



**SRI RAMACHANDRA
INSTITUTE OF HIGHER EDUCATION AND RESEARCH
(DEEMED TO BE UNIVERSITY)
Porur, Chennai – 600116**

**FACULTY OF
SPORTS AND EXERCISE SCIENCES**

REGULATIONS & SYLLABUS FOR

B.Sc. (Hons) SPORTS AND EXERCISE SCIENCES

(Choice Based Credit System 2015)

B. Sc. (Hons) SPORTS AND EXERCISE SCIENCES DEGREE PROGRAMME

INTRODUCTION

The B.Sc. in Sports and Exercise Science Degree course is being offered by Sri Ramachandra University in collaboration with the University of Cape Town, South Africa, a world renowned university for sports medicine and exercise science. The faculty of University of Cape Town participate in teaching and training of students enrolled in this course. This is a four-year, undergraduate degree program, covering all aspects of sports and exercise science. Sri Ramachandra University already has excellent play fields and other sports and recreational facilities. Besides class room teaching in theoretical aspects, the students will be enabled to have practical experience by postings in various sports and athletic clubs and other establishments. Students who graduate will have ample opportunities in getting employment in sports science establishments, associations, clubs -- both private and public sector.

Sri Ramachandra Arthroscopy & Sports Sciences Centre (SRASSC) is partnering with Exercise & Training Academy (ETA), Cape Town, South Africa for providing world class education and training culminating in authentic Certification for Coaches and Trainers. The facilities available in SRASSC are the most comprehensive, modern and first of its kind in India. With the availability of international expertise along with excellent infrastructure, sports community can look forward to SRASSC as the one stop shop for its entire sports requirements.

PROGRAM SUMMARY

B. Sc. (Hons) SPORTS AND EXERCISE SCIENCES Degree Programme

1. B. Sc. (Hons) Sports and Exercise Sciences is a 4 years undergraduate degree program including 1 year of internship offering total of 177 credits
2. At the end of the third year, student's progress to the fourth year in which h internship and project are offered.
3. The program is for 8 semesters i.e., 2 semesters / year
4. Courses included in the curriculum are assessed using the absolute grade system. It indicates a 10-point scale of evaluation of the performance of students in terms of grades and grade point.
5. Grade point average (GPA) and Cumulative grade point average (CGPA) will be declared as per the University rules
6. The degree of '**B. Sc. (Hons) SPORTS AND EXERCISE SCIENCES**' shall be awarded after satisfactory completion of internship

Syllabus for B. Sc (Hons) SPORTS AND EXERCISE SCIENCE Degree Programme

Core, Discipline Specific Elective and Ability Enhancement Courses

(For Generic Elective, A Few Ability Enhancement and Skill Enhancement courses refer CBCS Hand Book, 2016 and the Common core Syllabi)

First Year – Semester - I							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
1	USS 15CT 101	Anatomy	4	-	-	4	60

Course description:

- A study of the anatomical structure of the human body.
- Body structure will be studied by organ systems.
- Form-function relationships with emphasis on clinically relevant anatomy.
- The laboratory study will involve observing and learning from human skeletal collections and dissected cadavers and preserved specimens.

Objectives:

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

- Describe the structure and functions of the organ systems of the human body.
- Describe how the organ systems function and interrelate.
- Learn basic technical terminology and language associated with anatomy.
- Develop a self-identity of what it means to be “human”.

Learning Objectives: Skills

- Identify the anatomical structure in the dissected specimen.
- Learn to correlate anatomical structures with relevant clinical conditions.

First Year – Semester - I							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
2	USS 15CT 103	Physiology	4	-	-	4	60

Objectives of the course:

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

- ✓ Comprehend basic terminologies used in the field of Human Physiology
- ✓ Define and describe basic Physiological Processes governing the normal functioning of the human body
- ✓ Apply this knowledge in their Allied Health Science practice

First Year – Semester - I							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
3	USS 15CT 105	Biochemistry	4	-	-	4	60

Objectives :

- To have a knowledge about the chemistry and metabolism of various macromolecules- carbohydrate, protein and lipids
- To learn about enzymes, vitamins, minerals and nutrition
- To know the structure and function of Hemoglobins, Nucleic acids.
- To learn about the organ function tests like Liver Function Tests and Renal Function Tests.

First Year – Semester - I							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
4	USS 16DE 107	Essentials of Applied Genetics	3	-	-	3	45

Learning Objectives:

To describe the cellular organelles and their functions

To explain the genetic basis of disorders

To illustrate the recent laboratory technologies used in the clinical diagnosis

To stress upon the concepts of genetic engineering

First Year – Semester - I							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
5.	USS 15AE 109 (AAE 001)	English	2	-	-	2	30

Learning Objective:

This course is designed to build spoken and written English competency of the students needed to function effectively in academic setup.

First Year – Semester - I							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
6	USS 15CL 151	Anatomy (Practicals)	-	-	2	2	60

Learning Objectives: This module is designed to demonstrate the dissected specimens and their anatomical features

Demonstration of dissected specimens.

Learning outcomes:

At the end of the module, the student must be able to,

1. Identify the dissected and gross specimens
2. Illustrate the structure of cell and its organelles

First Year – Semester - I							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
8	USS15CL 155	Biochemistry (Practicals)	-	-	2	2	60

Learning Objectives

To demonstrate the various biochemical assays used in clinical diagnosis

Practical:

1. Demonstration of reactions of carbohydrates and proteins.
2. Interpretation of charts
- 3.

First Year – Semester - II							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
9	USS 15CT 102	Essential Microbiology and Pharmacology	4	-	-	4	60

Learning Objectives

This module is intended to provide knowledge on

- Basic principles of sterilization and disinfection, biomedical waste management and standard precautions.
- Source and mode of spread of infection and basic concepts of immunology and its applications
- Common microbial diseases- its causes, prevention and treatment
- Introduce the students to Basic Pharmacology of various common medications used in the field of sports sciences

First Year – Semester - II							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
10	USS 15CT 104	Pathology	3	-	-	3	45

Learning Objectives

This module aims at providing an understanding of basic concepts of pathology including process of inflammation and features of various systemic diseases

First Year – Semester - II							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
11	USS 15CT 106	Introduction to sports codes	3	1	-	4	75

Learning Objectives and outcomes

Many sports contain similar components of exercise (e.g. running, jumping), but vary with regards to the overall outcome of the sport (e.g. high jump vs. sprinting). It is rare that an individual know and understand all the codes, but in order to aid the athlete/coach/sport doctor/nutritionist, it is essential for the student to be familiar with the requirements of the sport and the type of athlete competing. This

module will therefore introduce individual and team sports to the student, focusing on the basic structure, equipment required and rules of each sport. Topics involving talent identification, preparation of athlete(s), conditioning to achieve top performance, and the competence required by athletes and coaches to perform at various levels of competition (school to Olympic) will be introduced. Each student will also perform a practical session where the above is explained, played and competed in.

First Year – Semester – II							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
12	USS 15DE 108	Sports Sociology	3	-	-	3	45

Learning Objectives:

- Understanding the institution of sport from various sociological perspectives.
- Understanding sport and its interrelationship with other social-cultural environments to include educational, political, economic, and religion.
- To gain knowledge of the philosophical values involved within sport participation

First Year – Semester - II							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
13	USS 15DE 110	Basic Computing	2	-	1	3	60

Learning objectives:

To familiarize with basic concepts of computer and developer tools
 To familiarize with internet concepts, office packages and various advancements in networking.
 To incorporate computing concepts and its application in their core domain of expertise

As Per Common GE, AE, SE Syllabus, 2016- to be followed

Semester – 2 or 5							
Offered by Department of Community Medicine, Faculty of Allied Health Sciences							
Course Code	Course Title	L	T	P	C	Total Hours	
AAE 007	Community Medicine	2	-	-	2	30	
Offered to: B.Sc., (AHS; MRIT), B.Sc., (TCM), B.Sc., (Sports & Exercise Science); BPT							

Objectives

Facilitate the students to

- Acquire excellent knowledge in the principles of Community Medicine
- Acquire excellent skills in the practice of Community Medicine.

SYLLABUS PROVIDED IN THE COMMON CBCS SYLLABI FOR ELECTIVES

First Year – Semester - II							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
17	USS 15CL 152	Essential Microbiology and Pharmacology (Practicals)		-	2	2	60

Microbiology Lab

Learning Objective

This module aims at providing practical knowledge of

1. Spotters

- a) Disposable syringe
- b) Sterile cotton swab
- c) Bacterial filters
- d) Anaerobic jars
- e) Gram stained smears showing gram positive cocci and gram negative bacilli
- f) Gram stained smears showing Candida
- g) Culture growth of Aspergillus and dermatophytes
- h) Bacterial culture media plates (Blood agar, chocolate agar and MacConkey's agar)
- i) Antibiotic susceptibility test
- j) Ascaris lumbricoides
- k) Taenia

2. Clinical case discussion with charts

- a) Skin and soft tissue infections
- b) Clostridial infections
- c) Ring worm/ Tinea infections
- d) Food poisoning
- e) Gastroenteritis

Learning outcomes:

At the end of the module, the student must be able to
Have brief practical Knowledge on sports related infection.

Recommended reading

Practical Microbiology - Prof.C.P.Baveja

Pharmacology Lab

Learning Objective

This module is intended to discuss the various modalities of drug delivery and instruments relevant to it.

Instruments Needles

Intravenous
Intrathecal
Spinal
Intra arterial

Students Discussion

Syringes: Tuberculin
Insulin
I.V cannula
Scalp. Vein set

Students Discussion

Enema can

Inhalers
Spacers
Nebulizers

Students Discussion

Tablets – Enteric coated, Sustained release, Sub-lingual

Students Discussion

Capsules, Spansules, Pessary, Suppository

Students Discussion

Topical Preparation, Ointment, Lotion, Powder, Drops – eye / ear

Charts: Mechanism of action of drugs, adverse effects, toxicology

Spotters: drugs

Text books suggested for reading:

1. Text book of pharmacology for Dental & Allied Health Science 2nd edition Padmaja Udaykumar
2. Pharmacology for dental students Tara V shanbhag, Smita Shenoy, Veena Nayak
3. Principles of pharmacology 2nd edition H.L.Sharma & KK Sharma

First Year – Semester - II							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
18	USS 15CL 154	Pathology (Practicals)		-	1	1	30

Learning Objective

The Gross specimens and instruments relevant to the disease processes and diseases taught will be shown and explained.

Second Year – Semester -III							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
19	USS 15CT 201	Functional anatomy and Fundamentals in Sport Biomechanics	4	-	-	4	60

Description:

This functional anatomy component of this module incorporates a detailed examination of the structure and function of bones, joints, muscles and nerves with emphasis on the identification of anatomical structures and their relevance to human motion. It forms the basis for subsequent study of the physiological and biomechanical aspects of sport science.

This biomechanics component of this module investigates the mechanical principles required to produce movement. It analyses both internal and external forces with respect to the human body and its environment, with a view to applying various mechanical principles to optimise human performance

Learning Objectives:

- To explain the structure and function of the human musculoskeletal system, particularly under movement conditions
- To understand the fundamental concepts of mechanics applicable to the study of human motion
- To demonstrate knowledge of the scientific approach to the study of human movement
- To understand the limitations imposed by physical laws on human motion
- To discuss the optimization of human performance through application of mechanical principles.
- To conduct basic analyses of human motion

Contribution to course aims and graduate attributes:

This anatomy component of this module provides students with conceptual knowledge and skills related to the structure and function of the human musculoskeletal system and form the basis for more applied study in sports science.

The biomechanics component provides students with an understanding of the physical laws that govern motion and forms the theoretical basis for subsequent applied biomechanical analyses of human movement. This knowledge is integral to the quantitative empirical approach to solving biomechanical problems in human movement science.

Second Year – Semester -III							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
20	USS 15CT 203	Fundamentals in Nutrition and Metabolism	3	-	1	4	75

OBJECTIVES**Learning objective:**

- To provide a biochemical and physiological understanding of nutrition requirements and how these nutrients are metabolized.

Practical component

- Learning Objectives**
- To illustrate the principles of menu planning according to specific needs
- To demonstrate the techniques of anthropometric measurement

Learning outcomes:

At the completion of this module the student should be able to;

- Understand the basic principles of nutrition
- Know the characteristics of nutrients. Explain the role of macro- and micro-nutrients in the diet
- Understand influences of dietary intake and nutritional health
- Understand the roles of core metabolic pathways
- Demonstrate an understanding the effects of normal, over- and under-nutrition
- Demonstrate skills required for assessing food intake and taking anthropometric measurements
- Relate the structure of the gastrointestinal system to the processes involved in the digestion and absorption of major nutrients and factors
- Know the different nutritional needs of different groups (children, elderly, pregnant women etc)

Learning outcomes:At the end of the Practical module, the student must be competent to

- ❖ Plan menu for different age groups
- ❖ Measure anthropometric data
 - Deficiencies or excess vitamins and its influence on health
 - Classification of vitamins
 - Fat soluble vitamins & food sources
 - Water soluble vitamins & food sources
 - Who needs vitamins?

Second Year – Semester -III							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
21.	USS 15CT 205	Fundamentals in Sport and Exercise Physiology	4	-	-	4	60

Learning Objectives

This module is the core of exercise physiology. The essence of this module is for the student to understand the physiological responses of the systems to exercise in order to uphold homeostasis and life.

Second Year – Semester -III							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
22.	USS 15DE 207	Fundamentals in Sport and Exercise Psychology	3	-	-	3	45

Learning objective: To examines various personality and social-psychological factors that underlie participation, adherence and performance in physical activity and sport.

Second Year – Semester -III							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
24.	USS 15AE 211	Basics of research methodology	2	-	-	2	30

Second Year – Semester -III							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
25.	USS 15CL 251	Functional Anatomy and Fundamentals in Sports Biomechanics (Practical)	-	-	2	2	60

Learning Objectives

- To learn the functional anatomy as relevant o understanding of sports biomechanics
- To understand basic sports biomechanics principles which form basis of complex movement analyses

Second Year – Semester -IV							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
27.	USS 15CT 202	Exercise prescription, measurement and evaluation	4	-	-	4	60

Description:

In part, this module examines principles related to the prescription of exercise across a wide variety of populations to achieve specific gains in health, strength, power, endurance and speed. The interrelationships between physical activity and the physiological and anatomical development of the individual are taken into when developing programmes, as are age and gender. The module also provides students with proficiency in the skills required to assess fundamental capacities related to sports science and emphasizes the development of physical capacity (endurance, strength and flexibility) and basic training methodology.

Learning Objectives:

- To understand the procedures for evaluating fitness and prescribing exercise for varying populations

- To understand the theoretical issues relating to exercise prescription for varying populations
- To describe the processes and practical applications involved in the development of human physical capacity including strength, power, flexibility and cardiovascular endurance.

Learning Outcomes:

This module is designed to provide students with a strong understanding of safe and effective methods for delivery and evaluation of exercise and physical activity programs for groups and individuals. It develops students' understanding of the fundamentals of assessment and enhancement of physical ability and focuses on the appropriateness and accuracy of methods to assess human capacity across the exercise spectrum.

Second Year – Semester -IV							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
28.	USS 15CT 204	Fundamentals in the neurophysiological control of movement	2	-	1	3	60

Description:

This module examines the processes underlying skilled motor performance, how skilled performances are learned and how to apply the principles of skilled performance and learning in instructional settings in human movement such as teaching, coaching and rehabilitation.

Learning Objectives:

- To understand the principles underlying the learning of skilled movements.
- To understand the training factors that influence acquisition and retention of skilled movements
- To apply the principles of skilled performance in various human movement settings such as teaching, coaching, training and rehabilitation.

Learning Objectives: This module aims to give the student practical knowledge and skills of how to perform various laboratory exercise physiology tests. The students should know the various equipments that are used, its troubleshooting and detailed procedures.

Second Year – Semester -IV							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
29.	USS 15CT 206	Introduction to Sports Injuries	4	-	-	4	60

Objectives of module and outcomes

Many sports contain similar components of exercise (e.g. running, jumping), but vary with regards to the overall outcome of the sport (e.g. high jump vs. sprinting). It is rare that an individual know and understand all the sports, but in order to aid the athlete/coach/sport doctor/nutritionist, it is essential for the student to be familiar with the injuries associated with the codes. The sports scientist should be aware of serious injuries which demand cessation of sport or exercise or its modification thus. Focus should be given to prevention of injuries as part of training programmes. Finally, the most common injuries associated with a particular code will be highlighted.

Second Year – Semester -IV							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
31.	USS 15AE 210	Health Promotion	2	-	-	2	30

Description:

This module explores and examines a range of contemporary health issues that exist in Indian society. It focuses on a social view of public health to deepen knowledge and understanding of the fundamental health principles and explore a range of health models. The social determinants of health are examined to highlight the limitations of medical approaches and introduce the social model of health. Knowledge and understanding of lifestyle, sexual and mental health issues are critically analysed by examining the range of physical, social and cultural determinants that impact on health and wellbeing. The course enables students to identify and discuss preferred solutions to critical issues in health and well-being, and provides an overview of the links between behavioural risk factors and illness and mortality as well as between health behaviours and disease prevention and wellness. Students learn behaviour change principles and strategies for effective implementation of healthy lifestyle goals and habits.

Learning Objectives:

- To describe the major approaches to the promotion of health, from local to global perspectives; including theories and evaluation methods
- To identify the basic principles of behaviour change and management, the scientific, social, cultural and economic bases of health promotion, as well as the political and ethical issues that impact health promotion activities
- To understand factors that impact health and wellbeing: including individual behaviour, environmental and social factors across the lifespan
- To describe the common barriers to participating physical activity, the consequences of low activity and methods to promote physical activity in individuals and whole populations.

Contribution to course aims and graduate attributes:

This module introduces a range of health promotion concepts from specific interventions or health enhancement in individuals, to community-wide prevention or health protection programs. It further provides the opportunity to gain an understanding of the social, cultural, economic and political issues related to health. It provides an overview of the links between certain behavioural risk factors (such as smoking, high-fat diet, chronic stress) and illness and mortality; as well as between health behaviours (such as balanced nutrition, exercise, good sleep habits and stress reducing activities) and disease prevention and wellness.

Second Year – Semester -IV

Course Number	Course Code	Course Title	L	T	P	C	Total Hours
32.	USS 15AE 212	Introduction to Physical development and ageing	2	-	-	2	30

Description:

This module investigates human growth and development across the lifespan and the biology of aging. The effects of age, gender, ethnicity, culture and development stages on physical capacity are explored. It also analyses the effects of physical activity and health behaviours on growth and development.

Learning Objectives:

- To describe and discuss the processes of human growth and development over the life span with particular reference to physical, cognitive and socioemotional development
- To critically analyse how age, gender, cultural background and developmental stages influence individual exercise capacity and motivation to adopt an active lifestyle
- To evaluate the impact of physical activity on human growth and development across the lifespan.

Contribution to course aims and graduate attributes:

This module provides students with an understanding of human growth, development and aging processes. The focus is to critically analyse the interaction between physical activity and human growth and development. The content forms the basis for the study of exercise physiology, sport and exercise psychology, exercise prescription, and health and well-being.

Second Year – Semester -IV							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
33.	USS 15CL 252	Exercise prescription, measurement and evaluation (Practical)	-	-	2	2	60

Description:

In part, this module examines principles related to the prescription of exercise across a wide variety of populations to achieve specific gains in health, strength, power, endurance and speed. The interrelationships between physical activity and the physiological and anatomical development of the individual are taken into when developing programmes, as are age and gender. The module also provides students with proficiency in the skills required to assess fundamental capacities related to sports science and emphasises the development of physical capacity (endurance, strength and flexibility) and basic training methodology.

Learning Objectives:

- To understand the procedures for evaluating fitness and prescribing exercise for varying populations
- To demonstrate the ability to design and implement appropriate training programs for populations ranging from healthy individuals to elite athletes
- To demonstrate proficiency in the measurement of anatomical and physiological capacities

Learning Outcomes:

This module is designed to provide students with a strong understanding of safe and effective methods

for delivery and evaluation of exercise and physical activity programs for groups and individuals. It also develops competencies in assessment of anthropometry, cardiorespiratory health and fitness, muscular strength and endurance, data analysis, and functional testing central to professional practice in health, fitness and sports settings.

Third Year – Semester –V							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
35.	USS 15CT 301	Applied sport and exercise Biomechanics	4	-	-	4	60

Learning Objectives:

- To extend knowledge of the biomechanical basis of physical activity and sports performance
- To identify the fundamental biomechanical principles related to physical performance
- To understand the limitations imposed by physical laws on human motion

Learning Outcome:

After this module, student should be able to apply a detailed knowledge of biomechanics and functional musculoskeletal anatomy to the analysis of human movement.

It also provides the opportunity for students to measure the physical attributes of physical activity and sports performance. This includes the theoretical analysis of human motion as well as the use of bioinstrumentation during performance. These skills are integral to the problem solving nature of sports science and the quest for optimal performance.

Third Year – Semester -V							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
36.	USS 15CT 303	Rehabilitation Of Sports Injuries	3	-	1	4	75

Learning Objective:

- To understand the basic principles of rehabilitation of sports injuries.
- To be able to assist a clinician and athlete with evaluation and rehabilitation of injuries.
- To understand the precautions to be taken while dealing with rehabilitating athletes.

Learning Objectives:

- To observe the types of exercises that are performed as part of rehabilitation.
- To observe how rehabilitation differs from routine training and exercise
- To learn precautionary measures while training a rehabilitating athlete.
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Third Year – Semester -V							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
37.	USS 15CT 305	Sports Management & Sports Industry	4	-	-	4	60

Learning Objectives:

This module introduces the student to career options where the skills acquired could be implemented, for the better of sport at developmental level, school, national and Olympic level. The student will cover aspects of the various disciplines of the sporting industry, focusing on specific skills required in the various disciplines.

Third Year – Semester -V							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
39	USS 15AE 309	Basics of Biostatistics	2	-	-	2	30

Third Year – Semester -V							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
40	USS 15AE 311	Physical activity and exercise in diseased population	2	-	-	2	30

Learning Objectives:

- To understand the factors underpinning the development of lifestyle-related diseases
- To identify and measure physical performance of those at risk of and with known disease
- This module provides students with conceptual knowledge and skills related to the management and prescription of exercise for diseased populations. It focuses on the professional, analytical and technical skills required for exercise scientists in the health and fitness setting.

Learning Outcomes:

- Student should be able to examine the aetiology of lifestyle and clinically relevant diseases with a focus on physical activity and exercise.
- Student should be able to present information relating to the physical and mental health benefits of physical activity and exercise for health under various physiological and metabolic conditions.
- Students develop an understanding of the factors that determine, influence and modify the physical activity habits of individuals and whole populations who may present with, or be at risk of, various disease states.
- Students also develop competencies in assessment of cardio respiratory health, muscular and orthopaedic performance and clinical exercise stress testing central to professional practice in the health and fitness setting.

Third Year – Semester -V							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
41	USS 15CL 351	Applied Sport and Exercise Biomechanics (Practicals)	-	-	2	2	60

Learning objective:

This module expands upon a variety of mechanical concepts integral to the study of human motion. Quantitative problems are developed further and linear and angular kinetics are applied to sporting techniques and other human movements. The use of technical equipment for data collection and analysis

is a major component of the module.

Learning Outcome:

- To show competence of skills in the biomechanical assessment of movement.
- To be proficient in the use of a variety of instrumentation techniques specific to sports science.

Third Year – Semester –VI							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
43	USS15CL 302	Applied sport and exercise nutrition	3	-	-	3	45

OBJECTIVES

Module objective: To apply theoretical principles of nutrition to the sport and exercise domain.

Module outcomes: At the completion of this module the student must be able to;

- Demonstrate an understanding of energy intake and expenditure
- Be aware of the role of nutrition in supporting training and improving performance in sport
- Understand the relationship between hydration and sport performance
- Be knowledgeable about the role of supplements and ergogenic aids in sport and exercise performance
- Understand the different nutritional requirements in different environments and of different populations/groups
- Discuss the effect of sport and exercise on nutrition-related disease
- Gather and interpret sport and exercise nutritional information

Third Year – Semester -VI							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
44	USS 15CT 304	Applied physiology	4	-	-	4	60

Learning Objectives:

This module is the follow up on the physiological responses to exercise, namely the physiological adaptations that incur after long-term training. The essence of this module is for the student to understand the physiological **adaptations** of the systems to training in order to uphold homeostasis more economically, thus improving energy efficiency and to improve overall performance. This module also illustrates how intrinsic (genes, age, ethnicity, gender and disease) and extrinsic (environment, technology, training and ergogenic aids) factors causes acute or chronic effects / adaptations to the physiological systems, either weakening, upholding or improving overall performance.

Third Year – Semester -VI							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
45	USS 15CT306	Applied sport and exercise psychology	3	-	1	4	75

Learning objective: To explore psychological theory to address sport and exercise behaviour.

Learning outcomes: On completion of this module the student should be able to;

- Demonstrate an understanding of the application of psychology in sport and exercise
- Know the use of imagery and mental rehearsal in sport and exercise

- c) Know the techniques used to control arousal in sport and exercise
- d) Understand how group dynamics affect sport environments
- e) Be knowledgeable about the psychological effects of sport injuries

Practical component:**Learning Objectives:**

- Articulate the process of test construction and validation.
- Evaluate tests using basic measurement constructs such as validity, reliability, norms and standardization.
- Conduct, Assessment and interpret the results in a professional report.
- Describe the categories of assessment, instruments and indicate familiarity with several measures from each category.
- Consider cultural diversity in the field of psychology assessment.

Learning Outcomes:

- Student should have a broad overview of the psychological assessment of individual and offers students opportunities to develop the skills needed to become reflective decision makers throughout the assessment process.
- Students should be able to develop a conceptual model of assessment that will guide them through the assessment process for initial client referral to final report writing.

Third Year – Semester -VI							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
47	USS 15AE 310	Performance analysis, technology and innovation	2	-	-	2	30

Learning Objective and outcomes:

To gain advance knowledge in athlete monitoring, testing and performance evaluation of sports and athletes.

Third Year – Semester -VI							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
48	USS 15AE 312	Basic trauma care management	2	-	-	2	30

Objectives :

- Basic life support
- Primary and secondary assessment of a patient
- Musculoskeletal trauma assessment and management

Third Year – Semester -VI							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours

49	USS15CL 352	Applied sports and exercise nutrition (Practicals)	-	-	2	2	60
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Learning Objective:

To use practical skills to make nutritional assessments as useful in sports science.

To form nutritional guidelines for various groups of populations.

Third Year – Semester –VI							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
50	USS15CL 354	Applied Physiology (Practicals)	-	-	2	2	60

B. Sc (Hons) SPORTS AND EXERCISE SCIENCE – Year 4– Semester- VII										
Course Number	Course code	Course Title	Faculty Code	Credits				Hours/ semester		
				Lecture (L)	Tutorial(T)/ Clinical Training(CT)	Practical (P)/Research Project	Credits(C)	Lecture/ Tutorial	Practical	Total hours
52	USS 15RP 451	Project - Part I	AHS	-	-	5	5	-	150	150
53	USS 15IN 453	Internship-I	AHS	-	-	10	10	-	450	450
		Total		-	-	15	15	-	600	600

B. Sc (Hons) SPORTS AND EXERCISE SCIENCE – Year 4– Semester- VIII										
Course Number	Course code	Course Title	Faculty Code	Credits				Hours/ semester		
				Lecture (L)	Tutorial(T)/ Clinical Training(CT)	Practical (P)/Research Project	Credits(C)	Lecture/ Tutorial	Practical	Total hours
54	USS 15RP 452	Project - Part II	AHS	-	-	5	5	-	150	150
55.	USS 15IN 454	Internship-II	AHS	-	-	10	10	-	450	450
		Total		-	-	15	15	-	600	600

INTERNSHIP: OBJECTIVES

To facilitate reinforcement of training from supervised to full responsibility

To facilitate acquisition of additional knowledge

To facilitate the understanding of professional responsibilities and ethical practices including

- The rights and dignity of clients
- Consultation and referrals to other professionals
- Ethical conduct and professional obligations to peers, colleagues, clients, families and the community at large

GUIDELINES

The internship shall commence after the student has completed and passed all academic and clinical requirements

The internship is compulsory

The duration of the internship shall be one year

The degree of **B.Sc(Hons)** Sports & Exercise Sciences shall be awarded after the satisfactory completion of the internship

DURATION OF POSTINGS

B. Sc (Hons) Sports and Exercise Science students will be doing their internship for one year. They will undergo training in following sports science areas.

B. Sc (Hons) SPORTS AND EXERCISE SCIENCE – INTERNSHIP		
Sports Science Area	Duration(hrs)	Credits
High Performance Sports Centre and Gym	450	10
Biomechanics	135	3
Exercise Physiology	90	2
Sports Nutrition	90	2
Sports Psychology	90	2
High Altitude Chamber	45	1
Total	900	20

INTERNSHIP ATTENDANCE AND EXTENSION: As per University regulations for Internship.

EVALUATION OF INTERNEES

Day to day assessment of the internees during their internship postings shall be done. The objective is that all the interns must acquire necessary minimum skills required for carrying out day to day professional work competently. This shall be achieved by maintaining **Records** and performance **Log Book** by all internees.

The evaluation will be done at the end of every clinical rotation by concerned internal faculties. The intern is expected to demonstrate competence in carrying out the following activities:

High performance sports Centre and gym

- To demonstrate the procedures for evaluating fitness, prescribing exercise and designing training programs for varying populations
- To apply the theoretical knowledge of various issues relating to exercise prescription for varying populations

Biomechanics

- To identify anatomical landmarks for marker placement
- To assist in conducting 2D video analysis of various sports and movements

Exercise Physiology

- To prepare athletes and clients for Exercise Physiology laboratory assessments.
- To conduct and interpret the various laboratory measurements with different ergometers
- To assist in report generation

Sports Nutrition

- To conduct anthropometric assessments of athletes
- To assist in gathering information pertaining to nutritional counselling.

Sports Psychology

- Be familiar in using various psychometric tools for athletic assessment.

High Altitude chamber

- To apply the principles of high altitude training for exercise prescription and performance enhancement.

21 EVALUATION OF PROJECT:

- a) The CIA marks for Project –Part I will be awarded based upon the presentation of literature review and procuring Institutional Ethical Committee approval for the project.
- b) The evaluation of Project –Part II would be done by internal examiners after the submission of final project report.



SRI RAMACHANDRA
INSTITUTE OF HIGHER EDUCATION AND RESEARCH
(Category - I Deemed to be University) Porur, Chennai

SRI RAMACHANDRA
FACULTY OF SPORTS & EXERCISE SCIENCES

REGULATIONS & SYLLABUS
FOR
M.Sc. SPORTS AND EXERCISE PSYCHOLOGY DEGREE PROGRAM
(Under Choice Based Credit System, 2015)

(Effective from the Academic Year 2020–2021)

**MASTER OF SCIENCE (M.Sc.) in SPORTS AND EXERCISE PSYCHOLOGY [S23]
DEGREE PROGRAM**

Preamble

This program aims to teach skill sets to create high quality sports psychology professional in the sports industry. Students will be trained in evidence-based practices to demonstrate performance enhancement in competitive sports through sports psychology service delivery. Qualified sports psychologist will be proficient in assessing athletes/client needs, designing appropriate strategies to best achieve sports culture and quality of life.

Curriculum

Program Learning Outcomes

The M.Sc. graduate in Sports and Exercise Psychology will

- a) Develop competencies to functionally assess psychological concerns within sports and exercise setting.
- b) Provide evidence based interventions towards performance enhancement and injury prevention.
- c) Independently pursue research within sports and exercise domain.
- d) Support athlete/client in injury rehabilitation context
- e) Nurture quality of life and sports culture in the country.
- f) Demonstrate multi-cultural sensitivity in professional practice.
- g) Demonstrate professional conduct and adhere to professional ethics and principles

Intake: 15 students per academic year

First Year – Semester -1								
Course Number	Course Code	Course Category	Course Title	Lecture (L)	Clinical Training (CT)	Research Project (RP) Thesis	Total Credits	Total Hours
1	PEP20CT101	CT 1	Foundation of Sports Psychology	2	2	0	4	90
7	PEP20CL151	CL 1	Foundation of Sports Psychology – Practical	0	0	3	3	90

Learning Outcome

At the end of the course, the students should be able to

- Comprehend the historical developments
- Recognise the role of sport psychologist
- Explain the biological basis of behaviour
- Value the ethics in sports and exercise psychology
- Explain the concepts of sports and exercise psychology.

First Year: Semester I; COMMON COURSE Work

Course Number	Course Code	Course Title	L	T	P	C	Total Hours
2	PEP20CT103	Research Methodology & Biostatistics (MCT010)	4	-	-	4	60

Objectives

- To understand the basics of research
- To formulate the scientific hypothesis
- To test the hypothesis and analyze the results

Learning outcomes

- At the end of the course, the student will be able to
- Prepare a research protocol
 - Critically evaluate Journal articles
 - Write a paper for publication with the assistance of the guide

First Year – Semester -1

Course Number	Course Code	Course Category	Course Title	Lecture (L)	Clinical Training (CT)	Research Project (RP) Thesis	Total Credits	Total Hours
3	PEP20CT105	CT 3	Fundamentals of Exercise Psychology	2	1	1	4	90

Learning Outcome

At the end of the course, the students should be able to

- Differentiate physical activity and exercise.
- Employ exercise/physical activity for quality of life.
- Interpret psychological responses to exercise as a moderator of life stress.
- Appraise psychological benefits of exercise to promote mental health.

First Year – Semester -1

Course Number	Course Code	Course Category	Course Title	Lecture (L)	Clinical Training (CT)	Research Project (RP) Thesis	Total Credits	Total Hours
4	PEP20CT107	CT 4	Psychology of Youth Sports	2	1	1	4	90

Learning Outcome

At the end of the course, the students should be able to

- Identify sensitive periods in growth and development
- Contrast the conventional trends with contemporary trends to deal with children in sports.
- Appraise the economic impact and overemphasis of winning.
- Evaluate the challenges in sports participation and commitment.
- Examine the compatibility of motivational climate and goals to prevent drop out.

First Year – Semester -1

Course Number	Course Code	Course Category	Course Title	Lecture (L)	Clinical Training (CT)	Research Project (RP) Thesis	Total Credits	Total Hours
5	PEP20DE 109	DE 1	Foundations of Sports Science	3	0	0	3	45

Learning Outcome

At the end of the course, the students should be able to

- Identify different disciplines to integrate in the sports psychology practice
- Recognise the role and limitation in an applied context
- Explain the multi-disciplinary approaches for effective sports psychology practice

First Year – Semester -1

Course Number	Course Code	Course Category	Course Title	Lecture (L)	Clinical Training (CT)	Research Project (RP) Thesis	Total Credits	Total Hours
6	PEP20D E111	DE 2	Essentials of Exercise Physiology	3	0	0	3	45

Learning Outcome

At the end of the course, the students should be able to

- Describe the physiological changes in various systems produced during exercise
- Demonstrate knowledge and understanding of the physiologic consequences of training.
- Discuss the potential uses of cardiopulmonary exercise testing

First Year – Semester -1								
Course Number	Course Code	Course Category	Course Title	Lecture (L)	Clinical Training (CT)	Research Project (RP) Thesis	Total Credits	Total Hours
8	PEP20C R153	CR 1	Clinical Postings - 1	0	0	2	2	60

Learning Outcome	
At the end of the course, the students should be able to	<ul style="list-style-type: none"> Identify the background of the case Recognize the main concerns of the case. Explain rationales for planning interventions Relate research basis for practice

First Year – Semester - 2								
Course Number	Course Code	Course Category	Course Title	Lecture (L)	Clinical Training (CT)	Research Project (RP) Thesis	Total Credits	Total Hours
9	PEP20C T102	CT 5	Psychological Skill Training(PST)	3	0	1	4	75
15	PEP20C L152	CL 2	Psychological Skill Training (PST)– Practical	0	0	3	3	90

Learning Outcome	
At the end of the course, the students should be able to	<ul style="list-style-type: none"> Evaluate different methods for need assessment in sports Distinguish components of psychological skill training. Develop a stepwise procedure for skill training. Distinguish specific strategies matching to athletes' problem. Formulate laboratory and field-based exercises for PST.

First Year – Semester - 2								
Course Number	Course Code	Course Category	Course Title	Lecture (L)	Clinical Training (CT)	Research Project (RP) Theses	Total Credits	Total Hours
10	PEP20CT104	CT 6	Psychological Consideration during Injury Rehabilitation	2	0	1	3	60

Learning Outcome
At the end of the course, the students should be able to <ul style="list-style-type: none"> ● Recognise different types of sports injuries. ● Support the athlete psychologically and the sports medicine team during rehabilitation. ● Differentiate individual differences in injury responses. ● Locate the role of sport psychologist in recovery and quick return to play.

First Year – Semester - 2								
Course Number	Course Code	Course Category	Course Title	Lecture (L)	Clinical Training (CT)	Research Project (RP) Theses	Total Credits	Total Hours
11	PEP20CT106	CT 7	Psychology Of Peak Performance	2	0	1	3	60

Learning Outcome
At the end of the course, the students should be able to <ul style="list-style-type: none"> ● Compare the psychological demands placed on different types of sport. ● Employ strategies /techniques to enhance personal control and regulation. ● Examine demand-resource balance for peak performance. ● Differentiate the impact of different type of social support for peak performance ● Distinguish choking and performance slump and ways to deal with choking.

First Year – Semester - 2								
Course Number	Course Code	Course Category	Course Title	Lecture (L)	Clinical Training (CT)	Research Project (RP) Theses	Total Credits	Total Hours
12	PEP20DE108	DE 3	Sports and Society	3	0	0	3	45

Learning Outcome								
At the end of the course, the students should be able to								
<ul style="list-style-type: none"> Recognize the process of socialization and transitions in a sports context. Acquire cultural competence and respect diversity during sports consultations. Identify the prevalence of addictive and unhealthy behaviours. 								

First Year – Semester - 2								
Course Number	Course Code	Course Category	Course Title	Lecture (L)	Clinical Training (CT)	Research Project (RP) Thesis	Total Credits	Total Hours
13	PEP20G E110	GE 1	To be chosen by the student	3	0	0	3	45

First Year – Semester - 2								
Course Number	Course Code	Course Category	Course Title	Lecture (L)	Clinical Training (CT)	Research Project (RP) Thesis	Total Credits	Total Hours
14	PEP20S E112	SE 1	To be chosen by the student	2	0	0	2	30

First Year – Semester -2								
Course Number	Course Code	Course Category	Course Title	Lecture (L)	Clinical Training (CT)	Research Project (RP) Thesis	Total Credits	Total Hours
16	PEP20C R154	CR 2	Clinical Postings - 2	0	0	2	2	60

Learning Outcome	
At the end of the course, the students should be able to	
<ul style="list-style-type: none"> Identify the background of the case Recognize the main concerns of the case. Explain rationales for planning interventions Relate research basis for practice 	
CLINICAL POSTINGS - II	
Case Vignette / Outline from <ul style="list-style-type: none"> Stress Energy balance Injury and Rehabilitation 	At the end of the course, the students should be able to <ul style="list-style-type: none"> Identify key points of the case

<ul style="list-style-type: none"> ● Mental Toughness ● Attentional Control <p>Problem-based Assessment - Process</p> <ul style="list-style-type: none"> ● Keypoints ● Rationale ● Evidence-based <p>Logbook</p> <ul style="list-style-type: none"> ● Academic learning ● Personal growth learning 	<ul style="list-style-type: none"> ● Demonstrate the rationale of case analysis/diagnosis ● Provide evidence-base for an action plan
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First Year – Semester - 2								
Course Number	Course Code	Course Category	Course Title	Lecture (L)	Clinical Training (CT)	Research Project (RP) Thesis	Total Credits	Total Hours
17	PEP20R P156	RP 1	Research Seminar-I	0	0	3	3	90

Learning outcomes
<p>At the end of the course, the student will be able to</p> <ul style="list-style-type: none"> ● Formulate a research question and prepare a research protocol ● Implement the research protocol and use appropriate statistical methods for analyzing the data and write a research article

Each candidate, as part of course completion requirements, should submit a dissertation in the domain of sports and exercise psychology.

Students are taught how to generate a hypothesis; how to design experiments to prove or disprove a hypothesis, how to test a null hypothesis; requirements of good experimental design; use of instruments for research,

Within the framework and facilities of the Faculty Of Sports And Exercise Sciences and other available infrastructure of the University, the students will be assigned a dissertation/research project. They will also be asked to read about background information regarding the topic of their study and do a literature survey and prepare a project outline (research proposal) in consultation with the faculty.

The faculty supervisor by periodic monitoring will guide the work of the student. The student will spend roughly 90 working days (approx 40 working days in the 3rd semester and 50 working days in the fourth- semester) on the allotted project. The student will be continuously assessed and graded by the faculty and HOD on their attendance, devotion to work, data gathering, honest and authentic lab work; documentation, and interpretation and in the overall preparation of final dissertation report. The dissertation work will thus constitute an important objective proof of the knowledge and academic work/experience gained by them in the M. Sc. Sports and exercise Psychology Program.

The research project work could be laboratory-based. Permission may be granted to select the number of students, to carry out a part of their lab work in external institutions by the HoD, based on the needs assessment and scientific depth of the research and as part of collaborations.

The summative evaluation of the project would be done by University examination based on the content and output of the submitted dissertation; and dissertation *viva voce* before the examiners. A dissertation is a bound form of a detailed report of the research carried out by each student. It has to be presented in the internationally accepted format containing a title sheet, bonafide certificate, contents, introduction, review of literature, the scope of the research

including lacunae; objectives or hypothesis, experimental design and results, discussion and summary, references and acknowledgement. The model format of layout, designing, an order of binding; referencing style are available on the website (www.sriramachandra.edu.in- under research) and may be followed. The framework for evaluation of formative and summative assessments is provided in section 24, Table 16.2 and the scheme of examinations Table 29. A passing minimum of 50% in the continuous assessment is essential to qualify for appearing in the end semester with $\geq 80\%$ attendance.

It is desirable that the student is encouraged to submit one publication or presentation from out of the dissertation before appearing for the university examinations. This will be a culmination of the three semesters of a research orientation of the students, which will be an asset to any organization employing them.

Second Year – Semester - 3								
Course Number	Course Code	Course Category	Course Title	Lecture (L)	Clinical Training (CT)	Research Project (RP) Thesis	Total Credits	Total Hours
18	PEP20CT 201	CT 8	Psycho-Social Perspectives in Sports	2	1	1	4	90
23	PEP20CL 251	CL 3	Psycho-Social Perspectives In Sports - Practicals	0	0	3	3	90

Learning Outcome	
	<p>At the end of the course, the students should be able to</p> <ul style="list-style-type: none"> • Value diversity in the sports context • Interpret types of aggression to minimize negative effects. • Describe the impact of the audience in sports performance • Identify social-cognitive perspective in sports coaching • Describe the issues related to women athletes

Second Year – Semester - 3								
Course Number	Course Code	Course Category	Course Title	Lecture (L)	Clinical Training (CT)	Research Project (RP) Thesis	Total Credits	Total Hours
19	PEP20C T203	CT 9	Interpersonal Skills in Sports Organization	2	0	2	4	90

Learning Outcome								
<p>At the end of the course, the students should be able to</p> <ul style="list-style-type: none"> • Explain the organizational structure and levels in a sports organization. • Create appropriate management strategies to deal with stress in organizations. • Select strategies to manage conflict personally and professionally • Identifying the skills and characteristics and take responsibility for the work. • Identify team climate and create an environment for an appropriate process for intervention • Interpret the emotions of others and have empathy, to positively influence the members of the team. 								

Second Year – Semester – 3								
Course Number	Course Code	Course Category	Course Title	Lecture (L)	Clinical Training (CT)	Research Project (RP) Thesis	Total Credits	Total Hours
20	PEP20C T205	CT 10	Positive Athlete Development	2	1	0	3	60

Learning Outcome								
<p>At the end of the course, the students should be able to</p> <ul style="list-style-type: none"> • Understand basic counselling skills as practised by an effective counsellor. • Describe the importance of creativity in sports for planning strategies in sports • Classify passion in sports for activities in sustainable psychological wellbeing & self-growth • Explain the positive aspects of human experience • Manage factors related to career transition. 								

Second Year – Semester – 3								
Course Number	Course Code	Course Category	Course Title	Lecture (L)	Clinical Training (CT)	Research Project (RP) Thesis	Total Credits	Total Hours

21	PEP20C T207	CT 11	Professional Practice In Sports	2	1	0	3	60
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Learning Outcome								
At the end of the course, the students should be able to								
<ul style="list-style-type: none"> Choose the appropriate model of consultancy. Distinguish the role of a sports psychologist to meet the demand in the sports context. Select models of consultancy for people with special needs. Question self practices and identify alternative measures through reflective practice. 								

Second Year – Semester – 3								
Course Number	Course Code	Course Category	Course Title	Lecture (L)	Clinical Training (CT)	Research Project (RP) Thesis	Total Credits	Total Hours
22	PEP20G E209	GE 2	To be chosen by the student	3	0	0	3	45

Second Year – Semester - 3								
Course Number	Course Code	Course Category	Course Title	Lecture (L)	Clinical Training (CT)	Research Project (RP) Thesis	Total Credits	Total Hours
24	PEP20 CR253	CR 3	Clinical Postings – III	0	0	2	2	60

Learning Outcome	
At the end of the course, the students should be able to	
<ul style="list-style-type: none"> Identify the background of the case Recognize the main concerns of the case. Explain rationales for planning interventions Relate research basis for practice 	

CLINICAL POSTINGS - III	
Case Vignette / Outline from <ul style="list-style-type: none"> Diversity context Aggression Passion Career transition Problem-based Assessment - Process <ul style="list-style-type: none"> Keypoints Rationale Evidence-based Logbook <ul style="list-style-type: none"> Academic learning Personal growth learning 	At the end of the course, the students should be able to <ul style="list-style-type: none"> Identify key points of the case Demonstrate the rationale of case analysis/diagnosis Provide evidence-base for an action plan

- The students posted will be given a case vignette. The students learn about dealing with the case through the experience of solving a problem found in trigger material.
- The process allows for the development of desirable skills and attributes to be an effective sports and exercise psychologist.
- The emphasis will be on - what they already know - what they need to know - how and where to access new information that may lead to the resolution of the problem.
- Session notes are to be maintained with complete details and follow up, duly signed by the faculty in-charge which should be submitted at the end of the semester.

(Case records not duly signed by the supervisor and incomplete case sheets will not be considered for evaluation.)

Define Assessments period and mode here – a minimum of 10 cases to be covered within one semester

Second Year – Semester - 3								
Course Number	Course Code	Course Category	Course Title	Lecture (L)	Clinical Training (CT)	Research Project (RP) Thesis	Total Credits	Total Hours
25	PEP20R P255	RP 2	Research Seminar-II	0	0	3	3	90

Learning outcomes

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

- Formulate a research question and prepare a research protocol
- Implement the research protocol and use appropriate statistical methods for analyzing the data and write a research article

Each candidate, as part of course completion requirements, should submit a dissertation in the domain of sports and exercise psychology.

Students are taught how to generate a hypothesis; how to design experiments to prove or disprove a hypothesis, how to test a null hypothesis; requirements of good experimental design; use of instruments for research,

Within the framework and facilities of the Faculty Of Sports And Exercise Sciences and other available infrastructure of the University, the students will be assigned a dissertation/research project. They will also be asked to read about background information regarding the topic of their study and do a literature survey and prepare a project outline (research proposal) in consultation with the faculty.

The faculty supervisor by periodic monitoring will guide the work of the student. The student will spend roughly 90 working days (approx 40 working days in the 3rd semester and 50 working days in the fourth- semester) on the allotted project. The student will be continuously assessed and graded by the faculty and HOD on their attendance, devotion to work, data gathering, honest and authentic lab work; documentation, and interpretation and in the overall preparation of final dissertation report. The dissertation work will thus constitute an important objective proof of the knowledge and academic work/experience gained by them in the M. Sc. Sports and exercise psychology Programme.

The research project work could be laboratory-based. Permission may be granted to select the number of students, to carry out a part of their lab work in external institutions by the HoD, based on the needs assessment and scientific depth of the research and as part of collaborations.

The summative evaluation of the project would be done by University examination on the basis of content and output of the submitted dissertation; and dissertation *viva voce* before the

examiners. A dissertation is a bound form of a detailed report of the research carried out by each student. It has to be presented in the internationally accepted format containing a title sheet, bonafide certificate, contents, introduction, review of literature, the scope of the research including lacunae; objectives or hypothesis, experimental design and results, discussion and summary, references and acknowledgement. The model format of layout, designing, an order of binding; referencing style are available on the website (www.sriramachandra.edu.in- under research) and may be followed. The framework for evaluation of formative and summative assessments is provided in section 24, Table 16.2 and the scheme of examinations Table 29. A passing minimum of 50% in the continuous assessment is essential to qualify for appearing in the end semester with $\geq 80\%$ attendance.

It is desirable that the student is encouraged to submit one publication or presentation from out of the dissertation before appearing for the university examinations. This will be a culmination of the three semesters of a research orientation of the students, which will be an asset to any organization employing them.

Second Year – Semester - 4								
Course Number	Course Code	Course Category	Course Title	Lecture (L)	Clinical Training (CT)	Research Project (RP) Thesis	Total Credits	Total Hours
26	PEP20R P252	RP 3	Dissertation & Viva Voce	0	0	6	6	180

Learning outcomes
At the end of the course, the student will be able to <ul style="list-style-type: none"> Formulate a research question and prepare a research protocol Implement the research protocol and use appropriate statistical methods for analyzing the data and write a research article

Each candidate, as part of course completion requirements, should submit a dissertation in the domain of sports and exercise psychology.

Students are taught how to generate a hypothesis; how to design experiments to prove or disprove a hypothesis, how to test a null hypothesis; requirements of good experimental design; use of instruments for research,

Within the framework and facilities of the Faculty Of Sports And Exercise Sciences and other available infrastructure of the University, the students will be assigned a dissertation/research project. They will also be asked to read about background information regarding the topic of their study and do a literature survey and prepare a project outline (research proposal) in consultation with the faculty.

The faculty supervisor by periodic monitoring will guide the work of the student. The student will spend roughly 90 working days (approx 40 working days in the 3rd semester and 50 working days in the fourth- semester) on the allotted project. The student will be continuously assessed and graded by the faculty and HOD on their attendance, devotion to work, data gathering, honest and authentic lab work; documentation, and interpretation and in the overall preparation of final dissertation report. The dissertation work will thus constitute an important objective proof of the knowledge and academic work/experience gained by them in the M. Sc. Sports and Exercise Psychology Programme.

The research project work could be laboratory-based. Permission may be granted to select the number of students, to carry out a part of their lab work in external institutions by the HoD, based on the needs assessment and scientific depth of the research and as part of collaborations.

The summative evaluation of the project would be done by University examination on the basis of content and output of the submitted dissertation; and dissertation *viva voce* before the examiners. A dissertation is a bound form of a detailed report of the research carried out by each student. It has to be presented in the internationally accepted format containing a title sheet, bonafide certificate, contents, introduction, review of literature, the scope of the research including lacunae; objectives or hypothesis, experimental design and results, discussion and summary, references and acknowledgement. The model format of layout, designing, an order of binding; referencing style are available on the website (www.sriramachandra.edu.in- under research) and may be followed. The framework for evaluation of formative and summative assessments is provided in Table 16.2 and Table 17.3. A passing minimum of 50% in the continuous assessment is essential to qualify for appearing in the end semester with $\geq 80\%$ attendance.

It is desirable that the student is encouraged to submit one publication or presentation from out of the dissertation before appearing for the university examinations. This will be a culmination of the three semesters of a research orientation of the students, which will be an asset to any organization employing them.

Second Year – Semester - 4								
Course Number	Course Code	Course Category	Course Title	Lecture (L)	Clinical Training (CT)	Research Project (RP) Theses	Total Credits	Total Hours
27	PEP20IN 254	IN 1	Internship	0	0	6	6	270

Learning outcomes
<p>At the end of the course, the student will be able to</p> <ul style="list-style-type: none"> To develop professional work habits and understand the difference in working styles. Independently formulate a plan of action best suited for the athlete/client.



SRI RAMACHANDRA
INSTITUTE OF HIGHER EDUCATION AND RESEARCH
(Category - I Deemed to be University) Porur, Chennai

SRI RAMACHANDRA FACULTY OF SPORTS & EXERCISE SCIENCES

REGULATIONS AND SYLLABUS FOR
MASTER OF PHYSIOTHERAPY (SPORTS) DEGREE PROGRAM
(Under Credit Based Semester System)

MASTER OF PHYSIOTHERAPY (SPORTS)

Preamble:

Sri Ramachandra Institute of Higher Education & Research (Deemed to be University) realized the need for creating qualified Allied Health care professionals and has introduced innovative, competency based programs.

Definition adopted:

“A sports physiotherapist is a recognized professional who demonstrates advanced competencies in the promotion of safe physical activity participation, provision of advice, and adaptation of rehabilitation and training interventions, for the purposes of preventing injury, restoring optimal function, and contributing to the enhancement of sports performance, in athletes of all ages and abilities, while ensuring a high standard of professional and ethical practice”.

The objectives of the postgraduate graduate sports program in Sri Ramachandra Institute of Higher Education and Research Institute are to produce competent sports physiotherapists,

1. As a **manager of the sports person** responsible for
 - i. Preventing injury
 - ii. Providing acute physiotherapy intervention
 - iii. Planning and executing rehabilitation
 - iv. Enhancing sports performance
2. As an **advisor promotes safe and active lifestyle** among the sports person
3. As a competent **professional and a lifelong learner** demonstrates high standards of professional ethics, integrity & continuous learning

Roles:

- ✓ Manager
- ✓ Advisor
- ✓ Professional
 - Ethical practitioner
 - Communicator
 - Team player
- ✓ Reflective practitioner
- ✓ Lifelong learner
- ✓ Innovator

Competencies:

- I. Manager
 - I.1. Demonstrate knowledge of basic sports science subjects required to practice as a sports physiotherapist
 - I.2. Demonstrate the knowledge in related clinical subjects
 - I.3. Identifies the appropriate physiotherapy investigations/ Procedures required
 - I.4. Demonstrates skills in handling the physiotherapy equipments
 - I.5. Performs the physiotherapy procedures skillfully
 - I.6. Documents the results in prescribed format
 - I.7. Provide appropriate client care considering socio economic and cultural aspects informed by research evidence
 - I.8. Adheres to the safety procedures
- II. Critical thinking
 - II.1. Demonstrates sound professional judgment and reasoning in decision-making in sports injury rehabilitation
 - II.2. Synthesizes and analyzes the sports science information in decision making
 - II.3. Integrates relevant information with previous learning, experience, professional knowledge, and current practice models in sports sciences
- III. Ethics and accountability
 - i. Adheres to the Code of Ethics prescribed by the professional body/Faculty/Department
 - ii. Maintains appropriate relationships and boundaries with clients and other members involved in the care
- IV. Communication
 - i. Communicates effectively with the clients, inter professional team members, and other stakeholders using client-centered principles that address physical, social, cultural or other barriers to communication
 - ii. Delivers information in a respectful, thoughtful manner
 - iii. Uses a systematic approach to record keeping of service provided
 - iv. Maintains confidentiality and security in the sharing, transmission, storage, and management of information.
 - v. Demonstrates an appropriate use of information technology relevant to their field
- V. Professional Responsibility

- i. Practices as a sports physiotherapist exercising their professional judgment
- ii. Demonstrates a commitment to their clients , public and profession
- iii. Practices within scope of professional and personal limitations and abilities
- iv. Demonstrates professional integrity
- v. Practices in a non-discriminatory way
- vi. Demonstrates a commitment to the growth of the profession

VI. Inter professional relationship

- i. Collaborates with inter professional team and other stakeholders
- ii. Demonstrates flexibility within the sports team
- iii. Works effectively with inter professional team and other stakeholders to manage positive professional relationships
- iv. Manages differences, misunderstandings, and limitations that may contribute to inter professional tensions in an effective and diplomatic manner as a member of the sports team

VII. Reflective practice

- i. Demonstrates the importance of self-awareness and self-reflection
- ii. Be able to reflect critically on personal practice in order to be able to improve it.
- iii. Takes responsibility for personal and professional development

VIII. Lifelong learning committed to continuous improvement of skills and knowledge

- i. Demonstrates commitment to continuing competence
- ii. Apply newly gained knowledge or skills to the care of the clients
- iii. Familiar with contemporary sports sciences research methods
- iv. Demonstrates the process of evidence-based practice (Ask, acquire, appraise, apply and assess)

Intake: 10 students per academic year

**MPT (Sports)
Course content**

*Offered in Blended mode

First Year – Semester -1								
Course Number	Course Code	Course Category	Course Title	Lecture (L)	Tutorial	Practical	Total Credits	Total Hours
1	PSP20CT101	CT1	Applied Sciences for Sports Physiotherapist*	2	1	1	4	90

Rationale for the inclusion of the course in the programme

Revise and update knowledge in basic medical sciences require to learn and practice sports physiotherapy.

Learning Outcomes

On completion of this course, students should be able to:

CO1. Demonstrate knowledge of Anatomy, Physiology and Biochemistry Knowledge related to sports physiotherapy.

CO2. Demonstrate application of knowledge of Anatomy, Physiology and Biochemistry Knowledge related to sports physiotherapy.

CO3. Demonstrate advanced knowledge of musculoskeletal anatomy and physiology as it relates to musculoskeletal diagnoses and associated physical assessments.

First Year – Semester -1									
Course Number	Course Code	Course Category	Course Title	RG	Lecture (L)	Tutorial	Practical	Total Credits	Total Hours
2	PSP20CT102	CT2	Kinesiology and Biomechanics for Sports Physiotherapists*	A	2	2	-	4	90
6	PSP20CL106	CL1	Kinesiology and Biomechanics for Sports Physiotherapists (Practicals)	A	-	-	2	2	60

Rationale for the inclusion of the course in the programme

Revise and update knowledge in basic medical sciences require to learn and practice sports physiotherapy

Learning Outcomes

On completion of this course, students should be able to:

CO1. Demonstrate advanced biomechanics and kinesiology knowledge and skills in sports physiotherapy.

CO2. Demonstrate application of biomechanics and kinesiology knowledge and skills in sports physiotherapy.

CO3. Demonstrate skills in analyzing and interpreting movement analysis reports

CO4: Demonstrate knowledge and skills in applying the kinesiological principles in clinical decision making

First Year – Semester -1									
Course Number	Course Code	Course Category	Course Title	RG	Lecture (L)	Tutorial	Practical	Total Credits	Total Hours
3	PSP20CT103	CT3	Musculoskeletal Physiotherapy theory and practice-I*	B	2	1	-	3	60
7	PSP20CL107	CL2	Musculoskeletal Physiotherapy theory and practice-I (Practicals)	B	-	-	2	2	60

Rationale for the inclusion of the course in the programme

To develop advanced knowledge in biopsychosocial and physiotherapy theory as it relates to examination of patients with musculoskeletal disorders and develop advanced skills in physical examination of patients with musculoskeletal disorders.

Learning Outcomes

On completion of this course, students should be able to:

CO1. Demonstrate advanced knowledge of clinical reasoning theory.

CO2. Demonstrate advanced application of knowledge of clinical reasoning theory, principles of musculoskeletal examination and common clinical patterns.

CO3. Demonstrate advanced knowledge of how clinical reasoning is informed by information obtained in the patient interview and physical examination.

CO4. Demonstrate advanced proficiency in performing a musculoskeletal physical examination.

First Year – Semester -1								
Course Number	Course Code	Course Category	Course Title	Lecture	Tutorial	Practical	Total Credits	Total Hours
4	PSP20CT104	CT 4	Research Methodology and Biostatistics	4	0	0	4	60

Objectives	Learning outcomes
<ul style="list-style-type: none"> To understand the basics of research To formulate scientific hypothesis To test the hypothesis and analyze the results 	<p>At the end of the course the student will be able to</p> <ul style="list-style-type: none"> Prepare a research protocol Critically evaluate Journal articles Write a paper for publication with assistance of the guide

First Year – Semester -1								
Course Number	Course Code	Course Category	Course Title	Lecture	Tutorial	Practical	Total Credits	Total Hours
5	PSP20CT105	CT5	Essentials of Exercise Physiology (Equivalent to PEP20DE111)	3	0	0	3	45

Learning Outcome
At the end of the course, the students should be able to <ul style="list-style-type: none"> Describe the physiological changes in various systems produced during exercise Demonstrate knowledge and understanding of the physiologic consequences of training. Discuss the potential uses of cardiopulmonary exercise testing

First Year – Semester -1								
Course Number	Course Code	Course Category	Course Title	Lecture	Tutorial	Practical	Total Credits	Total Hours
8	PSP20CR108	CR1	Clinical Training-I	0	0	3	3	135

Learning Outcome
On completion of this course, students should be able to: CO 1: Reflect on the assessment and screening of Sports injury CO 2: Reflect on the Bio-Mechanical and kinesiological evaluation of athletes CO 3: Appreciate the role of sports physiotherapist on field and at rehabilitation facilities CO 4: Appreciate the role of various professionals in sports CO 5: Recognize the scope of Sports physiotherapy
Assessment: Log book, Written Assignment and Group discussion

First Year – Semester -2									
Course Number	Course Code	Course Category	Course Title	RG	Lecture	Tutorial	Practical	Total Credits	Total Hours

9	PSP20CT201	CT6	Musculoskeletal Physiotherapy theory and practice- II*	C	2	2	-	4	90
13	PSP20CL205	CL3	Musculoskeletal Physiotherapy theory and practice- II (Practicals)	C	-	-	2	2	60

Rationale for the inclusion of the course in the programme:

To develop advanced knowledge in biopsychosocial and physiotherapy theory as it relates to examination of patients with musculoskeletal disorders and develop advanced skills in physical examination of patients with musculoskeletal disorders.

Learning Outcome

At the end of the course, the students should be able to

CO1. Critically analyse the role of exercise in general health, well-being and management of injury and/or a chronic condition affecting health.

CO2. Demonstrate the application of various exercise tests, with consideration of their indications, benefits and limitations.

CO3. Demonstrate advanced clinical reasoning and skills in examination and management of movement dysfunction in musculoskeletal disorders.

CO4. Explain, and apply the principles of functional assessment, motor learning and motor control theory in patient assessment and exercise prescription in a case presentation

First Year – Semester -2

Course Number	Course Code	Course Category	Course Title	Lecture	Tutorial	Practical	Total Credits	Total Hours
10	PSP20CT202	CT7	Fitness Training	2	1	1	4	90

Learning Outcome

At the end of the course, the students should be able to

- Describe the responses and adaptations to training
- Demonstrate the procedures involved in sport-specific fitness assessments.
- Discuss the processes and potential application of different methods of training

First Year – Semester -2

Course Number	Course Code	Course Category	Course Title	Lecture	Tutorial	Practical	Total Credits	Total Hours
11	PSP20CT203	CT8	Evidence informed clinical practice	2	1	-	3	60

Rationale for the inclusion of the course in the programme:

Provide graduate students with the knowledge and skills to search for, and critically review quantitative research evidence in a systematic and rigorous manner, that informs a clinical question and enables them to become educated consumers of health research which can be used to inform advanced clinical care and lifelong learning

Learning Outcome

At the end of the course, the students should be able to

- CO1. Design a well framed clinical review question relevant to clinical practice
- CO2. Develop a structured search strategy which enables access to, and search of, sources of research evidence
- CO3. Explain the design and conduct of experimental and observational studies relevant to Allied Health contexts and practice
- CO4. Identify risk of bias and rigor of primary and secondary research evidence using critical appraisal processes
- CO5. Synthesise findings from relevant primary research into a body of evidence
- CO6. Discuss how review findings could be effectively translated into clinical practice contexts taking into account clinical expertise, clinical contexts and client's values and circumstances

First Year – Semester -2

Course Number	Course Code	Course Category	Course Title	Lecture	Tutorial	Practical	Total Credits	Total Hours
12	PSP20CT204	CT9	Essentials of Sports Nutrition and Sports Psychology	2	1	-	3	60

Rationale for the inclusion of the course in the programme:

To develop an understanding of concepts and application of nutrition and psychology in injury rehabilitation context as it relates to dealing with patients during injury rehabilitation

Learning Outcome

At the end of the course, the students should be able to

- CO1-Emphasis the need of balanced diet in rehabilitation context
- CO2-Discuss the requirement of macro and micronutrients to enhance performance and recovery
- CO3-Apply the knowledge of sports nutrition in athletic setting.
- CO4-Explain the concepts of sports motivation during rehabilitation.

- CO5-Analyse the dynamics of emotions during rehabilitation.

- CO6-Apply basic techniques of psychology during rehabilitation.

First Year – Semester -2								
Course Number	Course Code	Course Category	Course Title	Lecture	Tutorial	Practical	Total Credits	Total Hours
14	PSP20CR206	CR2	Clinical Training-II	0	0	4	4	180

Learning Outcome
On completion of this course, students should be able to: CO 1: Perform basic assessment and screening of sports injury under supervision CO 2: Conduct kinesiological screening under supervision CO 3: Assist the sports physiotherapist in assessing and providing physiotherapy care under supervision CO 4: Communicate effectively with sports management team including players CO 5: Reflect on the sports team dynamics
Assessment: Log book, Case presentation, Reflection writing

Second Year – Semester -3									
Course Number	Course Code	Course Category	Course Title	RG	Lecture	Tutorial	Practical	Total Credits	Total Hours
15	PSP20CT301	CT10	Fundamentals of Sports Physiotherapy*	D	3	1	-	4	75
18	PSP20CL304	CL4	Fundamentals of Sports Physiotherapy (Practicals)	D	-	-	2	2	60

Rationale for the inclusion of the course in the programme:

To advance contemporary knowledge and skills of biomedical and clinical sciences relevant to sports injury prevention, assessment and management.

Learning Outcome

At the end of the course, the students should be able to
CO1. Develop advanced contemporary science-based knowledge in sports physiotherapy practice
CO2. Apply and integrate advanced contemporary evidence and science-based knowledge to the assessment and management of an athlete in sports physiotherapy practice.
CO3. Develop and revise the theoretical basis of sports physiotherapy across specific populations.
CO4. Develop a case management plan that reflects the theoretical basis of sports physiotherapy practice

Second Year – Semester -3								
Course Number	Course Code	Course Category	Course Title	Lecture	Tutorial	Practical	Total Credits	Total Hours
16	PSP20CT302	CT11	Return to sport*	2	1	-	3	60

Rationale for the inclusion of the course in the programme:

To provide opportunities for students to reflect on their current practice and apply advanced knowledge of theories of motivation, learning and behaviour change underpinning health and disability to the facilitation of complex and challenging change interventions in physiotherapy practice.

Learning Outcome

At the end of the course, the students should be able to

CO1. Apply advanced knowledge of critical thinking and reasoning in self-reflection of current physiotherapy practice.

CO2. Apply advanced knowledge of biopsychosocial practice in physiotherapy practice.

CO3. Apply advanced knowledge of neuroscience processes underpinning learning.

CO4. Apply and justify theories of motivation underpinning health and disability to the facilitation of complex and challenging change interventions.

CO5. Apply and justify theories of learning underpinning health and disability to the facilitation of complex and challenging change interventions.

CO6. Apply and justify theories of behavior change underpinning health and disability to the facilitation of complex and challenging change interventions.

CO7. Apply advanced knowledge of challenges that may impede the progress of setting and achieving collaborative goals for facilitating change.

Second Year – Semester -3									
Course Number	Course Code	Course Category	Course Title	RG	Lecture	Tutorial	Practical	Total Credits	Total Hours
17	PSP20CT303	CT12	Sports Injury rehabilitation*	E	3	1	-	4	75

19	PSP20CL305	CL5	Sports Injury rehabilitation (Practicals)	E	-	-	2	2	60
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Rationale for the inclusion of the course in the programme:

To provide opportunities for students to understand the principles and current practice of sports injury rehabilitation.

Learning Outcome

At the end of the course, the students should be able to

CO1: Apply the advanced knowledge of rehabilitation in managing clients with sports injuries

CO2: Demonstrate knowledge and skills in identifying the impairments, activity limitations and participatory restrictions caused due to sports injury

CO3: Select and use appropriate outcome measure to document the impairments, activity limitations and participatory restrictions caused due to sports injury

CO4: Integrate the basic sports sciences knowledge in rehabilitating the clients with various sports injuries

CO5: Demonstrate the knowledge and skills in rehabilitating the clients as effective team member

CO6: Plan and implement evidence based physical rehabilitation protocol for various sports injuries

First Year – Semester -3

Course Number	Course Code	Course Category	Course Title	Lecture	Tutorial	Practical	Total Credits	Total Hours
20	PSP20CR306	CR3	Clinical Training-III	0	0	4	4	180

Learning Outcome

On completion of this course, students should be able to:

CO 1: Perform fitness assessment and interpret the results

CO 2: Interpret the screening results and plan physiotherapy protocol based on the results

CO 3: Perform on field assessment and provide physiotherapy care

CO 4: Plan and execute rehabilitation protocol for injured athletes in consultation with the superiors

CO 5: Communicate effectively with the team and players

CO 6: Document the assessment, management and evaluation cycle clearly as per the centers protocol

First Year – Semester -3								
Course Number	Course Code	Course Category	Course Title	Lecture	Tutorial	Practical	Total Credits	Total Hours
21	PSP20RP307	RP1	Research Seminar	0	0	2	2	60

Learning Outcome								
On completion of this course, students should be able to:								
CO1- Appropriately and Efficiently Search Scientific Literature								
CO2-Critically review published scientific publication								
CO3-Present critical appraisal of the scientific article at department journal club								
CO4-Critical review of scientific publications in the chosen area for dissertation								

Second Year – Semester -4								
Course Number	Course Code	Course Category	Course Title	Lecture	Tutorial	Practical	Total Credits	Total Hours
22	PSP20CT401	CT13	Physical activity for health Promotion	2	1	-	3	60

Rationale for the inclusion of the course in the programme:								
To introduce physical activity as a component in promoting health across lifespan								
Learning Outcome								
At the end of the course, the students should be able to								
CO1: Apply the knowledge and skills in prescribing physical activity to promote health across lifespan								
CO2: Analyse the individual factors in carrying out regular physical activity for health promotion								
CO3: Apply the principles of sports in promoting physical activity behavior								
CO4: Identify the facilitating factors and barriers in continuing physical activity among health individuals and sports persons								

Second Year – Semester -4									
Course Number	Course Code	Course Category	Course Title	RG	Lecture	Tutorial	Practical	Total Credits	Total Hours
23	PSP20CT402	CT14	Advanced Sports Physiotherapy Practice*	F	3	1	-	4	75

24	PSP20CL403	CL6	Advanced Sports Physiotherapy Practice (Practicals)	F	-	-	2	2	60
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Rationale for the inclusion of the course in the programme:

This course provides the advanced knowledge, skills and attitudes required for physiotherapists to care the athletes of various level

Learning Outcome

At the end of the course, the students should be able to

CO1. Critically analyse the role of physiotherapy in sports injury management

CO2. Demonstrate the application of various sports physiotherapy techniques in clients with sports injuries

CO3. Demonstrate advanced clinical reasoning and skills in examination and physiotherapy management of sports injuries

CO4. Explain, and apply the principles of functional assessment, motor learning and motor control theory in client assessment and exercise prescription in a case presentation

First Year – Semester -4

Course Number	Course Code	Course Category	Course Title	Lecture	Tutorial	Practical	Total Credits	Total Hours
25	PSP20CR404	CR4	Clinical Training-IV	0	0	5	5	225

Learning Outcome

On completion of this course, students should be able to:

CO 1: Perform fitness assessment and interpret the results

CO 2: Interpret the screening results and plan physiotherapy protocol based on the results

CO 3: Perform on field assessment and provide physiotherapy care

CO 4: Plan and execute rehabilitation protocol for injured athletes in consultation with the medical and rehabilitation team members

CO 5: Communicate effectively with the team and players

CO 6: Document the assessment, management and evaluation cycle clearly as per the centers protocol

Assessment:

DOPS, Logbook, Portfolio, Case presentation and Journal writing

First Year – Semester -3

Course Number	Course Code	Course Category	Course Title	Lecture	Tutorial	Practical	Total Credits	Total Hours
26	PSP20RP405	RP2	Dissertation and Viva Voce	0	0	6	6	180

Learning Outcome
<p>On completion of this course, students should be able to:</p> <p>CO1- Conduct the proposed research study after obtaining clearance from Ethics committee</p> <p>CO2-Analyze the data obtained with appropriate statistical test and tool</p> <p>CO3-Interpret the findings of the study in the light of the recent scientific literature</p> <p>CO4-Write the Dissertation for submission</p>

Each candidate, as part of course completion requirements, should submit a dissertation in the domain of Sports Physiotherapy.

Students are taught how to generate a hypothesis; how to design experiments to prove or disprove a hypothesis, how to test a null hypothesis; requirements of good experimental design; use of instruments for research,

Within the framework and facilities of the Faculty Of Sports And Exercise Sciences and other available infrastructure of the University, the students will be assigned a dissertation/research project. They will also be asked to read about background information regarding the topic of their study and do a literature survey and prepare a project outline (research proposal) in consultation with the faculty.

The faculty supervisor by periodic monitoring will guide the work of the student. The student will spend roughly 90 working days (approx 40 working days in the 3rd semester and 50 working days in the fourth- semester) on the allotted project. The student will be continuously assessed and graded by the faculty and HOD on their attendance, devotion to work, data gathering, honest and authentic lab work; documentation, and interpretation and in the overall preparation of final dissertation report. The dissertation work will thus constitute an important objective proof of the knowledge and academic work/experience gained by them in the MPT (Sports) degree program.

The research project work could be laboratory-based. Permission may be granted to select the number of students, to carry out a part of their lab work in external institutions by the HoD, based on the needs assessment and scientific depth of the research and as part of collaborations.

The summative evaluation of the project would be done by University examination on the basis of content and output of the submitted dissertation; and dissertation *viva voce* before the examiners. A dissertation is a bound form of a detailed report of the research carried out by each student. It has to be presented in the internationally accepted format containing a title sheet, bonafide certificate, contents, introduction, review of literature, the scope of the research including lacunae; objectives or hypothesis, experimental design and results, discussion and summary, references and acknowledgement. The model format of layout, designing, an order of binding; referencing style are available on the website (www.sriramachandra.edu.in- under research) and may be followed. The framework for evaluation of formative and summative assessments is provided in Table 14.2 and Table 15.1. A passing minimum of 50% in the continuous assessment is essential to qualify for appearing in the end semester with $\geq 80\%$ attendance.

It is desirable that the student is encouraged to submit one publication or presentation from out of the dissertation before appearing for the university examinations. This will be a culmination of the three semesters of a research orientation of the students, which will be an asset to any organization employing them.



**SRI RAMACHANDRA
INSTITUTE OF HIGHER EDUCATION AND RESEARCH
(DEEMED TO BE UNIVERSITY)
Porur, Chennai – 600116**

**FACULTY OF
SPORTS AND EXERCISE SCIENCES**

**REGULATIONS & SYLLABUS
M.Sc. BIODYNAMICS DEGREE PROGRAM
(Choice Based Credit System – 2015)**

**M.Sc. BIOKINETICS
DEGREE PROGRAM****INTRODUCTION**

The M.Sc. (**Biokinetics**), is a co-badged post graduate program of Sri Ramachandra Institute of Higher Education and Research and University of Cape Town, South Africa. This 2 year program offers a holistic approach to a profound understanding of application of exercise in rehabilitation or performance enhancement. It is concerned with health promotion, the maintenance of physical abilities and final phase rehabilitation, by means of scientifically-based physical activity prescription. Further, this program is designed to provide a thorough training in a particular subject area through formal lectures and / or seminar with practical experience. The syllabus framed by the University for the Program is designed to achieve an internationally accepted standard and also to better understand the modern concepts of movement analysis. The research project provides training in a particular area through original exploration and experimentation, culminating in the preparation of a dissertation that concludes the research undertaken. Thus the program shall impart advanced theoretical and practical aspects of subjects.

Scope of the Program:

Biokineticists use physical activity as their key therapeutic modality. Biokinetic scope of practice include health & wellness, sports & exercise performance enhancement, final phase of orthopaedic rehabilitation and management of chronic diseases. Our applied learning techniques ensure our students are fully prepared for the workplace on graduation. The career options include Biokineticist, Strength and Conditioning Coach, Lecturer, PhD Student, Research Assistant and Post-Doctoral Researcher.

Program Summary

1. **M.Sc. Biokinetics** DEGREE PROGRAM is a postgraduate degree program offered under Choice Based Credit System,2015.
2. It is a 2 years program with four semesters of study carrying a total credits of **90** under the Faculty of Sports and Exercise Science.
3. Students register for core theory (CT), core lab (CL), electives and ability enhancement courses.
4. The program offers a research project for each student
5. Evaluation is based on the UGC recommended 10-point grading system. Grades and classes will be declared as per university rules

Program Objectives:

PO1-Understand and be able to apply specific techniques to functionally assess orthopaedic injuries/conditions to provide specific exercise prescription programmes for effective final phase rehabilitation of orthopaedic injuries/conditions

PO2- Able to promote health and implement health promotion through physical activity in groups and at population level

PO3-Apply scientific principles in exercise physiology, biomechanics, sport psychology, motor control and motor development, sports nutrition, injury prevention, periodization and recovery, to assist athletes and sports persons optimize performance, aid in recovery and minimize risk of injury.

PO4-Develop competencies in health risk assessment and risk stratification, pre-exercise health-related fitness assessment and interpretation (including a graded exercise test and ECG), contraindications for exercise, exercise prescription and programming, monitoring and progression

Learning outcomes:

- Gain and demonstrate practical knowledge of strategies for final phase rehabilitation of orthopaedic injuries
- Demonstrate knowledge and application of exercise prescription and programming for apparently healthy persons, throughout the life course, for children, adults, older adults and during pregnancy.
- Develop and monitor strength and conditioning programmes for competitive athletes and sports persons
- Plan, implement and interpret appropriate health-related fitness assessments, toward exercise prescription and programming
- Conduct efficient research related to biokinetics and extract meaningful inferences

M.Sc. Biokinetics [S22]

First Year-Semester I							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
1	PSK19CT101	Orthopaedic Rehabilitation – I	3	2		4	75
7	PSK19CL151	Orthopaedic Rehabilitation – I (Practicals)			2	2	60
Objectives		Learning outcomes					
<p>The course offers the biokineticist an essential understanding regarding the incidence, aetiology, and the implications of clinical assessment (including history, symptoms, and special tests) of specific orthopaedic injuries/conditions for rehabilitation strategies. In addition, the graduates will learn and be able to apply specific techniques to functionally assess orthopaedic injuries/conditions to provide specific exercise prescription programmes for effective final phase rehabilitation of orthopaedic injuries/conditions.</p>		<p>CO 1: Gain a theoretical understanding of the common aetiological factors associated with orthopaedic injuries CO 2: Gain a theoretical basis on which to structure and progress a programme of rehabilitation for orthopaedic injuries and to become familiar with injuries and the different manifestation of injuries; CO 3: Gain practical knowledge of strategies for final phase rehabilitation of orthopaedic injuries; CO 4: Practically integrate rehabilitation modalities and assessment; CO 5: Plan a programme of rehabilitation for the injury, monitor and progress appropriately; CO 6: Recognise boundaries of scope of practice and specific role of biokinetics in sports and prevention medicine; CO 7: Assess readiness to return to sport/activity and to communicate with sports person/participant, coach or parent concerning any limitations or concerns.</p>					
PSK19CL151: Practicals							
<p>The aim of this course is to provide an opportunity for “case-based” learning in final phase orthopaedic rehabilitation. Biokineticists will be provided with a series of clinical cases, beginning with a history (partial to complete), some results of functional, clinical and biomechanical</p>		<p>CO.1 Develop and demonstrate competencies in adopting a systematic approach to injury assessment injury prevention and management (Van Mechelen model or similar)</p> <ol style="list-style-type: none"> 1. Devise an evidence-based approach to injury rehabilitation, specific to the area and type of injury; 2. Develop and demonstrate competency in clinical reasoning; 					

<p>assessments (partial to complete), including special tests.</p> <p>Students will be allocated different cases to present. This will involve a brief, evidence-based literature review on the injury or condition, specific aspects related to the history that may be missing, or which can be elaborated, including predisposing and aetiological factors. Students will be asked to speak to the results of any assessments provided, or to suggest others, with motivation. Students will be expected to demonstrate competencies in functional clinical and biomechanical assessment for a specific injury or condition, and to recommend an evidence-based exercise programme and course of rehabilitation, including “return to sport or activity” criteria.</p>	<ol style="list-style-type: none"> 3. Demonstrate an understanding of the limitations and boundaries concerning scope of practice 4. Demonstrate competency in patient handling skills and clinical assessment. 5. Demonstrate competency in writing clinical case notes and referral and follow-up letters
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First Year-Semester I							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
2	PBK19CT103	Research Methodology and Biostatistics (MCT010)	4			4	60
Objectives		Learning outcomes					
<p>The overall aims of this course are several-fold. Firstly, we are aiming to create a research “culture” within the group of biokineticists to inform clinical reasoning and inform evidence-based best practice. Secondly, students must learn and apply sound principles of research design, as it relates to their own research projects, and in evaluating the work of others when reviewing the scientific literature. Therefore, in conjunction with good research design, students will acquire and apply the skills of “critical appraisal”. This will equip students to use an evidence-based approach to both research and clinical decision-making.</p> <p>In addition, students will acquire data management skills and a working knowledge of introductory biostatistics, so that they can select and apply the appropriate biostatistical techniques to specific research questions and data sets. Students will be mentored in scientific writing, such that they will be able to produce; 1) a well-structured and ethical research proposal, 2) a topical and evidence-based literature review, and 3) scholarly interpretations of data gathered and statistically analysed, in the form of an original manuscript, suitable for peer review.</p> <p>Finally, students will be introduced to evaluation, and in particular, programme and process evaluation, as well as qualitative research methodology. These are important skills that may be applied for programme implementation.</p>		<p>CO1-Formulate a testable hypothesis, and choose an appropriate research design for a clinical, practical or applied research question,</p> <p>CO2-Conduct a systematic literature review (in line with PRISMA guidelines);</p> <p>CO3-Develop a well-structured and ethical research proposal;</p> <p>CO4-Apply the basic skills for acquiring data, cleaning data, and organizing data;</p> <p>CO5-Apply basic biostatistical methods required to answer specific research questions related to the research projects;</p> <p>CO6-Interpret data which has been gathered and analyzed and produce a scholarly manuscript/s;</p> <p>CO7-Critically appraise existing peer-reviewed evidence;</p> <p>CO8-Collect, analyse, and interpret the results of qualitative research (i.e. in-depth interviews, focus group discussions, observation);</p> <p>CO9-Understand and be able to apply the various frameworks for process, programme and outcome evaluation.</p>					

First Year: Semester I; Category: Core Theory							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
3	PSK19CT105	Strength and Conditioning for Athletic Performance-I	2		4	4	90
Objectives		Learning outcomes					
<p>There is an increasing need for biokineticists to expand their skills to become specialized sports and conditioning practitioners, especially in the climate of rapidly changing and evolving training methods and approaches. The course aims to provide biokineticists with advanced skills for strength and conditioning training, which will equip them to prescribe training regimes for sporting codes, special populations, general fitness and conditioning regimes, sports performance and the rehabilitation of injuries. Moreover, it has become increasingly evident that many of the health-related benefits of exercise attributed to cardiorespiratory conditioning may also be demonstrated with resistance training and muscle strengthening.</p> <p>The overarching objectives of this module are i) to gain a detailed understanding of the physiological and biomechanical mechanisms associated with strength and resistance training/conditioning, and ii) to be able to apply this understanding to the assessment of strength and muscular endurance, for the purposes of resistance training, exercise prescription, programming, monitoring, progression, periodization and recovery. These principles will be applied to apparently health adult populations, children and adolescents, older adults, and persons with disability.</p> <p>Students are encouraged to write the USA recognized Strength and Conditioning Specialist Examination (CSCS) upon completion of the course (international exam fee applicable), although this will not be a requirement to pass the course.</p>		<p>CO1-Demonstrate an understanding of the underlying mechanisms and physiological, structural and biomechanical adaptations that occur with strength and resistance training;</p> <p>CO2-Apply this knowledge, to address dose, intensity, modality, types of contraction, and movement patterns required for different conditions and sports specific applications.</p> <p>CO3-Assess strength and muscular endurance and movement patterns, in relation to the sport-specific applications/ requirements or specific to the chronic conditions requiring rehabilitation or pre-habilitation;</p> <p>CO4-Interpret results of assessment, against sports-specific requirements to develop a strength and conditioning programme/s; considering modality, dose, progression and periodisation, and the appropriate consideration of types of training including plyometric and eccentric training.</p>					

First Year-Semester I							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
4	PSK19CT107	Biokinetics in sports skills and coaching	2	2		3	60
Objectives		Learning outcomes					
<p>Biokineticists provide exercise prescription, programming and monitoring for the apparently healthy public, as well as persons with chronic conditions. One important area of expertise is providing sports-specific exercise programs that support the acquisition and optimization of sports skills. The biokineticist will provide the specific physical (strength, speed and muscular endurance, cardiorespiratory endurance), as well as psychomotor skills training, that will provide support to coaches, athletes and sports persons. Biokineticists working in the sports environment may be required to provide such training programs for individuals and teams, working with coaches and other support personnel. The ability to understand the team and the coaching dynamic is of critical importance. Implicit in these relationships is some understanding of sports psychology.</p>		<p>CO1-Demonstrate the ability to work within a team and provide evidence-based guidance on sports-specific training for the physical and psychomotor demands of a discipline.</p> <p>CO2-Critically evaluate the physical and psychomotor skills required for specific sporting disciplines, team positions and level of play;</p> <p>CO3-Provide exercise programming, including periodization, to enhance sports-specific skill development and performance;</p> <p>CO4-Demonstrate the ability to modify these programmes for persons with disability, for persons returning to sport following an injury, for persons at different stages of the lifecourse;</p> <p>CO5-Modify sports specific skill training techniques based on differences in equipment, handed-ness, level of play and experience.</p> <p>CO6-Demonstrate an understanding of the basic principles of sport psychology, as these apply to performance and rehabilitation.</p>					

First Year-Semester I							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
5	PSK19CT109	Physical activity & Health Promotion	3			3	45
Objectives		Learning outcomes					
<p>The overarching objectives of this module are to provide i) the basic theoretical understanding concerning physical activity, sedentary behaviour and health, and ii) the practical knowledge and skills to enable graduates to assess, evaluate and interpret results of fitness and health risk assessment, iii) to prescribe and monitor physical activity and health-related fitness in persons across</p>		<p>CO1-Demonstrate an understanding of the Wellness Continuum and domains of wellness, by means of relevant real-life and simulated examples.</p> <p>CO2-Demonstrate knowledge and understanding of the role of physical activity in health and disease.</p> <p>CO3-Demonstrate an understanding and the practical application of models of behaviour change theory in promoting health through physical activity.</p> <p>CO4-Apply appropriate knowledge, skills and values</p>					

<p>the life course, and iv) to be able to promote health and implement health promotion through physical activity in groups and at population level.</p>	<p>related to the role of brief behaviour change counselling (BBCC) and wellness coaching in health promotion and wellness.</p> <p>CO5-Acquire and be able to apply a physiological understanding of growth, development and aging throughout the life course, from early childhood to senior adults, including pregnancy.</p> <p>CO6-Acquire and be able to apply an understanding of the socio-ecological factors that impact on exercise adherence, and health risk behaviours.</p> <p>CO7-Demonstrate knowledge and application of exercise prescription and programming for apparently healthy persons, throughout the life course, for children, adults, older adults and during pregnancy.</p>
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First Year-Semester I							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
6	PSK19AE111	Physical literacy, motor skills in children	2			2	30
Objectives		Learning outcomes					
<p>Movement forms the basis of physical activity for fun and enjoyment, sports participation and ultimately, sports performance. However, in children, it is also an essential part of cognitive and social development. In this course, the biokineticist will review critical stages of growth and development in children and adolescents, with specific reference to participation in physical activity and sport. The course will provide an overview of the foundations of movement, fundamental motor skills (FMS) and physical literacy in children.</p> <p>Furthermore, the course will provide practical examples of activities that can be used to strengthen and encourage the development fundamental motor skills (FMS), motor learning and physical literacy, defined as “the development and competence in fundamental movement skills and fundamental sport skills” (Ford et al., 2011), in all children. Finally, there will be a focus on applying this learning to exercise programming for sports skill development, and more specifically, to explore the framework of long-term athlete development (LTAD).</p>		<p>CO1-Demonstrate a working knowledge of the various stages and milestones of human development in children and adolescents, and any special consideration for participation in physical activity;</p> <p>CO2-Identify and develop activities (age- and stage-based) to strengthen basic fundamental motor skills and physical literacy in children;</p> <p>CO3-Demonstrate competency in the assessment of FMS and in the interpretation of the results of assessment; to be able to apply these results to exercise programming;</p> <p>CO4-Demonstrate an understanding of the LTAD model, and competencies to apply this or a similar framework in the development of sports-specific skills across ages and stages in children;</p> <p>CO5-Design a logic model for a school- or community-based physical activity intervention for children; and to be able to adapt it for children with special needs or developmental concerns.</p>					

First Year: Semester I; Category: Clinical Rotation							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
8	PSK19CR153	Clinical Rotation-I			6	2	90
Objectives		Learning outcomes					
The aim of this course is to provide students with 'real-world" clinical experiences, under supervision, with clients, patients, sports-persons and sports teams. They will be expected to keep a portfolio of the various cases, histories, clinical findings, special tests, functional measures, training and exercise programmes, monitoring and progression. This will include any referral correspondence, follow-up communication, any clinical research as evidence to inform practice.		Gain clinical experience and develop clinical reasoning skills with patients, clients and teams, with respect to exercise programming, for performance, injury prevention, injury management and rehabilitation, chronic disease prevention and management.					

First Year: Semester II; Category: Core Theory							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
9	PSK19CT102	Strength and Conditioning for Athletic Performance - II	3	2		4	75
15	PSK19CL152	Strength and Conditioning for Athletic Performance - II (Practicals)	2			2	60
Objectives		Learning outcomes					
The student will have the opportunity to functionally assess individual athletes and teams, at various stages of their training and preparation. They will be invited to colloquia to dialogue with other members of the sports medicine team, along with coaches, athletes and sports persons, so they can better understand the demands of the sport, peaking and periodization, player positions and training strategies and strength, speed, flexibility and strength/mass ratios and level of competition. Furthermore, students will become skilled in assessing the requirements of the sport and incorporating this analysis into their training programs.		CO1-Undertake a detailed study of sport-specific training requirements for strength and conditioning; CO2-Translate the available evidence into strength and condition training practices; CO3-Assess the effectiveness of these strategies, taking into account the level of play, the demands of the sport, and the period required for recovery;					

PSK19CL152: **Practicals**

<p>The student will have the opportunity to assess individual athletes and teams, at various stages of their training and preparation. For each of these encounters, the students will be asked to design a training programme for strength and conditioning the athletes. The training programme will be presented, and under supervision and with consultation with the athletes, sports persons and coaches, be implemented, with monitoring, evaluation and progression.</p>	<p>CO1-Demonstrate the ability to apply practical and clinical reasoning in the development of a sport-specific strength and conditioning programme; CO2-</p> <p>Demonstrate the ability to work with coaches, athletes, sports persons and support personnel in the implementation and adjustment of sports-specific strength and conditioning programmes, based on ongoing assessment and performance measures, fatigue and recovery.</p>
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First Year: Semester II; Category: Core Theory

Course Number	Course Code	Course Title	L	T	P	C	Total Hours
10	PSK19CT104	Orthopaedic Rehabilitation - II	3		2	4	75
Objectives		Learning outcomes					
<p>This course will extend the work undertaken in the first semester, in which the students were familiarised the student with the prevalence and incidence, symptoms, and aetiology of specific and common orthopaedic injuries/conditions, related to participation in sport and physical activity. In this module, students will develop clinical and practical competencies in specific techniques, to assess these injuries/conditions, for the purposes of exercise programming for effective final phase rehabilitation.</p> <p>Students will gain experience and knowledge on how to structure specific exercise programmes for orthopaedic conditions. They will gain practical competencies in functional assessment of common sports-related orthopaedic injuries, prescribing appropriate exercises based on the outcome of these assessments, analysing and monitoring complications and progression within the rehabilitation programme and modifying exercise programmes accordingly. The practical competencies will be taught in</p>		<p>CO1-Demonstrate an understanding of common musculo-skeletal injuries and conditions, including, among others their prevalence, incidence, severity, symptoms, possible causes (aetiology) and treatment; CO2-Demonstrate the ability to take comprehensive medical and injury histories in a variety of patients, interpret and apply them to rehabilitation strategies and programmes;</p> <p>CO3-Apply observation, palpation and specialised manual evaluation techniques in assessing individual injury (TOTAPS, Talk, Observe, Touch, Active, Passive, Skills);</p> <p>CO4-Demonstrate competency in the use of advanced exercise testing equipment and techniques to assess individuals with different injuries;</p> <p>CO5-Recognise possible signs and symptoms indicating emergency medical attention, further investigation or referral of the patient is required;</p> <p>CO6-Apply special investigation methods and understand their clinical usefulness in chronic disease & disability management contexts;</p> <p>CO7-Plan and implement effective and efficient exercise rehabilitation programmes for various chronic</p>					

<p>real-life case study format.</p> <p>Students will become familiar with different rehabilitation strategies, based on the best available and most current evidence-based practice. They will be able to argue for their decisions and demonstrate good clinical reasoning.</p>	<p>orthopaedic conditions, and those related to certain chronic diseases and disabilities;</p> <p>CO8-Understand and apply an inter-disciplinary approach and use referrals in the rehabilitation and management of various chronic orthopaedic conditions, and those related to certain chronic diseases and disabilities</p>
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First Year-Semester II							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
11	PSK19CT106	Biokinetics for High Performance Sport	2		2	3	60
Objectives		Learning outcomes					
<p>This course is designed to address the specific training needs of athletes and sports-persons competing at a high-level of sports performance. The biokineticist will apply scientific principles in exercise physiology, biomechanics, sport psychology, motor control and motor development, sports nutrition, injury prevention, periodization and recovery, to assist athletes and sports persons optimize performance, aid in recovery and minimize risk of injury. Specifically, these individuals “develop safe, evidence-based, performance enhancement interventions in conjunction with medical, allied health and coaching staff” and “provide training and/or physical assessment data to assist medical staff to make a final decision on a athlete’s readiness on a return to play following an injury or illness “(*extracted from the scope of practice for Australian Accredited Sport Scientists, Exercise & Sports Science Australia (ESSA) Web: essa.org.au).</p>		<p>(Extracted from: Australian Accredited Sport Scientists, Exercise & Sports Science Australia)</p> <p>CO1-“Develop strength and conditioning programmes for competitive athletes and sports persons;</p> <p>CO2-Monitor and interpret adaptations to training load, and modify training accordingly;</p> <p>CO3-Analyse the training requirements for various sports based on skills and techniques used;</p> <p>CO4-Provide biomechanical analysis for injury prevention or to improve performance;</p> <p>CO5-Liaise other members of the support team to optimise performance;</p> <p>CO6-Remain current with the latest techniques in performance management.”</p>					
First Year: Semester II; Category: Discipline Specific Elective							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
12	PSK19CT108	Physical activity in chronic diseases	2		2	3	60

Objectives	Learning outcomes
<p>This course provides an overview of the prevalence, incidence and aetiology of, as well as the pathophysiology underlying major chronic, non-communicable diseases (cardiovascular disease, chronic obstructive pulmonary disease, certain cancers, Type 2 diabetes, and osteoporosis). The role of exercise/physical activity in the primary and secondary prevention and management of these conditions will be discussed. Furthermore, exercise dose-response, modality, intensity and frequency, will be reviewed, particularly with the growing body of evidence concerning the health benefits of high-intensity interval training and resistance training.</p> <p>The students will develop competencies in health risk assessment and risk stratification, pre-exercise health-related fitness assessment and interpretation (including a graded exercise test and ECG), contraindications for exercise, exercise prescription and programming, monitoring and progression, and brief behaviour change counselling.</p> <p>The course will prepare students to work with clients at risk for, and patients with known, chronic, non-communicable diseases, providing health risk and fitness assessment and exercise prescription, and lifestyle guidance.</p>	<p>CO1-Demonstrate a working knowledge of the burden of disease, the aetiology and underlying patho-physiology of various chronic diseases and disabilities;</p> <p>CO2-Demonstrate an understanding of the potential role for exercise and physical activity in the prevention and management of these conditions;</p> <p>CO3-Plan, implement and perform individually-based, pre-exercise, risk stratification;</p> <p>CO4-Plan, implement and interpret appropriate health-related fitness assessments, toward exercise prescription and programming;</p> <p>CO5-Be able to identify absolute and relative contraindications for exercise testing and prescription;</p> <p>CO6-Design and implement evidence-based and individualised, exercise programmes, with monitoring and progression;</p> <p>CO7-Demonstrate the understanding of a multi-disciplinary approach in rehabilitation</p> <p>CO8-Apply the criteria for successful discharge of a patient with chronic, non-communicable disease from a supervised exercise programme;</p> <p>CO9-Adapt programmes to minimise risk for musculoskeletal injury, and for modalities including resistance training;</p> <p>CO10-Interpret the findings of each evaluation/assessment and to communicate it effectively to the patient while displaying empathy and patience and respecting the autonomy of the individual.</p>

First Year- Semester II							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
13	PSK19GE110	To be chosen by the students	3			3	45

First Year-Semester II								
Course Number	Course Code	Course Title	L	T	P	C	Total Hours	
14	PSK19AE112	Biokinetics in the workplace	1	2		2	45	
Objectives		Learning outcomes						
<p>This course is comprised of two main sections:</p> <p>(i) Ergonomics in the workplace, and</p> <p>(ii) Work site health promotion programmes.</p> <p>The coursework includes the theory underlying ergonomics assessment in various work settings and occupations, and students receive the required training to enable them to conduct an ergonomic risk assessment. In addition, students learn how to make the case for work-site health promotion programmes, to plan and conduct a needs assessment, and to plan and implement various work site health promotion strategies</p>		<p>CO1-Be familiar with the legal and regulatory environment for worksite health promotion with national and local setting;</p> <p>CO2-Conduct a needs analysis for Worksite Wellness or Health Promotion programme;</p> <p>CO3-Develop a logic model, and proposed pragmatic, “best-practice” worksite health promotion programme in consultation with key stakeholders;</p> <p>CO4-Determine the ergonomic, and physical occupational health requirements for specific occupations;</p> <p>CO5-Establish and implement criteria for “return to work” following injury or other medical event.</p>						

First Year- Semester II								
Course Number	Course Code	Course Title	L	T	P	C	Total Hours	
16	PSK19CR154	Clinical Rotation-II			6	2	90	
Objectives		Learning outcomes						
<p>As in the previous clinical postings course, the aim of this course is to provide students with ‘real-world” clinical experiences, under supervision, with clients, patients, sports-persons and sports teams. They will be expected to keep a portfolio of the various cases, histories, clinical findings, special tests, functional measures, training and exercise programmes, monitoring and progression. This will include any referral correspondence, follow-up communication, any clinical research as evidence to inform practice.</p>		<p>To gain clinical experience and develop clinical reasoning skills with patients, clients and teams, with respect to exercise programming, for performance, injury prevention, injury management and rehabilitation, chronic disease prevention and management.</p>						

Second Year- Semester III							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
17	PSK19CT201	Biokinetics and Neuromuscular Disorders	3	2		4	75
21	PSK19CL251	Biokinetics and Neuromuscular Disorders (Practicals)			2	2	60

Objectives	Learning outcomes
<p>* “This course provides the opportunity for students to understand the potential and limitations of exercise as a tool for clinical rehabilitation in humans with neurological disorders. Specific information about a range of neuromuscular disorders is provided, and students are encouraged to apply their knowledge to case studies and scenarios in order to develop the scientific and clinical attributes necessary to contribute effectively to a neuromuscular rehabilitation team.”</p>	<p>CO1-Demonstrate recognition of the limitations of scope of practice with respect to patients with neurological and neuromuscular conditions, but including benefits of physical activity for prevention and management of disease, injury and disability.</p> <p>CO2-“Demonstrate knowledge and communication skills needed to communicate professionally with physicians, physiotherapists, and other allied health care professionals about the treatment of neurological patients.</p> <p>CO3-Demonstrate knowledge and practical skills relevant to specific neurological disorders to allow the design and management of appropriate exercise interventions, on referral from a sports medicine or medical practitioner;</p> <p>CO4-Perform functional capacity evaluations, including physical fitness, posture and muscle balance, task-specific biomechanical analysis and motor control assessments.</p> <p>CO5-Liaise with medical and other allied-health professionals for a multi-disciplinary approach to health care. “</p>
PSK19CL251: Practicals	
<p>In the first course, the students focused on the underlying pathophysiology of certain neuromuscular conditions, such as: Stroke, Spinal cord injury, traumatic brain injury, multiple sclerosis, Parkinson’s, Spina bifida, Muscular dystrophies, cerebral palsy, motor neurone disease, neuropathies, myopathies, sarcopenia and aging.</p>	<p>CO1-Demonstrate the ability to apply practical and clinical reasoning in the development of an exercise prescription (for performance in disabled sports persons, and for health, in persons who are medically stable, with a neuromuscular disorder).</p> <p>CO2-Demonstrate the ability to monitor progress and adapt the programme accordingly, as well as recognizing the limitations of scope of practice and contraindications for</p>

<p>Working under supervision, the student will have an opportunity to functionally assess, and provide an exercise programme, for sports persons with certain neuromuscular conditions (for example, cerebral palsy) and other physical disabilities. They will also be provided with an opportunity to functionally assess and provide exercise prescription to otherwise medically stable persons, with neuromuscular limitations, such as older adults with sarcopenia, spinal cord injured persons, and amputees.</p> <p>The training programme will be presented, and under supervision, with athletes, sports persons and coaches or sports medicine practitioners and patients, be implemented, with monitoring, evaluation and progression.</p>	<p>exercise and certain modalities.</p> <p>CO3-Demonstrate practical understanding of the use of assistive devices in exercise programming.</p>
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Second Year- Semester III							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
18	PSK19CT203	Biokinetic Practice Management	3			3	45
Objectives			Learning outcomes				
To prepare graduates to apply their clinical/practical skills/knowledge in a variety of settings for practice/facilities/human resource /financial/marketing & management/ legal and regulatory environment.			<p>CO1-Demonstrate an understanding of and an ability to apply principles of human resource, financial and facilities management in a variety of settings;</p> <p>CO2-Recognise the ethical, legal and regulatory statutes and boundaries of scope of practice, locally, regionally and nationally</p>				

Second Year-Semester III							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
19	PSK19CT205	Nutrition, Doping and Ergogenic Aids	2	2		3	60
Objectives			Learning outcomes				
Many clients and patients seeking biokinetics advice also require nutritional support. These include overweight and obese persons, persons with chronic, non-communicable diseases, and sports persons and athletes. This course aims to provide students with a broad understanding of how nutrition can			<p>CO1-Demonstrate a working knowledge concerning nutritional strategies for i) enhancing sporting performance and/or recovery, ii) weight management, iii) reducing the risk for and managing non-communicable disease;</p> <p>CO2-Demonstrate a working knowledge concerning hydration strategies and potential risks during prolonged</p>				

<p>influence exercise and sports performance and also of weight management. Further, the course aims to equip students to make sound judgements of both the value and dangers of nutritional and other ergogenic aids in exercise performance.</p> <p>The topics that are addressed in this course include energy expenditure and requirements for weight management and exercise performance, hyponatremia, body composition for sport and the use and abuse of nutritional and pharmacological supplements and ergogenic aids in sport. (It is important to note that students will not be sufficiently qualified to prescribe diets and eating plans for individuals or athletes; rather they will have an understanding of the physiological mechanisms and adaptations that occur with various forms of nutritional supplementation and effects of ergogenic aids.)</p>	<p>endurance activities;</p> <p>CO3-Demonstrate the ability to measure and interpret body composition for health and performance, using standard techniques (anthropometry and bioelectrical impedance);</p> <p>CO4-Demonstrate an understanding of the ethical and legal considerations, attendant risks and performance benefits, and the underlying physiological mechanisms for both nutritional and non-nutritional ergogenic aids;</p> <p>CO5-Integrate nutritional guidance and advice, within the scope of practice of biokinetics, for lifestyle and performance, with referral where appropriate.</p>
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Second Year- Semester III							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
20	PSK19GE207	To be chosen by the students	3			3	45

Second Year- Semester III							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
22	PSK19CR253	Clinical Rotation-III			6	2	90
Objectives		Learning outcomes					
As in the previous clinical postings course, the aim of this course is to provide students with 'real-world" clinical experiences, under supervision, with clients, patients, sports-persons and sports teams. They will be expected to keep a portfolio of the various cases, histories, clinical findings, special tests, functional measures, training and exercise programmes, monitoring and progression. This will include any referral correspondence, follow-up communication, any clinical research as evidence to inform practice.		To gain clinical experience and develop clinical reasoning skills with patients, clients and teams, with respect to exercise programming, for performance, injury prevention, injury management and rehabilitation, chronic disease prevention and management.					

Second Year- Semester III							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
23	PSK19RP255	Seminar on Dissertation			12	6	180
Objectives		Learning outcomes					
To introduce the students to biokinetics research and improve their soft skills		This course will enable the students to: <ul style="list-style-type: none"> • Apply their clinical knowledge to develop solutions for clinical problems based on physical activity • Gain broad knowledge about the technical developments in the realm of their research. • Enhance their presentation and scientific writing skills. 					

Course Outline	
	Students will be presented with an opportunity to choose one topic related to biokinetics for project based study. Using critical thinking and analytic skills the students must make use of their knowledge in biokinetics to develop an innovative solution to the selected topic. The students will be encouraged to have multiple meetings with their lecturers and supervisors, in order to develop an in-depth understanding of both the challenge and their proposed solution.. An oral presentation will be expected from each student at the end of the course which will contain information regarding the problem, proposed solution, relevant literature information, patent search of prior-art, design hypothesis, planned testing & analysis, proposed timeline and clinical appropriateness of the solution/s proposed. This course puts high emphasis on research and at scientific report writing.
References	Previously submitted reports and presentations will be provided for reference only.

Second Year-Semester IV							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
24	PSK19CT202	Community Exercise Program	3	2		4	75
27	PSK19CL252	Community-based Exercise Program (Practicals)			4	2	60
Objectives		Learning outcomes					
The World Health Organization Global Plan for Physical Activity (GAPA 2018) recognizes the importance of community-based physical activity programmes and interventions as a “best buy” for population-based strategies to increase physical activity. Physical inactivity remains one of the most prevalent and modifiable risk factors for chronic, non-communicable diseases. Furthermore, increasing populations levels of physical		CO1-Demonstrate an understanding of community-based participatory approach to health promotion through physical activity; CO2-Participate in implementation and evaluation of community-based exercise programs; CO3-Demonstrate an understanding of ethical considerations of community-based exercise programs; CO4-Develop a program logic model, including a concept					

<p>activity will address more than 8 of the United Nations Sustainable Development Goals, including health for all, gender inequality, quality education, and resilient and inclusive cities.</p> <p>There are numerous examples of successful, community-based physical activity interventions, from both high- and middle-income countries, as well as a number from lower- and middle- income countries. These programmes typically involve a community-based participatory approach (CBP), the engagement of health champions from within communities and settings (schools, clinics, worksites, community centres, recreational facilities).</p> <p>This course will introduce students to “the theory and application of community-based program planning and evaluation. Concepts in community assessment, organization, and mobilization for the purposes of addressing identified public health concerns will serve as the foundation for the public health planning process (chronic disease burden, inactivity, obesity, lack of equitable access to physical activity opportunities, senior adults, vulnerable and disadvantaged groups, community assets and resources). Appropriate techniques of partnership building, planning strategies, evaluation and evidence-based decision-making will also be introduced.</p>	<p>document with an underlying rationale for a community-based program, considering issues of sustainability and scalability;</p>
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PSK19CL252: Practicals	
<p>In this module, students will move beyond the theoretical and identify and evaluate existing programmes. Furthermore, they will be asked to identify a community, and engage community members in a community needs assessment. Working in groups and with supervision, students will be asked to follow the PRACTIS guidelines, for Implementation and Scale up, to develop, implement and evaluate a pilot physical activity intervention within a pre-identified community.</p>	<p>CO1-Demonstrate the ability to engage community members and conduct a community needs assessment using an asset mapping approach;</p> <p>CO2-Demonstrate the ability to follow the PRACTIS guidelines and create a logic model for a pilot, community-based physical activity intervention;</p> <p>CO3-Implement and evaluate the pilot implementation and make recommendations.</p>

Second Year- Semester IV							
Course Number	Course Code	Course Title	L	T	P	C	TotalHours
25	PBK19CT204	Sports Technology Innovations	2	2		3	60
Objectives		Learning outcomes					
<ul style="list-style-type: none"> • Understanding the landscape of sports and identifying the space for innovation • Usage of technology to enhance performance and safety of athlete • Needs assessment towards technological innovations 		<ul style="list-style-type: none"> • Scope of sports technology innovation • Understanding steps towards grass root level innovations 					

Second Year- Semester IV							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
26	PSK19AE206	Weight management for health and performance	2			2	30
Objectives		Learning outcomes					
<p>This course prepares the candidate for exercise and lifestyle interventions in both obese patients and in sports persons seeking to gain or lose weight for competitions and performance. It will enable students to gain knowledge on the prevalence of obesity, risk for disease, metabolic syndrome and the</p>		<p>CO1-Demonstrate an understanding of the complex etiology of obesity and co-morbidities;</p> <p>CO2-Demonstrate an understanding of the role of physical activity in maintaining a healthy weight and managing the co-morbid conditions;</p> <p>CO3-Apply appropriate screening and assessment</p>					

strategies for weight loss maintenance and the implications of weight loss relapse. It will provide students with material to gain knowledge around behavior change strategies, the concept of motivational interviewing and the role of the environment of behavior change.	<p>techniques for fitness, body composition, basic nutritional information and other important lifestyle factors to inform behavior counseling and exercise prescription;</p> <p>CO4-Understand and incorporate knowledge concerning barriers to adherence, and relapse prevention in exercise programming;</p> <p>CO5-Understand and be able to provide guidance for persons wishing to gain weight or increase muscle mass, using exercise prescription, appropriate referrals, and basic nutritional information</p>
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Second Year-Semester IV							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
28	PSK19CR254	Clinical Rotation-IV			2	2	90
Objectives		Learning outcomes					
As in the previous clinical postings course, the aim of this course is to provide students with 'real-world" clinical experiences, under supervision, with clients, patients, sports-persons and sports teams. They will be expected to keep a portfolio of the various cases, histories, clinical findings, special tests, functional measures, training and exercise programmes, monitoring and progression. This will include any referral correspondence, follow-up communication, any clinical research as evidence to inform practice.		To gain clinical experience and develop clinical reasoning skills with patients, clients and teams, with respect to exercise programming, for performance, injury prevention, injury management and rehabilitation, chronic disease prevention and management.					

Second Year- Semester IV							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
29	PSK19RP256	Dissertation and Viva Voce			6	6	180
Objectives		Learning outcomes					

To enhance student's research skills.	<ul style="list-style-type: none"> • Identification of compelling research questions in developing country settings; • Formulation of research hypothesis that are likely to contribute to the literature; • Development of rigorous, systematic methodological frameworks from both an analytical and a conceptual perspective; • Overall organization of a research proposal to reflect the cogency, the priority and perhaps urgency of selected issues.
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Course Outline	
	The final year project is an important opportunity, at the end of the degree programme that involves the creative application of scientific principles to the solution of problems in society. The student is expected to work on the project both individually and under the guidance of a supervisor. This part of the course involves completion of the research proposal presented during the dissertation seminar.
Mode of Evaluation	Performed level of research, quality of write-up, achieved novelty and quality of final presentation.

Dissertation and Viva –Voce

DISSERTATION:

Students are taught how to find the gaps in the knowledge from library studies. Then generate a hypothesis; how to design experiments to prove or disprove a hypothesis. How to test a null hypothesis; requirements of a good experimental design; use of instruments for research,

Within the framework and facilities of the Department of Sports and Exercise Science and other available infrastructure of the university, the students will be assigned a dissertation research project. They will also be asked to do a literature survey, library studies and prepare a work outline (research proposal) in consultation with the faculty. Maintenance of a lab notebook with authenticated record of work carried out will also form a part of the formative assessment.

The faculty guide, by a periodical consultation with the HOD will focus the work of the student. Then the student will spend roughly 90 working days in the fourth- semester on the allotted project. The student will be continuously assessed and graded by the faculty and Professor on their attendance, devotion to work, data gathering, honest and authentic lab work; documentation, and interpretation and in the overall preparation of final dissertation work report. The dissertation work will thus constitute an important objective proof of the knowledge and academic / work experience gained by them in the M. Sc. Biokinetics Degree Program

The research project work could be hospital based, community based, industry based or laboratory based. Permission maybe granted to select number of students to carry-out a part of their lab work in

external institutions by the HoD based on the needs assessment and scientific depth of the research and as part of collaborations.

The summative evaluation of the project would be done by university examination on the basis of content and output of the submitted dissertation; and dissertation *viva voce* before the examiners. Dissertation is a bound form of a detailed report of the research carried out by each student. It has to be presented in the internationally accepted format containing a title sheet, bonafide certificate, contents, introduction, review of literature, scope of the research including lacunae; objectives or hypothesis, experimental and results, discussion and summary, references and acknowledgement. The model format of layout, designing, order of binding; referencing style are available on our website (www.sriramachandra.edu.in under research) and maybe followed. The framework for evaluation of formative and summative assessments is provided in the section 24, table 17.1 and scheme of examinations table 29. A passing minimum of 50% in the continuous assessment is essential to qualify for appearing in the end semester with $\geq 80\%$ attendance.

It is desirable that the student be encouraged to submit one publication or presentation from out of the thesis before appearing for the university examinations. This will be culmination of the three semesters of research orientation of the students which is an asset to any organization employing them.

EVALUATION OF DISSERTATION AND VIVA-VOCE

Pattern	Weightage	Marks
End Semester Exam Research Project		
External & Internal Examiners Dissertation copy	25 x 1	25
Presentation and Viva-voce	25 x 1	25
Total (a)	100/2	50
Continuous Internal Assessment for Research Project		
Laboratory Work/ Log Note Book	15 x 1	15
Dissertation Write Up	15 x 1	15
Journal Club & Presentation (3) Average of 3 Presentation	20 x 1	20
Total (b)		50
Grand Total (a + b)		100

- a) The concerned guide / head and the journal club coordinator may evaluate the performance of the candidate for the internal marks (max of 50). This includes a series of seminars on articles from reputed journal and laboratory skill.
- b) The external and internal examiners shall evaluate the dissertation work independently for 25 marks and the presentation and viva voce for 25 marks. This evaluation would reflect the quality of work put into the dissertation. An average of the evaluations of dissertation and viva voce is considered.

Format for Submission of Dissertation:

The dissertation should be as per the norms defined by the BoS. A sample format of the dissertation is defined below.

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10	Appendix (Copies of ethics committee approval, Informed consent, additional resources, Publications etc.,)	

- c) Two copies of the dissertation work shall be submitted one month prior to the commencement of the University examination to the Controller of Examinations of the University.
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**SRI RAMACHANDRA
INSTITUTE OF HIGHER EDUCATION AND RESEARCH
(DEEMED TO BE UNIVERSITY)
Porur, Chennai – 600116**

**FACULTY OF
SPORTS AND EXERCISE SCIENCES**

**REGULATIONS & SYLLABUS
For
M.Sc. BIOMECHANICS IN SPORT AND HUMAN MOVEMENT
Choice Based Credit System - 2015**

June, 2019

M.Sc. (Biomechanics in Sport and Human Movement) DEGREE PROGRAM

INTRODUCTION

The M.Sc. (**Biomechanics in Sport and Human Movement**), is a co-badged post graduate program of Sri Ramachandra Institute of Higher Education and Research and University of Cape Town, South Africa. This 2 year program can be opted by candidates from both medical and engineering streams. Students will be able to gain a profound understanding of all major aspects of sport biomechanics and human movement related to clinical conditions. The program enables them to cater athletic performance improvement and injury prevention based on movement analysis. Further, this program is designed to provide a thorough training in a particular subject area through formal lectures and / or seminar with practical experience. The syllabus framed by the University for the Program is designed to achieve an internationally accepted standard and also to better understand the modern concepts of movement analysis. The research project provides training in a particular area through original exploration and experimentation, culminating in the preparation of a dissertation that concludes the research undertaken. Thus the program shall impart advanced theoretical and practical aspects of subjects.

Scope of the Program:

Graduates will be able to contribute to team work with a greater understanding of the inter-relationship between movement mechanisms, the fundamental nature of human performance at all levels and clinical outcome. Our applied learning techniques ensure our students are fully prepared for the workplace on graduation. The career options include Sports Bio mechanist, Performance Analyst, Gait Analyst, Sports Equipment Developer, Lecturer, PhD Student, Research Assistant and Post-Doctoral Researcher

Program Summary

1. **M.Sc. (Biomechanics in Sport and Human Movement) DEGREE PROGRAM** is a postgraduate degree program offered under Choice Based Credit System.
2. It is a 2 years program with four semesters of study carrying total credits of **90** under the Faculty of Sports and Exercise Science.
3. Students register for core theory (CT), core lab (CL), electives and ability enhancement courses.
4. The program offers a research project for each student
5. Evaluation is based on the UGC recommended 10-point grading system. Grades and classes will be declared as per university rules.

Program Objectives:

PO1-To understand and apply the basis of fundamental biomechanics of the human movement

PO2-To enhance student's knowhow and ability to use motion capture and analytic tools for movement analysis in sports and clinical settings

PO3-To illustrate 2 Dimensional and 3 Dimensional perspectives of any given objects using Computer Aided Drafting (CAD) tools

PO4-To understand and apply the technological advancement in the field of sports performance enhancement and injury prevention

Learning outcomes:

- Understand and quantify the cause and effect of force, linear and angular kinetics of human movement in sports and clinical conditions
- Interpret and analyze the kinematic, kinetic parameters and muscle activation of normal and pathological gait.
- Design footwear for specific rehabilitation protocols
- Conduct efficient research related to biomechanics and extract meaningful inferences

M.Sc. Biomechanics in Sport and Human Movement

First Year: Semester I; Category: Core Theory								
Course Number	Course Code	Course Title	L	T	P	C	Total Hours	
1	PSM19CT101	Fundamentals of Medical Sciences	3		2	4	75	
Objectives		Learning outcomes						
Familiarizing with the basic principles of human systems so that biomedical engineer can function effectively		<p>On completion of the course the student will have, The student will be better equipped to interact with doctors, nurses and paramedics and also with industry dealing with medical equipment. The student will be able to design and develop medical equipment and devices as they will possess enough knowledge on human systems.</p> <ul style="list-style-type: none"> • an ability to function on multidisciplinary teams • Knowledge of contemporary issues relevant to biomedical engineering. • Demonstrate their understanding of biochemical principles that assist in the understanding of physical activity and exercise; • Provide a framework for understanding the pathophysiologic mechanisms responsible for diseases of major public health importance 						

Practical Component not defined here- One can include those Labs units within the theory units or separately identified so that a practical IA can be conducted. Questions for theory exams can include practical questions also

First Year: Semester I; Category: Core Theory								
Course Number	Course Code	Course Title	L	T	P	C	Total Hours	
2	PSM19CT103	Fundamentals of Engineering Sciences	3		2	4	75	
Objectives		Learning outcomes						
The objectives of this course are to ensure that students, whatever their mathematical background at entry, acquire the mathematical knowledge and skills required both for the 1st Year Engineering courses and for the more advanced mathematical techniques introduced and applied in the 2nd Year course. Impart relevant skills and knowledge for independent learning of other subjects that require such skills and		<ul style="list-style-type: none"> • Evaluate the limits of a function as x approaches a value (or approaches positive/negative infinity) numerically, graphically, and analytically. • Define and evaluate a function for Continuity, Compute the derivative of a function using the Limit Definition, Differentiate Algebraic, Trigonometric, Inverse Trigonometric, Exponential and Logarithmic functions using appropriate derivative rules such as; constant, power, product, quotient, and chain rules • Able to apply knowledge of mathematics, science, and engineering • Able to design and conduct experiments, as well as to 						

knowledge. To enable the students to understand the basics of the latest advancements in Physics, viz., Quantum Mechanics, Lasers, Fiber Optics, Ultrasonics, Microwaves and Nanotechnology

analyse and interpret data

- Able to identify, formulate, and solve engineering problems

First Year: Semester I; Category: Core Theory							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
3	PBK19CT105	Research Methodology and Biostatistics (MCT010)	4		0	4	60
Objectives		Learning outcomes					
To increase the student's ability to conduct research in biomechanics		After the completion of this course the students will be able to: <ul style="list-style-type: none"> • Demonstrate research thinking and apply statistical methods to analyse the observations • Verify and validate the research outcomes using statistical tools • Conduct efficient research and extract meaningful inferences 					

First Year: Semester I; Category: Discipline Specific Elective							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
4	PSM19CT107	Applied Mechanics	2		2	3	60
Objectives		Learning outcomes					
<ul style="list-style-type: none"> • To understand and apply the principles of mechanics • To understand the fundamental concepts of statics, dynamics and equilibrium • To understand the various methods involved in the measurement and analysis of mechanics of materials. 		This course will introduce students with the basics of mechanics and its applications. At the end of the semester, students should have the knowledge about forces, equilibrium, statics, dynamics, friction and strength of materials. This course introduces the students with the application of principles of mechanics to the various practical situations. This knowledge will help the students to understand and solve problems in involving motion and loading.					

First Year: Semester I; Category: Discipline Specific Elective							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
5	PSM19CT109	Biomechanics and Musculoskeletal System	2		2	3	60
Objectives		Learning outcomes					
This course introduces the students with the application of principles of mechanics to the biological systems along with the involvement of musculoskeletal system in human movement. This knowledge will help the students to understand and solve problems in human movement science.		<ul style="list-style-type: none"> • To understand and analyze biomechanical and functional anatomic concepts. • To understand the fundamental concepts of biomechanics applied at cellular, tissue and skeletal level. • To understand the various methods involved in the measurement and analysis of biomechanical data at cellular, tissue and whole-body level. • To understand the human movement and its applications. 					

First Year: Semester I; Category: Clinical Rotation							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
6	PSM19CR151	Clinical Rotation – I			12	4	180
Objectives		Learning outcomes					
To introduce the students to the hospital environment and acclimatize them to the workings of a clinical institutions.		After the end of this course, the students will be able to: <ul style="list-style-type: none"> • Apply their knowledge of rehabilitation in a clinical setting • Make use of machines and tools available in a rehabilitation facility • Better understand and make efficient decisions post a particular trauma and/or surgery. 					

First Year: Semester II; Category: Core Theory							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
7	PSM19CT102	Introduction to Human Movement Analysis	3		2	4	75
Objectives		Learning outcomes					
<ul style="list-style-type: none"> • The purpose of this course is to introduce students to concepts of mechanics as they apply to human movement. • The student should gain an understanding of the mechanical and anatomical principles that govern human motion • Analyse kinematic, dynamic and energetic aspects of human movement. 		<ul style="list-style-type: none"> • Apply kinematic and kinetic descriptors to human movements. • Apply mechanical laws and principles to anatomical structures. • Describe how musculoskeletal structures influence human movement. • Analyze human performance from measured data. 					

First Year: Semester II; Category: Core Theory							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
8	PSM19CT104	Human Movement Analysis in Medical Conditions – I	3	2		4	75
11	PSM19CL152	Human Movement Analysis in Medical Conditions – I (Practicals)			4	2	60
Objectives		Learning outcomes					
The purpose of this course is to develop the ability to link the structure of the human body with its function from a mechanical perspective, with particular attention to pathological conditions and changes across one lifespan particularly in the upper body biomechanics.		<ul style="list-style-type: none"> Describe motion with precise, well-defined mechanical and biomechanical terminology; Understand and quantify linear and angular characteristics of motion; Understand the quantitative relationships between angular and linear motion characteristics of a rotating body; Understand and quantify the cause and effect of force, linear and angular kinetic of human movement; Interpret and analyze the kinematic, kinetic parameters and muscle activation of normal and pathological gait. 					
Practicals							
This course aims at making the students acclimatise with instruments and devices required to analyze and study human movement.		<p>Each student will be able to:</p> <ul style="list-style-type: none"> understand and quantify linear and angular characteristics of motion; understand the quantitative relationships between angular and linear motion characteristics of a rotating body; understand and quantify the cause and effect of force, linear and angular kinetic of human movement; Interpret and analyze the kinematic, kinetic parameters and muscle activation of normal and pathological gait. 					

First Year: Semester II; Category: Core Theory							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
9	PSM19CT106	Sports Biomechanics - I	3	2		4	60
12	PSM19CL154	Sports Biomechanics – I (Practicals)			4	2	60
Objectives		Learning outcomes					
The aim of this subject is to extend the basic knowledge of mechanics, material science from non-living bodies to living bodies, the application of mechanical laws in sports.		<p>By successfully completing this course:</p> <ul style="list-style-type: none"> The student will be able to apply biomechanical principals to sports movements Apply existing and create new strategies for sports injury related rehabilitation 					

Practicals	
To enhance student's knowhow and ability to use motion capture and analytic tools for movement analysis in sports.	By successfully completing this course: <ul style="list-style-type: none"> • The student will be able to detect biomechanical problems related to sports and strategize adequate interventions • Test and validate existing and create new strategies for sports injury related rehabilitation

First Year: Semester II; Category: Generic Elective							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
10	PSM19GE108	To be chosen by the students	3			3	45

First Year: Semester II; Category: Clinical Rotation							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
13	PSM19CR156	Clinical Rotation – II			2	2	90
Objectives		Learning outcomes					
To introduce the students to the hospital environment and acclimatize them to the workings of a clinical institutions		After the end of this course, the students will be able to: <ul style="list-style-type: none"> • Apply their knowledge of rehabilitation in a clinical setting • Make use of machines and tools available in a rehabilitation facility • Better understand and make efficient decisions post a particular trauma and/or surgery. 					

Second Year: Semester III; Category: Discipline Specific Elective							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
14	PSM19CT201	Footwear Biomechanics	2		1	3	60
Objectives		Learning outcomes					
To introduce the students to footwear design and functionality.		Successful completion of this course will enable the students to <ul style="list-style-type: none"> • Design footwear for specific rehabilitation protocols. • Enhance sport wear design and appearance based on athlete's needs. 					

Second Year: Semester III; Category: Discipline Specific Elective							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
15	PSM19CT203	Introduction to CAD Modelling	3			3	45
18	PSM19CL251	Introduction to CAD Modelling (Practicals)			4	2	60
Objectives		Learning outcomes					
The objective of the course is to teach students on illustrating 2 Dimensional and 3 Dimensional perspectives of any given objects using Computer Aided Drafting (CAD) tools such as AutoCAD / SOIDWORKS/ SKETCHUP. The course learners would be trained to create 2D / 3D models.		Successfully completing this course will enable the students to: <ul style="list-style-type: none"> • Design novel medical devices according to a problem. • Innovate frugal patient-specific rehabilitative devices. • Reduce hospital's dependence on foreign/commercialised devices. 					

Second Year: Semester III; Category: Discipline Specific Elective							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
16	PSM19CT205	Bio-Design and Medical Device Design	2		2	3	60
Objectives		Learning outcomes					
By using the concept of bio design, the student would be trained on bringing user-centric design think approach to create innovative product solutions.		Successfully completing this course will enable the students to: <ul style="list-style-type: none"> • Design novel medical devices according to a problem. • Innovate frugal patient-specific rehabilitative devices. • Reduce hospital's dependence on foreign/commercialised devices. 					

Second Year: Semester III ; Category: Generic Elective							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
17	PSM19GE207	To be chosen by the students	3			3	45

Second Year: Semester III; Category: Clinical Rotation							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
19	PSM19CR253	Clinical Rotation-III			2	2	90
Objectives		Learning outcomes					
To introduce the students to the hospital environment and acclimatize them to the		After the end of this course, the students will be able to: <ul style="list-style-type: none"> • Apply their knowledge of rehabilitation in a clinical setting 					

workings of a clinical institutions.	<ul style="list-style-type: none"> • Make use of machines and tools available in a rehabilitation facility • Better understand and make efficient decisions post a particular trauma and/or surgery
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Second Year: Semester III; Category: Research Project

Course Number	Course Code	Course Title	L	T	P	C	Total Hours
20	PSM19RP255	Seminar on Dissertation			12	6	180
Objectives		Learning outcomes					
To introduce the students to biomechanical research and improve their soft skills		This course will enable the students to: <ul style="list-style-type: none"> • Work on real world biomechanical challenges. • Apply their clinical and engineering knowledge to develop solutions for clinical problems • Gain broad knowledge about the technical developments in the realm of their research. • Enhance their presentation and scientific writing skills. 					

Course Outline

	<p>Students will be presented with an opportunity to choose one topic of their liking among an array of biomedical and sports biomechanics challenges. Using critical thinking and analytic skills the students must make use of their knowledge in sports biomechanics to develop an innovative solution to the selected topic. The students will be encouraged to have multiple meetings with their lecturers and supervisors, in order to develop an in-depth understanding of both the challenge and their proposed solution. This course puts high emphasis on research and at scientific report writing. An oral presentation will be expected from each student at the end of the course which will contain information regarding the problem, proposed solution, relevant literature information, patent search of prior-art, design hypothesis, planned testing & analysis, proposed timeline and clinical appropriateness of the solution/s proposed.</p>
References	Previously submitted reports and presentations will be provided for reference only.

Second Year: Semester IV ; Category: Core Theory

Course Number	Course Code	Course Title	L	T	P	C	Total Hours
21	PSM19CT202	Biomechanics of Sports Injuries and Rehabilitation	4			4	60
Objectives		Learning outcomes					
Understand the mechanisms of sports injuries and preparation and rehabilitation of an injured athlete. Understand strength and conditioning protocols as well as injury prevention programs.		<ul style="list-style-type: none"> • Running, throwing and landing mechanics and their contribution to injury. • Developing core stability and flexibility after injury. • Performance frameworks for medical and injury screening. • Retraining of muscle, tendon, and bone injuries. 					

Second Year: Semester IV ; Category: Discipline Specific Elective							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
22	PBK19CT204	Sports Technology Innovation	2	2		3	60
Objectives		Learning outcomes					
<ul style="list-style-type: none"> • Understanding the landscape of sports and identifying the space for innovation • Usage of technology to enhance performance and safety of athlete • Needs assessment towards technological innovations 		<ul style="list-style-type: none"> • Scope of sports technology innovation • Understanding steps towards grass root level innovations 					

Second Year: Semester IV ; Category: Core Theory							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
23	PSM19CT206	Human Movement Analysis in Medical Conditions - II	4			4	60
25	PSM19CL252	Human Movement Analysis in Medical Conditions – II (Practicals)			4	2	60
Objectives		Learning outcomes					
The purpose of this course is to make students aware of human movement analysis with particular attention to pathological conditions and changes across one lifespan particularly in the lower body biomechanics.		<ul style="list-style-type: none"> • Describe motion with precise, well-defined mechanical and biomechanical terminology; • Understand and quantify linear and angular characteristics of motion; • Understand the quantitative relationships between angular and linear motion characteristics of a rotating body; • Understand and quantify the cause and effect of force, linear and angular kinetic of human movement; • Interpret and analyze the kinematic, kinetic parameters and muscle activation of normal and pathological gait. 					
Practicals							
This course aims at making the students acclimatise with instruments and devices required to analyse and study human movement.							

Second Year: Semester IV ; Category: Core Theory							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
24	PSM19CT206	Sports Biomechanics - II	4			4	60
26	PSM19CL254	Sports Biomechanics - II (Practicals)			4	2	60
Objectives		Learning outcomes					
<ul style="list-style-type: none"> Understand advanced topics of sports biomechanics and performance Understand biomechanics of sports movements due to external forces and internal forces Applying biomechanics principles for technique and performance enhancement. 		<ul style="list-style-type: none"> Apply biomechanics principals in specific sports activities. Analyze sports performance from measured data and learn techniques to enhance it. 					

Practicals	
To enhance student's knowhow and ability to use motion capture and analytic tools for movement analysis in sports.	By successfully completing this course: <ul style="list-style-type: none"> The student will be able to detect biomechanical problems related to sports and strategize adequate interventions Test and validate existing and create new strategies for sports injury related rehabilitation

Second Year: Semester IV; Category: Research Project							
Course Number	Course Code	Course Title	L	T	P	C	Total Hours
27	PSM19RP256	Dissertation and Viva Voce\$			12	6	180
Objectives		Learning outcomes					
To enhance student's research skills.		<ul style="list-style-type: none"> Identification of compelling research questions in developing country settings; Formulation of research hypothesis that are likely to contribute to the literature; Development of rigorous, systematic methodological frameworks from both an analytical and a conceptual perspective; Overall organization of a research proposal to reflect the cogency, the priority and perhaps urgency of selected issues. 					

Course Outline	
	The final year project is an important opportunity, at the end of the degree programme, to tackle a real biomedical engineering project that involves the creative application of scientific principles to the solution of problems in society. The student is expected to

	work on the project both individually and under the guidance of a supervisor. This part of the course involves prototyping the finalised design solution presented during the dissertation seminar. The students will be able to successfully develop and demonstrate a working model or device or software which appropriately overcomes the biomechanical/biomedical challenge/s.
Mode of Evaluation	Performed level of research, quality of write-up, achieved novelty and quality of final presentation.

Dissertation and *Viva –Voce*

DISSERTATION:

Students are taught how to find the gaps in the knowledge from library studies. Then generate a hypothesis; how to design experiments to prove or disprove a hypothesis. How to test a null hypothesis; requirements of a good experimental design; use of instruments for research, Within the framework and facilities of the Department of Sports and Exercise Science and other available infrastructure of the university, the students will be assigned a dissertation research project. They will also be asked to do a literature survey, library studies and prepare a work outline (research proposal) in consultation with the faculty. Maintenance of a lab notebook with authenticated record of work carried out will also form a part of the formative assessment.

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The research project work could be hospital based, community based, industry based or laboratory based. Permission maybe granted to select number of students to carry-out a part of their lab work in external institutions by the HoD based on the needs assessment and scientific depth of the research and as part of collaborations.

The summative evaluation of the project would be done by university examination on the basis of content and output of the submitted dissertation; and dissertation *viva voce* before the examiners. Dissertation is a bound form of a detailed report of the research carried out by each student. It has to be presented in the internationally accepted format containing a title sheet, bonafide certificate, contents, introduction, review of literature, scope of the research including lacunae; objectives or hypothesis, experimental and results, discussion and summary, references and acknowledgement. The model format of layout, designing, order of binding; referencing style are available on our website (www.sriramachandra.edu.in-under-research) and maybe followed. The framework for evaluation of formative and summative assessments is provided in the section 24, table 17.1 and scheme of examinations table 29. A passing minimum of 50% in the continuous assessment is essential to qualify for appearing in the end semester with ≥80% attendance. It is desirable that the student be encouraged to submit one publication or presentation from out of the thesis before appearing for the university examinations. This will be culmination of the three semesters of research orientation of the students which is an asset to any organization employing them.

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