition and Immune Function in Athletes

**Master of Science in Sport (Sport Orthopedic Surgeon)**

**Orthopedic subspecialty training**

Bio- Mechanics

Immune Response to Implants

Metallic Alloys

Movements for Chronic Group Diseases

Understand Human Movement for Health and Disease

**Surgical Parts**

Hand Surgery

Shoulder and Elbow Surgery

Total Joint Reconstruction (arthoplasty)

Pediatric Orthopedics

Foot and Ankle Surgery

Spine Surgery

Musculoskeletal Oncology

Surgical Sport Medicine

Orthopedic Trauma

Orthopedic Sports Medicine

Repair of Trochanteric Fracture

Repair of Ankle Fracture (Fibula), Repair Fracture of the Distal of Radius

Repair of Rotator Cuff Tendon

Removal of support implant and others

## Sport Biometry

**Course Title**: Research Methods and Data Analysis for sport and Exercise Science (**Sport Biometry**)

**Course Code**: SPSC: 501

**Credit Hours**: 3

### Professional Profile

On the completion of the course the graduates will be able:

* To design and manage plan of research process and the way in which research can be applied in a sport and exercise context
* To build skills or knowledge of exploring data collection and analysis techniques , and
* To promote a broad band approach and scientific principles to the existing physical culture and sport policy

Graduate Profile

After successful completion of the program the graduates should understand:

* Key issues in research methods for the sport and exercise sciences
* Data collection techniques for the sport and exercise sciences
* Qualitative data analysis for the sport and exercise sciences, and
* Quantitative data analysis for the sport and exercise sciences

### Course Descriptions

1. Key issues in research methods for the sport and exercise sciences

1. Quantitative research
2. Qualitative research
3. Validity, Reliability, Accuracy, and Precision

Data Collection Techniques for the Sport and Exercise Sciences

* 1. Types of data
  2. Qualitative techniques
  3. Quantitative techniques
  4. Classifications of data
  5. Research design
  6. Ethical and legal issues in research
     + Code of conduct
     + Ethical clearance
     + Legal issues and others

1. Qualitative Data Analysis Techniques for the Sport and Exercise Sciences
   1. Stages of data analysis
      * Coding, (open coding, axial coding, selective coding)
   2. Displaying data (network, diagrams, cycle diagram and others)
   3. Conclusion and verifying data
2. Quantitative Data Analysis Techniques for Sport and Exercise Sciences
   1. Data analysis (parametric tests, ANOVA, t- test, regression, correlation, co- variance analysis and non – parametric (Chi – square, degrees of freedom, ICT. And others
   2. Organizing data
   3. Displaying data
   4. Measurement of central tendency, and
   5. Variability

**Reference Materials:**

* Andersen, N.H. and Ramwell, P.W. (1974) Biological Aspects of Post Glands. Arch. Inter. Med. 133, 30.
* Barrow, H.M and McGee, R.:”A Practical Approach to Measurement in

Physical Education” Third Edn., 1979, Lea and Febiger, Philadelphia.

* Bass, A.L: Treatment of Muscles, Tendon and Minor Joint Injuries in Sport, Proc. Roy. Soc. 62, 925, 1969.
* Human Kinetics; Sport Physiology, 1 Edition. Aug, 20, 2004.
* Rout ledge; Oxygen up take Kinetics in Sports, Exercise, and Medicine, 1 Edition, Jan, 21, 2005.
* Human Kinetics; Applied Anatomy and Biomechanics in Sport, 1 Edition, Mar. 10, 2000.
* Human kinetics Canada Ltd.; Assessing Sport Skills, Mar. 6, 2001.
* Rout Ledge; Biomechanical Evaluation of Movement in Sport and Exercise; The British Association of Sport and Exercise Sciences Guide, 1 edition, Dec. 2007.
* Human Kinetics Canada Ltd., Coaches Guide to Drugs and Sport, 1 Edition, oct, 11, 2001.
* Saga more publishers, A Guide to Sport Nutrition, 1 Edition, Aug. 2003. Rout Ledge, Research, Ethics in Exercise, Health Science and Sport, 1 Edition, Dec. 2006.
* Rout ledge, Skill Acquisitions in Sport: Research, Theory and Practice, 1st edition, May, 14, 2004.
* Rout Ledge, the British Association of Sport and Exercise Guide. Port and Exercise Physiology Testing Gardenias, 1 edition, dec. 19, 2006
* Clarke H.david, H. Harrison Clarke, Research Processes in Physical Education and Health

#### - 26 -

* Peter McGinnis, Biomechanics of Sport and ExerciseSBN-13:9780736051019, Pub. Date**:** November 2004
* Knutzen Joseph Hamill, KathleenM***.*** Biomechanical Basis of Human Movement. February 2008,
* Verma J.P, A Text Book On Sports Statistics Published By Venus

Publication in Feb. 2000

* Nelson Silverman, Stephen, Thomas, Jack, Research Methods in Physical Activity*.* ISBN-13**:** 9780736056205, Pub. Date**:** July 2005

* Singh, Hardyal (2009). Science of Sports Training, Fundamental of Sports Training

**MASTER OF SCIENCE PROGRAM IN SPORT NUTRITION**

**Course Breakdown**

**Year- I Semester - I**

|  |  |  |  |
| --- | --- | --- | --- |
| **No** | **Course Code** | **Course Title** | **Credit hours** |
| **1** | **SpSc 511** | Human Nutrition | 3 |
| **2** | **SpSc541** | Research Method | 3 |
| **3** | **SpSc 531** | Physical Anthropometric | 2 |
| **4** | **SpSc 591** | Organic Chemistry | 3 |
| **5** | **SpSc541** | Culture and Nutrition | 2 |
|  |  | **Total** | **13** |

**Year - I Semester II**

|  |  |  |  |
| --- | --- | --- | --- |
| **No** | **Course Code** | **Course Title** | **Credit hours** |
|  | **SpSc522** | Sport Nutrition | 3 |
|  | **SpSc502** | Nutritional Biochemistry | 3 |
|  | **SpSc 552** | Ergogenic Aids | 2 |
|  | **SpSc 562** | Nutrition and Rehabilitation | 3 |
|  | **SpSc612** | Applied Exercise Physiology | 3 |
|  |  | **Total** | **14** |

**Master- Thesis - Year I Semester II**

|  |  |  |  |
| --- | --- | --- | --- |
| **No** | **Course Code** | **Course Title** | **Credit hours** |
|  | **SpSc582** | Thesis | **6** |

**Course Description**

**Year- I Semester – I**

**Course Title: Human Nutrition**

**Course Code: SpSc 511**

**Credit Hours: 3**

**Course Objectives:**

At the end of this course students will be able to:

* Understand dietary resources, physiological role and requirement of major nutrients
* Know the role of nutrition in growth and health through the life cycle.
* Recognize the role of diet in the development of chronic diseases, such as cardiovascular disease, cancer, diabetes, etc.
* demonstrate an in-depth scientific knowledge of the underlying physiological and biochemical processes relevant to human nutrition
* apply this knowledge to assist in assessing the nutritional value of natural and manufactured foods
* apply this knowledge to develop plans to provide safe and nutritious food supply and develop a basic risk management plan for a safe and nutritious food supply
* Appreciate the social, cultural psychological, environmental, economic and political factors of food and food use.
* Estimate opportunities to improve nutrition and food supply in a community .
* Demonstrate an ability to identify and develop nutritional education resource material.
* To enable graduates to apply nutrition principles to health promotion and the prevention of diet-related disease conditions.

**Course Description**

The course will enable the students to demonstrate clear understanding nutrient requirements at different life

This course is designed to provide students with a basic understanding of exercise physiology and the systems involved in human performance. Specific topics addressed are Nutrition for Health and Changing Lifestyles, enhancement of energy capacity, exercise performance and environmental stress, body composition, energy balance, weight control, Nutrient sufficiency and human needs, Nutrition and lifestyle, Food, Nutrition and Health Policies and disease prevention; Food Product Development that can promote health and increase the competitiveness of food production, processing and marketing industries, Exercise Testing and Nutrition Assessment. Graduates will learn to work scientifically with nutrition and health problems in society.

**Course content**

**Chapter One:** Nutrition for Health and Changing Lifestyles

* Macronutrients - food sources, fate and use in the body; dietary fibre and health
* Micronutrients-human needs and dietary sources**.** Energy concepts (energy balance; weight control; obesity and methods of weight loss diets)

**Chapter Two**: **Nutrient sufficiency and human needs**

* + Basic Principles of Human Nutrition
  + planning a healthy diet; nutritional status;
  + dietary management,Obesity and Eating Disorders

**Chapter Three**: **Nutrition and lifestyle**

* nutritional issues in lifestyle diseases; diabetes, heart disease and cancer; healthy fats; food safety

**Chapter Four:** **Nutrition in Human Health**

* Energy requirements
* Carbohydrates, Fat and protein, Vitamins and minerals in human nutrition in human nutrition, Fluids and electrolytes during exercise

**Chapter Five**: Nutrition in Exercise and Sport

**Chapter Six** Food, Nutrition and Health Policies

**Chapter Seven:** Food Product Development

* + Food Product Development that can promote health and increase the competitiveness of food production, processing and marketing industries.
  + Food: Facts and Fallacies, Food Quality Evaluation
  + Culture and Food Patterns**,** Ingredient Technology for Designed Foods

**Chapter Eight:** Exercise Testing and Nutrition Assessment

**Mode of Delivery**

* Lecture, Individual and group work and assignment, Discussion
* Inquiry, Practical work, Project work, Lesson presentation,
* Guest Lecturing, Field observation
* Seminar

**Mode of Assessment**

* Classroom exercise, Individual written assignment, Group assignment, written final exam

**References**

* Geofrey P Webb, Nutrition: A Health Promotion Approach , 2002,Arnold Publishers, UK
* Melvin H Williams, Nutrition for Health Fitness and Sports, 2000. McGraw-Hill Publishers, NY
* Ridgway, Food for Sport 1994.. Boxtree.

**Course Title: Research methodology**

**Course number: SpSc541**

**Credit hour: 3**

**Course Objective**

At the end of the course students will be able to:

* Identify area of problems using the literature in the way they prefer.
* Make the need assessments and propose a solution for the problems
* Understand the statistical concepts in research and measurement
* Write a thesis or research paper

**Course Description**

In this course, students will: develop a research question; conduct a literature search; learn about types of research designs and their appropriate use; write a research proposal; Know the Research methodology in sport nutrition - meaning of research, objective of research, motivation in research, type of research, research approaches, process, criteria of good research, problem encountered in doing research, using the literature in developing the problem and formulating the method, thesis: statistical concepts in research, , measurement and writing the research report. In this course, students will: learn how to develop research budgets and seek funding; review and apply basic statistical methods to analyze data; practice data analysis and graphic presentation; write abstracts; develop a poster presentation and a formal oral presentation.

**Course content**

**Chapter One:** Understanding the methods of nutrition research

* developing scientific research in sport nutrition

**Chapter Two:** Types of Research

**Chapter Three:** Criteria of Good Research

* developing the steps and methods of conducting scientific research

**Chapter Four:** Research Design

* advantages/disadvantages of various study designs

**Chapter Five:** Research objectives and hypothesis

* The gathering of information and the statistical methods of testing scientific hypotheses.

**Chapter Six:** Presenting the problem and formulating the method

**Chapter Seven:** Materials and Methods

* Source of Data
* Sampling Techniques

**Chapter Eight:** Statistical concepts in resear**ch**

* Approaches to data collection
* tools used in dietary assessment; measurement and interpretation and presenting research data

**Chapter Nine:** Measurement and writing the research report

**Mode of assessment**

* Assignments, Mid semester examination, Final semester exam, Seminars, Writing Masters Thesis

**Reference**

* Jhon W. Best, J. V. K, Research in Education,2003,Pearson Educ ,inc, New Delhi
* Craig A. Mertler, C. M. Charles Introduction to educational research 2002, Craig A. Fifth edition USA
* Jerry R. Thomas, Jack K. Nelson Research methods in physical activity. 1990.
* Draper, N.N. and Smith, H. 1981. Applied Regression Analysis. 2nd ed. Wiley, N.York.
* Clark H devid, H Harrison Clerke, research process in Physica education and Health

**Course Title: Physical Anthropometric**

**Course Code: SpSc 531**

**Credit Hours: 2**

**Course Objective**

At the end of the course students will be able to:

* Equipped with the facts about Physical Antropometry/antropometry
* Understand the role of anthropometric selection in young athletes
* Know the importance of body composition measurement at athletes and non-athletes
* Understand the connection between Exercise, aerobic capacity and body composition
* Be familiar with Body composition, Somatotype and growth type during childhood

**Course Description**

In this course the Anthropometric measurements, Body composition, Somatotype and growth type during childhood, Muscles and muscle management, Exercise, aerobic capacity and body composition.The importance of body composition measurement at athletes and non-athletes, the importance of body composition measurement at athletes and non-athletes will be dealt.

**Course Content:**

**Chapter One:** Anthropometry - an introduction- the science of human beings

**Chapter Two:** Anthropometric measurements

**Chapter Three** Division of anthropometry

**Chapter Four:** Human dimensions- human variations

**Chapter Five**: Factors affecting anthropometry/physical performance-muscular strength

* Biological, environmental, psychological, occupational

**Chapter Six:** Body composition, Somatotype and growth type during childhood

**Chapter Seven:**  Muscles and muscle management

**Chapter Eight:**  Exercise, aerobic capacity and body composition.

**Chapter Nine:**  The role of anthropometric selection in young athletes and talent identification

**Mode of Delivery**

* Lecture, Individual and group work and assignment, Discussion
* Inquiry, Practical work, Project work, Lesson presentation,
* Guest Lecturing, Field observation
* Seminar, Lab activities

**Mode of Assessment**

* Classroom exercise, Individual written assignment, Group assignment, written final exam

**References**

* Geofrey P Webb, Nutrition: A Health Promotion Approach, 2002..Arnold Publishers, UK
* Anthropometry of US Military Personnel (1991)
* ISO 7250: Basic human body measurements for technological design, International Organization for Standardization, 1998.
* ISO 8559: Garment construction and anthropometric surveys — Body dimensions, International Organization for Standardization, 1989.

**Course Title: Organic Chemistry**

**Course Code: SpSc 592**

**Credit Hours: 3**

**Course Objectives**

At the end of the course the student will be able to:

Individual who successfully complete this course will be able to:

* The development of organic chemistry
* Classify various preparative methods of biological molecules such as carbohydrates, lipids amino acids and proteins, and their important chemical properties

**Course Description**

Development of Organic Chemistry; Chemistry of biomoleculule (carbohydrate, lipids, amino acids and protein

**Course Content**

**Chapter One:** Chemistry of Bimolecular

* 1. Carbohydrate
     1. Glucose
     2. The structure and configuration of Glucose
     3. Anomeric forms of monosaccharide
     4. Glycosides
     5. Disaccharides
     6. Polysaccharides

**Chapter Two:** Lipids

* 1. Fatty acid
  2. Fatty acid
  3. Fat and Oil
  4. Phospholipids
  5. Prostaglandins
  6. Terpenes

**Chapter Three:** Protein and amino acids

* 1. amino acids
  2. Reaction of Amino acids
  3. Synthesis of Amino Acids
  4. Peptides of amino acids
  5. The primary structure of peptides
  6. Secondary and Tertiary structure of large peptides and proteins
  7. Peptide synthesis

**Chapter Four**: Enzymes

4.1 Properties of enzymes

4.2 major classes of enzymes

**Chapter Five:** Integration of Metabolism

* 1. Starvation and Fasting; similarities and differences

5.2 Nutrition, Vitamins

**Mode of Delivery**

* Lecture, Individual and group work and assignment, Discussion
* Inquiry, Practical work, Project work, Lesson presentation,
* Guest Lecturing, Field observation, Seminar

**Mode of Assessment**

* Classroom exercise, Individual written assignment, Group assignment, written final exam

**References**

* T.W.G.Solomons, Organic Chemistry, 7th Ed., 2004
* J. McMurry, Organic Chemistry,4th Ed., 1996
* F.A.Carry, Organic Chemistry,3rd Ed., 1996

**Course Title: Culture and Nutrition**

**Course Code: SpSc541**

**Credit Hours: 2**

**Course Objectives:**

At the end of this course student will be able to:

* Grasp the meaning and significance of food within cultures food and culture
* Understand means of approaching different culture
* Know how to minimize culture distresses – Language, typical Meal Patterns, Timing of Meals, Meal Style, Dress, Utensils and Grooming
* Understand the role of culture , language and nutrition
* Understand how food impacts health and nutritional status of various populations

**Course Description**

Food and Culture - The meaning and significance of food within cultures, exploring how climate, ethnicity, gender, socioeconomic status and religion influence food choices and preferences, how food impacts health and nutritional status of various populations, the experience of tasting foods and practicing food preparation techniques from a variety of traditions; Approaching Different Cultures- Customs/traditions and cultural norms-cultural differences - disorder with an athlete’s usual habits; Minimizing culture distress- Typical Meal Patterns, Timing of Meals, Meal Style and Language; Dress, Utensils and Grooming and nutrition

**Course content**

**Chapter One:** Food and Culture - The meaning and significance of food within cultures

**Chapter Two**: The impact of culture and ethnicity on food choices

**Chapter Three:** Factors that affect food choices and selection

* Patterns of eating, timing of meals, meal Style ,Occupation, Mood, Geographical factor, Age and Sex, Health, Education, Ethnicity, Balanced diet, Allergy to various foods, religion
* The experience of tasting foods and practicing food preparation techniques from a variety of traditions

**Chapter Four**:Approaching Different Cultures

* + - Customs/traditions and cultural norms
    - cultural differences - disorder with an athlete’s usual habits

**Chapter Five:** Nutrition, Malnutrition, Vegetarianism (Vegetarian diet), Food Labels and Health care

**Chapter Six:** Illnesses caused by improper nutrient consumption

**Chapter Seven:** Body composition: measurement methodologies and problems

**Mode of Delivery**

* Lecture, Individual and group work assignment, Discussion
* Practical work, Project work, Lesson presentation, ,Guest Lecturing, Field observation , Seminar, Lab activities

**Mode of Assessment**

* Classroom exercise, Individual and Group written assignment, written final exam

**References**

* Geofrey P Webb, Nutrition: A Health Promotion Approach, 2002,Arnold Pub, UK
* Melvin H Williams, Nutrition for Health Fitness and Sports, 2000. McGraw-Hill Publishers, NY
* Ridgway, Food for Sport 1994.. Boxtree.

**Year- I Semester – II**

**Course Title: Sport Nutrition**

**Course Code:** SpSc522

**Credit Hours:** 3

**Course Objectives**

At the end of this course the student wil be able to:

* Identify Nutrient for aerobic and anaerobic exercise,micro, macro and antioxidants of nutrient’s in sport
* apply Methods how to prepare menu for athlete for performance training
* Understand the goals of nutrition and the general nutritional requirements for life as well as athletes
* Identify Sports Drinks, Sports Supplements and Athletic Performance
* Understand the types of Sports Drinks and Fluid absorption and Sports Performance
* Clearly understand the role ofgeneral nutritional requirements for life as well as athletes

**Course Description**

This course deals with Goals of sport nutrition and general nutritional requirements for life as well as athletes,Methods to prepare menu for athlete for performance training. The course will cover the role of energy system, Sports Drinks, Fluid absorption and Sports Performance,

**Course Content**

**Chapter One:** Goals of sport nutrition

* The role of sport nutrition and physical activity in health promotion, disease prevention and sports performance.

**Chapter Two:** Nutrient Balance

2.1Nutrient for aerobic and anaerobic exercise

2.2 General nutritional requirements for life as well as athletes

* Energy Fuel
* Eating for Exercise - Fat or Carbs, Carbohydrates, Protein
* Caloric and fluid needs of the active person and the specialized needs of the athlete, ie vitamins, minerals and ergogenic aids.
* Food composition, dietary intake for both the active and the sedentary.
* Key factors in training diet

2.3 Macro, micro and antioxidants of nutrient’s in sport

**Chapter Three:** General nutritional requirements for Athletes

* Eating for training (before, during and after)
* Eating for Competition -week before a competition, before competition, during a competition and after competition

**Chapter Four:** [Eating Disorders in Athletes](http://sportsmedicine.about.com/cs/eatingdisorders1/a/aa110600a.htm)

**Chapter Five:**  Methods to prepare Menu for Athletes

* + - * Methods to prepare Menu for Athletes before performance training
      * Methods to prepare Menu for Athletes during performance training
      * Methods to prepare Menu for Athletes after performance training

**Chapter Six:** Fluid absorption and Sports Performance

* Hydration, Dehydration, Electrolytes,Glucose

**Chapter Seven**: Sports Drinks –

* Isotonic , Hypotonic and Hypertonic

**Chapter Eight:** Nutrition and weight management

* processed food and Balanced diet
* Assessment of body composition and physical fitness
* Exercise & Nutrition Prescriptions in Health and Disease

**Chapter Nine:** Sports Supplements and Athletic Performance

* Protein, Glucosamine, Ephedrine, Caffeine and Creatine, Alcohol, Amphetamines

**Mode of Delivery**

* Lecture, Individual and group work and assignment, Discussion
* Inquiry, Practical work, Project work, Lesson presentation,
* Guest Lecturing, Field observation, Seminar

**Mode of Assessment**

* Classroom exercise, Individual written assignment, Group assignment, written final exam

**References**

* B.Srilakshmi. Nutrition Science. 3rd ed. New Age International Publishers, 2008,Delhi
* Saga publisher- a guide to sport nutrition, 1st ed Aug 2003.
* Judy A Drikel,Sport Nutritio, London, New York WDC 1997
* Thomas H sawyer, A guide to Sport Nutrition, Thomas H sawyer,2003

**Course Title: Nutritional Biochemistry**

**Course Code: SpSc501**

**Credit Hours: 3**

**Course Objective**

At the end of the course students will be able to:

* + Understand the structures and chemistry of biological molecules – protein, carbohydrate and liquids of macro and micronutrients
* Understand the structure and function of nutrients within food and the body
* Know the different molecule reactions that take place in the body
* Know the Importance of nutrients and Roles of vitamins and minerals in the body
* Understand the effects of hormones on nutrient metabolism, and interactions among nutrients within the body.
* Identify and conduct Biochemical Analysis of Muscles and Muscular-contraction and Biochemical fitness tests in physical activities

**Course Description**

The course Nutritional Biochemistry is designed to make our students familiar with different types of biological molecules so that they will understand the applications of chemistry in life. Moreover, the students will understand the different metabolic reactions and pathways in the body of human beings. Understanding the structure and function of nutrients within food and the body, components of hormones, Biomechanical characteristics of physical qualities fitness tests and analysis, Iron,

**Course Content**

**Chapter One:** Definition and scope of Biochemistry, chemical and biochemical reactions

**Chapter Two:** Protein structure and function

2.2 structure and function of Amino acids- structure, as a buffer, peptide linkage

**Chapter Three:** Digestion, absorption and metabolism

3.1 The processes involved in the digestion, absorption and metabolism of nutrients

* 1. Amino Acids/ nitrogen metabolism- nitrogen fixation and synthesis of amino acid, digestion in dietary- removal of nitrogen from amino acid process

**Chapter Four:** Carbohydrate Metabolism

* 1. Structure of Carbohydrate - Digestion of carbohydrate
  2. Glycogen metabolism/starch- an overview and degradation of glycogen
  3. Metabolism of monosaccharide-overview
  4. Glycolysis –fats of pyruvate, energy yield of glycolysis

**Chapter Five:** Lipid Metabolism

5.1 Metabolism of dietary lipid- digestion, absorption, secretion, use of dietary lipids

5.2 fatty acid and Triacylglycerol metabolism

5.3 mobilization of stored fat and oxidation of fatty acids

**Chapter Six:** Biochemical Analysis

* 1. Biomechanical characteristics of physical qualities
  2. Muscles and Muscular-contraction
  3. Biochemical fitness tests in physical activities

**Chapter Seven:** Hematological, hormone, and Urine studies in Athletes

**Chapter Eight:** Metabolic blocks that occur from nutrition deficiencies, the dietary recommended intakes and nutrient deficiency diseases.

**Mode of Delivery**

* Lecture, Individual and group work and assignment, Discussion
* Inquiry, Practical work, Project work, Lesson presentation,
* Guest Lecturing, Field observation
* Seminar, Lab activities

**Mode of Assessment**

* Classroom exercise, Individual written assignment, Group assignment, written final exam

**References**

* Laila Das, Text book of Sports Medicine, 2006, India
* J.M.BergJ<L>Tymoczko and L.Stryer, Biochemistry,4th Ed.Lippinocott’s Illustrated reviews,2007
* Voet and Voet, Biochemistry, 2nd Ed.,1990

**Course Title: Ergogenic Aids**

**Course Code: SpSc 592**

**Credit Hours: 2**

**Course Objectives**

At the end of this course the student will be able to:

* Understand factors influencing athletes to use drugs
* Identify the types of drugs and their risks
* Make the students updated and familiar with method of preventing drug use in athletes
* Understand drugs misused by athletes and prohibited drugs by IOC

**Course Description**

This course focus on major problems facing sport today, definition- ergogenic aids, Categories or types of ergogenic aids, drugs misused by athletes and prohibited drugs by IOC, what factors influences athlete, therapeutic drugs, Ergogenic aids and sports performance or performance enhancing drugs, food supplements, typical drugs of misuse , drugs programs and challenges.

**Course Content**

**Chapter One:** Ergogenic aids –Definition

* Production, control and efficiency

**Chapter Two:** Categories or types of ergogenic aids

* Biomechanical Aids, Psychological aids, Physiological aids, pharmachological aids and nutritional aids.

**Chapter Three:** Safe Ergogenic aids

* Proper nutrition
* selecting good food choices and diets, calorie requirements, Electrolyte solutions
* Carbohydrate Loading
* Carbohydrate in the days and hours before strenuous training and competition
* consumption of carbohydrates in liquid or food form

**Chapter Four:** Ergogenic effects and Health Implication

* Drugs misused by athletes
* Therapeutic aids
* Performance enhancing drugs
* Drugs typically misused

**Chapter Five:** Currently prohibited drugs

* Drugs, methods, in certain circumstances

**Chapter Six:** What Factors Influence athletes, Food supplements, typical drugs of misuse

**Chapter Seven:** Drug programs and challenges

**Mode of Delivery**

* Lecture, Individual and group work and assignment, Discussion
* Inquiry, Practical work, Project work, Lesson presentation,
* Guest Lecturing, Field observation ,Seminar

**Mode of Assessment**

* Classroom exercise, Individual written assignment, Group assignment, written final exam

**References**

* Melvin H Williams,Nutrition for health, Fitness, and Sport,2007, New York
* Judy A. Driskell, Sport Nutrition,2000,USA
* Thomas D. et., al., Fit and Well- Core concepts and Labs in Physical Fitness and wellness, 2001, USA

**Course Title: Nutrition and Rehabilitation**

**Course Code: SpSc 562**

**Credit Hours: 3**

**Course Objectives:**

At the end of the course students will be able to:

* To equip graduates of the programme with advanced knowledge and skills in all aspects of nutrition and rehabilitation
* help athletes and non-athletes to make wise dietary choices
* conscious of Food sources of vitamin C,A, Zinc and nutrition assessment
* Identify the Injured athlete and take the necessary measures for rehabilitation and nutrition needs

**Course Description**

This course presents comprehensively study of the nutritional concerns of today’s recreational and competitive athlete. Topics include: Nutrition, Rehabilitation and sport, Important Nutrients for the Healing Process, Rehabilitation of the Injured Athlete - Injury, Surgery, infection and Nutrition Needs, Food sources of vitamin C,A, Zinc and Nutrition Assessment. This course is designed to teach about nutrition and rehabilitation, its role on the area of physical activity and how eating properly can help athletes perform to their maximum ability and easily rehabilitate.

**Course Content**

**Chapter One;** Sports rehabilitation

**Chapter Two:** Nutrition, assessment

**Chapter Three:** Nutrition in Athletic Training

* + - Important Nutrients for the Healing Process
    - Healing Response to Injury- Acute Inflammatory Stage, Repair (Regenerative) Stage and Remodeling (Maturation)Stage

**Chapter Four:** Management of injury and illness

**Chapter Five** Rehabilitation of the Injured Athlete - Injury, Surgery, infection and Nutrition Needs

**Chapter Six:** Nutrition and Sport Injury Rehabilitation

Food sources for Rehabilitation

* Food sources of vitamin C,
* Food sources of vitamin A,
* Food sources of vitamin Zinc

**Mode of Delivery**

* Lecture, Individual and group work and assignment, Discussion, Practical work, Project work, Lesson presentation, Guest Lecturing, Field observation Seminar

**Mode of Assessment**

* Classroom exercise, Individual written assignment, Group assignment, written final exam

**References**

* Human Kinetic Canada Ltd., Coaches Gide to drugs and sport, 1st ed, 2007
* Human Kinetic, Sport Physiology,1st ed. Aug 20, 2004
* Bass, A.L, Treatment of muscles, tendon and minor joint injuries in sport poc.Roy,Soc.62,925, 1969

**Course Title: Applied Exercise Physiology**

**Course Code: SpSc612**

**Credit Hours: 3**

**Course Objectives:**

By the end of this course the student is expected to:

* give an outline of physiology of exercise
* analyze the contribution of exe Dietary Intake and Nutritional Physiology, which is about how diet affects our body
* study the contribution of nutrition and exercise to human well being throughout life
* prepare qualified professionals to promote health and quality of life through the use of appropriate physical activity and lifestyle behaviors.

**Course Description**

Introduction-what exercise physiology is; brief historical part; the organization of the human body, the effect of exercise at each level, Cytology-different cells {comparative cell physiology},the effect of exercise on the muscle cell, the process of hydration/dehydration, the role of electrolytes in this process, the musculoskeletal system-function, the energy system and muscle contraction, joint physiology, Neuron-muscular coordination and sports skill, Physiology of circulo-respiratory system under exercise, Special groups & exercise-women children, disadvantaged, Training under different physical environment-acclimatization/acclamation, Methods & principles of sports training, Energy cost of some sports, Talent identification.It is a study of biomechanical aspects of muscle and joint forces during human movements as they relate to the mechanics of athletic injuries and injury prevention.

**Course Content**

**Chapter One**: Dietary Intake and Nutritional Physiology, which is about how diet affects our body

**Chapter Two:** The structureand function of skeletal muscles

* Muscle plasticity and adaptive response to exercise
* Muscle contraction and Neuromuscular Control during exercise

**Chapter Three:** Evaluation of physiological fitness of elite athletes

**Chapter four:** Measurement analysis of physiological function of sport persons

**Chapter Five:** Physiological demands in various games and sports

**Chapter Six:** Measurement of physiological function of altitude

**Mode of Delivery**

* Lecture, Individual and group work and assignment, Discussion
* Practical work, Project work, Lesson presentation,
* Guest Lecturing, Field observation , Seminar

**Mode of assessment**

* Assignments, Mid semester examination, Final semester examination, Seminars, Laboratory work report

**Reference**

* Guyton and Hall (2002) text book of medical physiology 10th ed.
* Lary G. Shaver (1981) Essential of exercise physiology Mdia Burgess pub.company.
* Jack H. W. &David L. Costill (1994) Physiology of sport and exercise Human kinetics
* Scott K. Powers and Edward J. (2007) exercise physiology theory and application to fitness and performance

**Course Title: Master’s Thesis**

**Course Code: SpSc582**

**Credit Hours: 6**

**Course Objectives:**

At the end of this work students will be able to:

* Collect the data, Analyze and Write a thesis
* Defend their thesis orally in front of the public audience

**Course description**

**Research for MSc Thesis**: Students, working with a research advisor, engage in independent research. Students are expected to meet regularly with the research advisor(s) and follow a jointly agreed upon schedule of planned meetings or stages or work. Students will submit a research proposal with defined and specific objectives. Upon approval by the advisor and department, the research work is undertaken. After completion of the work, a written document will be submitted and orally defended.

**Mode of assessment**

* Date of submission
* Presentation based on:
* Quality of paper presentation, Way of presentation
* Defending material presented, Pass score

**References:** Rout Ledge, skill acquisition in sport; research theory and Practice, 1st ed. May, 14, 2004

**Master of Science in Sport Science (Coaching and Therapy)**

a. Course Breakdown by Year and Semesters

Year one (Semester I)

|  |  |  |  |
| --- | --- | --- | --- |
| No | Title of the course | Course code | Credit hours |
| 1 | Research methodology | SpSc 501 | 3 |
| 2 | A functional approach to Human Anatomy | SpSc 521 | 3 |
| 3 | Sports Bio-Chemistry | SpSc 531 | 3 |
| 4 | Exercise Physiology | SpSc 541 | 3 |
| 5 | Sport Nutrition | SpSc 551 | 2 |

**Year one (Semester II)**

|  |  |  |  |
| --- | --- | --- | --- |
| No | Title of the course | Course code | Credit hours |
|  | Sport Psychology | SpSc 506 | 2 |
|  | Sports Bio-Mechanism | SpSc 507 | 3 |
|  | General Theory and methods of Coaching Science | SpSc 518 | 3 |
|  | Therapy Science | SpSc 509 | 3 |
|  | Sport Medicine | SpSc 601 | 3 |
|  |  | **Total** | 14 |

**Year two (Semester II)**

|  |  |  |  |
| --- | --- | --- | --- |
| No | Title of the course | Course code | Credit hours |
|  | Thesis | SpSc602 | 6 |

**b. Course Description**

**SpSc. 501: Research Methodology ------------------------ 3 Cr. Hrs.**

• Introduction to research concepts relevant to sports and physical fitness tests

in relations to sports.

• Test and measurements of various Anthropometries measurements and skills test related with games and sports.

• Statistical analysis of data, collections and Analysis of research thesis on emphasizing choice of title

**SpSc. 501: A functional approach to Human Anatomy ---------------------- 3 cr. Hrs.**

• Introduction to Anatomical terms in relation to Exercise performance.

• Factors .that limit development of endogenous organ of human body (i.e. cardiovascular, lymphatic, respiratory, digestive, urinary, nervous, and endocrine systems) to Acute and Chronic exercise.

• Function and duties of skeletal muscle, tissues, joint and muscular systems to exercises.

• Evaluation of muscles, bones, and fat masses to exercises.

• Anthropometric investigation of high performance athletes.

• Talent spotting on the basis ~f physical growth investigation.

• Physical fitness in relation to various athletics events.

**SpSc.521: Sports Bio - Chemistry ----------------- 3 Cr. Hrs .**

• Biochemical analysis of muscles and muscular - contraction.

• Biochemical fitness tests in physical activities.

• Hematological, Hormone, and Urine Studies in Athletes.

• Iron, Macro and Micro elements in Athletes.

• Biochemical characteristics of physical qualities.

**SpSc.541: Exercise Physiology---------------- 3 Cr. Hrs.**

• Introduction to the structure and function of skeletal muscles with a particular

emphasis on muscular plasticity and adaptive response to exercise.

• Evaluation of physiological fitness of national athletes.

• Measurement analysis of physiological function of sports persons .

• Physiological demands in various games and sports.

• Measurements of physiological function of altitude.

**SpSc~551: Sports Nutrition----------------------------- 2 Cr. Hrs**

• Introduction with an overview of nutrients for aerobic and anaerobic exercise

• Goals of' sports nutrition.

• General nutritional requirements for athletes (pre- event and after- event)

• Methods to prepare menu for athletes for performance training( before, during and after training)

• Micro, macro and antioxidant ( photochemical, intestinal bacteria flora) of nutrition's in sports

**SpSc. 506: Sports Psychology ------------------ 2 Cr. Hrs**

• Psychological preparation of athletes for competition

• Personality issue in sports

• Understanding the dynamic of motivation and emotion in sports and physical activity

• Leadership and group cohesion in sport

• Evaluation of specific psychological tests in sports

**SpSc. 507: Sports Bio- Mechanics --------- ------------------ 3 Cr. Hrs**

• Introduction and Movement analysis

• Application of Newton law of motion ( linear, angular and general motion)

• Analysis of fundamental movements

• Analysis of skill for different games and sports

• Force, friction and pressure

• Stability (static and dynamic), freely falling bodies, projectile and momentum.

**SpSc. 508: General Theory and Methods of Coaching Science ------- 2 + 1 Ch. Hrs.**

• Introduction to basic principles of coaching based on performance diagnostics.

• Conditional abilities ( strength, speed and endurance)

• Motor abilities (flexibility, coordination abilities and technique).

• Loading and adaptation process

• Overload: meaning, causes, symptoms and tackling of overload

• Tactical training, periodization and planning and competitions

• Influence of environmental hazards to coaching exercises.

**SpSc. 509: Therapy Science ------------------ 3 Cr. Hrs.**

• Therapeutic Exercise and Wellness Approaches to sports injuries.

• Sport - specific massage techniques.

• Pre - event, inter - competition, and post - event massage application to various sports.

• Preventive methods and techniques to decrease thfrisk of injuries.

• Hydro, Cryo, Diathermy and other Therapies for sport injuries.

• Health Education of sports.

• Nutritional therapy.

**SpSc. 601: Sports Medicine ------------------------ 3 Cr.hrs**

• General medical care of athletes.

• Medical evaluation of athletes .

• Common injuries in sports and competitive activities.

• Prevention of common injuries in different sports.

• Drug trials on treatment of injuries and up grading performance.

• Interpretation of ECG recording and reading to different sports events.

**SpSc. 602: Thesis ---------------------------------- 6 Cr. Hrs.**

After or with the approval of the Faculty Advisors, the students develop individual

research topics to complete the final degree requirements in the areas or discipline to

choose from.

**10. Reference Materials:**

• Andersen, N.H. and Ramwell, P.W. (1974) Biological aspects of post glands. Arch. Inter. Med. 133, 30.

• Barrow, H.M and McGee, R.:"A practical approach to measurement In physical education" Third Edn., 1979, Lea and Febiger, Philadelphia.

• Bass, A.L: Treatment of muscles, tendon and minor joint injuries in sport, .Proc.Roy. Soc. 62,925,1969.

• Human Kinetics; sport physiology, 1 Edition. Aug, 20, 2004.

• Rout ledge; oxygen up take kinetics in sports, exercise, and medicine, 1 Edition, Jan, 21, 2005.

• Human kinetics; Applied Anatomy and Biomechanics In sport, 1 Edition, Mar. 10,2000.

• Human kinetics Canada Ltd.; Assessing sport skills, Mar. 6, 2001.

• Rout Ledge; Biomechanical Evaluation of Movement in Sport and Exercise;

The British association of sport and exercise sciences guide, 1 edition, Dec. 2007.

• Human kinetics Canada Ltd., coaches guide to drugs and Sport, 1 Edition, oct, 11,2001.

• Saga more publishers, A Guide to sport nutrition, 1 Edition, Aug. 2003. Rout Ledge, Research, Ethics in Exercise, Health Science and sport, 1 Edition, Dec. 2006.

• Rout.' ledge, skill acquisitions In sport: research, theory and practice, 1 stedition, May, 14, 2004.

• Rout Ledge, the British Association of sport and Exercise and sport and Exercise Guide. Port and exercise physiology testing gardenias, 1 edition, dec. 19,2006

• Clarke H.david, H. Harrison Clarke, Research processes in physical education and health

• Peter McGinnis, Biomechanics of Sport and Exercise SBN-13: 9780736051019, Pub. Date: November 2004

• Knutzen Joseph Hamill, Kathleen M. Biomechanical Basis of Human Movement. February 2008,

• Verma J.P, A Text Book On Sports Statistics Published By Venus Publication in Feb. 2000

• Nelson Silverman, Stephen, Thomas, Jack, Research Methods In Physical Activity. ISBN-13: 9780736056205, Pub. Date: July 2005

• Singh, Hardyal (2009). Science of Sports Training, Fundamental of Sports training