ANNAMALAI UNIVERSITY

(A State University Accredited with 'A' Grade by NAAC)

MYAS – AU
DEPARTMENT OF SPORTS SCIENCES

DIVISION OF SPORTS TRAINING
AND
SPORTS NUTRITION

M.Sc. Strength and Conditioning

Programme Code: SSPO25

REGULATIONS AND SYLLABUS

(For students to be admitted from academic year 2019-20 onwards)

MISSION

The scientific application of strength and conditioning, in sports-specific contexts, has emerged as one of the most vibrant study areas in recent years. The mission of the Master of Science Strength & Conditioning program is to enhance the education of highly qualified strength & conditioning professionals through an inter professional curriculum integrated with opportunities to excel in research, advanced professional skills, and leadership development; ultimately translating experiences into their respective professions and future employment opportunities. The curriculum enhances fundamental concepts through advanced strength and conditioning courses while also including complementary subjects such as sports nutrition and sports rehabilitation. Our goals are to: equip students with a diverse and advanced knowledge base in the field of strength and conditioning; instil confidence in student's practical skills; and develop professionals who can interpret and apply research in their practice.

AIMS

The MSc in Strength and Conditioning degree is a high-level blended learning course, which will enable the students to transform themselves into fully qualified strength & conditioning professionals. This course is designed to enhance the students' current level of knowledge and expertise to an advanced level in the area of strength training and conditioning. Emphasis is placed on the exercise sciences (including anatomy, exercise physiology, biomechanics and nutrition), exercise technique, program design, organization and administration, and testing and evaluation.

REGULATIONS

Masters Degree in Strength and Conditioning

1. Objectives:

Masters Degree in Strength and Conditioning is a program consists of core courses, discipline specific elective courses, generic elective courses and value added courses. Core courses and discipline specific elective courses are basic courses required for each programme. Generic elective courses are offered by the other Divisions in the Department of Sports Science as well as by other Departments in Annamalai University. Value added courses are offered by the Departments of other faculties (*i.e. except Faculty of Science*). A course is divided into five units to enable the students to achieve modular and progressive learning.

This programme is designed to:

- To develop the knowledge, understanding and professional skills necessary to administer advanced strength and conditioning interventions.

- To show competency in the design and execution of scientific research.
- To engender the critical application of strength and conditioning theories, informed by Research-Informed Teaching.
- To develop a reflective and critical evaluation of their own practice, thereby enhancing performance of both the self and the performer.
- Synthesise advanced theory/knowledge to new situations, relating to strength and conditioning practice.
- To support the personal development of students, in relation to career prospects and contribution in the workplace, thereby supporting employability and enterprise.
- Demonstrate critical thinking skills related to the areas of physical activity, movement sciences, and sport through practical experiences.
- Obtain knowledge of content area specific to chosen career goals, such as strength and conditioning specialist, coaching, and corporate fitness and wellness, through didactic and internship experiences.
- Demonstrate the importance of the physical, psychological, and emotional demands of physically active individuals through didactic and practicum experience.

2. Definition of key words:

- **Programme:** An educational program leading to the award of a Degree, diploma or certificate.
- **Academic Year:** Two consecutive (one odd + one even) semesters constitute one academic year.
- **Semester:** Each semester consists of 15-18 weeks of academic work equivalent to 90 days of actual teaching days. The odd semester may be scheduled from July to December and even Semester from January to June.
- **CBCS (Choice Based Credit System):** It provides choice for students to select from the prescribed courses.
- **Course:** It is usually referred to as “Papers”. All courses need not carry the same weight. A course may comprise lectures/tutorials/laboratory, work/field, work/outreach activities/project work/vocational training/viva/seminars etc or a combination of some of these.
- **Credit:** A unit by which the course work is measured. It determines the number of hours of instructions required per week. One credit is equivalent to one hour of teaching or two hours of practical work.
- **Core course:** Are course that are basic to the subject of the degree. This is a course which is to be compulsorily studied by a student as a core requirement to the completion of the program.
- **Elective Courses:** This is a course that is supportive to the discipline of study, provides an expanded scope, enables exposure to some other domains or nurtures proficiency/skills. Elective papers can be of two types: Discipline Specific Elective (DSE) and Generic Elective (GE). Core / DS Electives will not be offered as Generic Electives. Elective papers can be taken from MOOC courses and credit transfer should be allowed.
- Each of the Core courses and Discipline Specific Elective (DSE) shall be of 4 credits. Credits under DSE may vary (16/12/8) depending upon the number of DSE courses offered across the semesters.

- **Discipline Specific Elective (DSE):** These courses are inter disciplinary in nature and considered similar to core course. And, the students have to choose one course from the option provided for them.
- **Generic Elective (GE):** These courses add generic proficiency to the students. Students have to choose generic elective courses in consultation with the head of the department from the Generic Elective courses offered by other Division of study in Sports Science or from other Departments in university.

3. Course Structure:

This **M.Sc. Strength and Conditioning** is a programme consists of core courses, soft core courses, practical courses, internship and project work. The entire programme carries credit system. The number and distribution of credits for the programme will be decided by the respective faculties.

A programme is divided into two Semesters, Odd Semester and Even Semester. The normal Semester periods are:

Odd Semester: July to November (90 Working days)

Even Semester: December to April (90 Working days)

4. Credits:

The term credit is used to describe the quantum of syllabus for various courses in terms and hours of study. It indicates differential weight age given according to the contents and duration of the courses in the curriculum design. The minimum credit requirement for a two years Master's Programme shall be 90.

One credit of theory equals one lecture hour and

One credit of practical equals two laboratory hours.

5. Courses:

Each Programme may consist of Lectures / Tutorials / Laboratory Work / Seminar / Project Work / Practical Training Report / Viva-Voce etc. Normally, in each of the programs, credits will be assigned on the basis of the Lectures/Tutorials/Laboratory Work and other form of learning in a 18 week schedule.

6. Eligibility for Admission:

A candidate who has passed any Bachelor degree with a minimum of 50% marks in aggregate and having represented the college /University/ District/State/National/International level in any discipline of sport/game.

7. Grading System:

The term grading system indicates a 10 point scale of evaluation of the performance of students in terms of marks, grade points, letter grade and class.

8. Duration:

The duration for completion of two Years Master's programme in any subject is four Semesters, but in any case not more than five years from the year of admission.

9. Attendance:

Every teaching faculty handling a course shall be responsible for the maintenance of Attendance Register for candidates who have registered for the course.

The instructor of the course must intimate the Head of the Department at least Seven Calendar Days before the last instruction day in the semester about the particulars of all students who have secured an attendance of less than 80%.

A candidate who has attendance less than 80% shall not be permitted to sit for the end–semester examination in the course in which the shortage exists.

However, it shall be open to the authorities to grant exemption to a candidate who has failed to obtain the prescribed 80% attendance for valid reasons on payment of a condonation fee and such exemptions should not under any circumstances be granted for attendance below 70%.

10. Examination:

There will be two sessional assessment tests and one End–Semester examination during each semester.

Sessional Test–I will be conducted after 35 working days and Sessional Test–II will be conducted after 70 working days.

Sessional Test–I will be a combination of a variety of tools such as class test, assignment and paper presentation that would be suitable to the course. This requires an element of openness. The students are to be informed in advance about the nature of assessment and the procedures. However, the tests are compulsory. Test–I may be for one hour duration. The pattern of question paper will be decided to the respective faculty. Sessional Test–I will carry 12.5% of marks of the entire course.

Sessional Test–II will be held after 70 working days for the syllabi covered between Seventh and Eleventh weeks.

Sessional Test–II will be conducted with a variety of assessment tools. It will also have an element of openness. The students are to be informed in advance about the nature of assessment and the procedures. However, the tests are compulsory. Test–II may be for two hours duration. The pattern of question paper will be decided by the respective Faculty. Sessional Test–II carries 12.5% of marks of the entire course.

There will be one End–Semester Examination of 3 Hours' duration in each course. The end semester examination will cover all the syllabus of the course for 75% of marks.

Each course shall carry a maximum of 100 marks for the purpose of grading. The distribution of marks shall be as follows.

Theory Marks			**Practical Marks**		
Internal	**External**	**Maximum**	**Internal**	**External**	**Maximum**
25	75	100	40	60	100

11. Non-Credit Course

For the Non-Credit Courses offered in a Semester, a 'Satisfactory Participation Certificate' shall be issued to the Student from the concerned authorities, only after securing ≥ 65% attendance in such a Course. No credits, marks or Letter Grade shall be allotted for the non-credit course.

12. Internship and Field visit:

The Internship / Practical Training shall carry 100 marks and shall be evaluated through internal assessment only. At the end of Internship / Practical training / Summer Project, the candidate shall submit a certificate from the organization where he /she has undergone training and a brief report. The evaluation will be made based on this report and a Viva-Voce Examination, conducted internally by a three member Departmental Committee constituted by the Head of the Department. Certificates (issued by the training centre or Organization) submitted by the candidate shall be attached to the mark list sent by the Head of the Department.

Field visit carry 100 marks and shall be evaluated through internal assessment only. At the end of field visit students has to submit the field visit report. Similarly, like internship evaluation will be made based on this report and a Viva-Voce Examination, conducted internally by a three member Departmental Committee constituted by the Head of the Department. Certificates (issued by the training centre or Organization) submitted by the candidate shall be attached to the mark list sent by the Head of the Department.

13. Evaluation:

Evaluation will be done on a continuous basis. Evaluation may be by Objective Type Questions, Quiz, Short Answers, Essays or a combination of these, but at the end semester it has to be a written examination.

The performance of students in each course is evaluated in terms of percentage of marks (PM) with a provision for conversion to Grade Point (GP). The sum total performance in each semester will be rated by GPA while the continuous performance from the 2nd Semester onwards will be marked by (OGPA).

14. Marks and Grading:

A student cannot repeat the Sessional Assessment Test–I and Sessional Test– II. However, if for any compulsive reason the student could not attend the test, the prerogative of arranging a special test lies with the teacher in consultation with the Head of the Department.

A minimum of 50% marks in each course is prescribed for a pass. A student has to secure 50% minimum in the End Semester Examination.

If a candidate who has not secured a minimum of 50% of marks in a course shall be deemed to have failed in that course.

The student can repeat the End Semester Examination when it is offered next in the subsequent Odd/ Even semesters till the regulations are in force. However, a candidate cannot move to the next semester if he/she has more than six papers as arrears at any point of time.

A candidate who has secured a minimum of 50 marks in all courses prescribed in the programme and earned a minimum of the credits will be considered to have passed the Master's Degree Programme.

15. Grading:

A ten point rating is used for the evaluation of the performance of the student to provide a letter grade for each course and overall grade for the Master's Programme. The letter grade assigned is given below:

Marks	Grade Point	Letter Grade	Class
90+	10	S	Exemplary
85-89	9.0	D	Distinction
80-84	8.5	D	Distinction
75-79	8.0	D	Distinction
70-74	7.5	A	First class
65-69	7.0	A	First class
60-64	6.5	A	First class
55-59	6.0	B	Second class
50-54	5.5	C	Second class
49 or less	-	F	Fail

The successful candidates are classified as follows:

I – Class 60% marks and above in over all percentage of marks (OPM).

II – Class 50–59% marks in over all percentage of marks.

Candidates who obtain 75% and above but below 91% of marks (OPM) shall be deemed to have passed the examination in First Class (Distinction) provided he/she passes all the course prescribed for the programme at the first appearance.

Candidates who obtain 90% and above (OPM) shall be deemed to have passed the examination in First Class (Exemplary) provided he/she passes the entire course prescribed for the programme at the first appearance.

For the Internal Assessment Evaluation the break up marks shall be as follows.

Test	10 marks
Assignment	05 marks
Case Study / Seminar / Short Answers etc.	05 marks
Attendance	05 marks
Total	25 Marks

Marks for Attendance Percentage

90% and above	5 Marks
80 – 89%	4 Marks
70 – 79%	3 Marks

16. Course–Wise Letter Grade:

The percentage of marks obtained by a candidate in a course will be indicated in a letter grade. A student is considered to have completed a course successfully and earned the credits if he/she secures over all grades other than F. A letter grade F in any course implies a failure in that course. A course successfully completed cannot be repeated for the purpose of improving the Grade point.

The F Grade once awarded stays in the grade card of the student and is not deleted even when he/she completes the course successfully later. The grade acquired later by the student will

be indicated in the grade sheet of the Odd/Even semester in which the candidates has appeared for clearance of the arrears.

A student secures F grade in any course which is listed as course as to repeat it compulsorily when the course is offered next. If it is an elective course, a student has the option to repeat it when it is offered next or to choose a new elective if he / she is chosen in the place of failed elective failed optional will be indicated as dropped in the subsequent grade card.

If a student secures F Grade in the Project Work/ Field Work/Practical Work/ Dissertation, either he/she shall improve it and resubmit it if it involves only rewriting incorporating the clarification of the evaluators of he/she can re–register and carry out the same in the subsequent semesters for evaluation.

17. Withdrawal from the course by the student:

Within two weeks from the date of commencement of the semester.

Annamalai University

MYAS-AU Department of Sports Sciences

Centre of Excellence

M.Sc. Strength and Conditioning

Two-Year (4-Semester) CBCS Programme

Programme Code: SSPO25

Programme Structure
(For students admitted from the academic year 2019-2020)

Course Code	Course Title	Hours/ Week		C	Marks		
		L	P		CIA	ESE	Total
Semester-I							
19MSCC101	Core 1: Fundamental Of Sports Training	4		4	25	75	100
19MSCC102	Core 2: Methods of sports training	4		4	25	75	100
19MSCC103	Core 3: Physiology of exercise and adaptation	4		4	25	75	100
19MSCP104	Core 4: Practical I: General Conditioning and Flexibility		8	3	40	60	100
19MSCP105	Core 5: Practical II: Sports and Games		8	3	40	60	100
	Elective 1: Interdepartmental Elective	3		3	25	75	100
				21	180	420	600
Semester-II							
19MSCC201	Core 6: Testing Procedures and Evaluation	4		4	25	75	100
19MSCC202	Core 7: Functional Anatomical Kinesiology	4		4	25	75	100
19MSCC203	Core 8: Sport and Fitness Administration	4		4	25	75	100
19MSCP204	Core 9: Practical III: Fitness Assessment and Recording Progress		6	3	40	60	100
19MSCP205	Core 10: Practical IV: Weight Training Program based on Sport and Fitness Goal		6	3	40	60	100
	Elective 2: Interdepartmental Elective	3		3	25	75	100
	Elective 3: Department Elective	3		3	25	75	100
				24	205	495	700
Semester-III							
19MSCC301	Core 11: Science of Sports Training -I	4		4	25	75	100
19MSCC302	Core 12: Research Methods and Statistics	4		4	25	75	100
19MSCC303	Core 13: Program Design and Periodization	4		4	25	75	100
19MSCI304	Core 14: Internship		6	4	25	75	100
19MSCP305	Core 15: Practical V: endurance and Agility Training		5	3	40	60	100
19MSCP306	Core 16: Practical VI: Fitness Drills		5	3	40	60	100
	Elective 4: Interdepartmental Elective			3	25	75	100
	Elective 5: Department Elective	3		3	25	75	100
				28	230	570	800
Semester-IV							

19MSCC401	Core 17: Science of Sports Training -II	4		4	25	75	100
19MSCC402	Core 18: Alternative Methods of Training	4		4	25	75	100
19MSCC403	Core 19: Sports injuries	4		4	25	75	100
19MSCP404	Core 20: Practical VII: Speed and Power Training		5	2	40	60	100
19MSCP405	Core 21: Practical VIII: Rehabilitation and Relaxation techniques		5	2	40	60	100
19MSCD406	Project Work/In-plant training		8	4	25	75	100
				20	180	420	600
	Total Credits			**93**			
	Value Added Courses						

L- Lectures; P- Practical; C- Credits; CIA- Continuous Internal Assessment; ESE- End-Semester Examination

Note:

1. **Students shall take both Department Electives (DEs) and Interdepartmental Electives (IDEs) from a range of choices available.**
2. **Students may opt for any Value-added Courses listed in the University website.**

Elective Courses

Department Electives (DE)

S. No.	Course Code	Course Title	hours/ week		C	Marks		
			L	P		CIA	ESE	Total
1.	19MSCE207.1	Sports Nutrition and Energy Metabolism	3	0	3	25	75	100
2.	19MSCE207.2	Obesity and Weight Management	3	0	3	25	75	100
3.	19MSCE308.1	Exercise Considerations for Special Populations	3	0	3	25	75	100
4.	19MSCE308.2	Sports and game specific Drills	3	0	3	25	75	100

Interdepartmental Electives (IDE)

S. No.	Course Code	Course Title	Department	Hours/ week		C	Marks		
				L	P		CIA	ESE	Total
1.	19 SOSE 115.1	Soft Skills	English	3	0	3	25	75	100
2.	19 MATE 215.1	Discrete Mathematics	Mathematics	3	0	3	25	75	100
3.	19 MATE 215.2	Numerical Methods		3	0	3	25	75	100
4.	19 MATE 315.1	Differential Equations		3	0	3	25	75	100
5.	19 STSE 215.1	Statistical Methods	Statistics	3	0	3	25	75	100
6.	19 STSE	Mathematical Statistics		3	0	3	25	75	100

	215.2								
7.	19 STSE 315.1	Bio-Statistics		3	0	3	25	75	100
8.	19 PHYE 215.1	Classical Mechanics and Special Theory of Relativity	Physics	3	0	3	25	75	100
9.	19 PHYE 215.2	Physics of the Earth		3	0	3	25	75	100
10.	19 PHYE 315.1	Bio-Medical Instrumentation		3	0	3	25	75	100
11.	19 PHYE 315.2	Energy Physics		3	0	3	25	75	100
12	19 CHEE 215.1	Applied Chemistry	Chemistry	3	0	3	25	75	100
13	19 CHEE 315.1	Basic Chemistry		3	0	3	25	75	100
14	19 CHEE 315.2	Instrumental Methods of Analysis		3	0	3	25	75	
15	19 BOTE 215.1	Plant Tissue Culture	Botany	3	0	3	25	75	100
16	19 BOTE 215.2	Plant Science – I		3	0	3	25	75	100
17	19 BOTE 315.1	Gardening and Horticulture		3	0	3	25	75	100
18	19 BOTE 315.2	Plant Science – II		3	0	3	25	75	100
19	19 ZOOE 215.1	Animal Culture Techniques	Zoology	3	0	3	25	75	100
20	19 ZOOE 315.1	Environmental Science		3	0	3	25	75	100
21	19 GEOE 215.1	Environmental Geosciences	Earth Sciences	3	0	3	25	75	100
22	19 GEOE 315.1	Applied Geophysics		3	0	3	25	75	100
23	19 MIBE 315.1	Microbiology	Microbiology	3	0	3	25	75	100
24.	19 CISE 215.1	R Programming	Computer & Information Science	3	0	3	25	75	100

Electives Offered to Other Departments

S. No.	Course Code	Course Title	Hours/ week		C	Marks		
			L	P		CIA	ESE	Total
1.	19MSCX206	Fundamentals of Sports Sciences	3	0	3	25	75	100
2.	19MSCX307	Basics of Strength and Conditioning	3	0	3	25	75	100

PROGRAM OUTCOMES (POs):

By the end of the program, the students will be able to

PO1 : **Domain knowledge**: Demonstrate knowledge of basic concepts, principles and applications of the specific science discipline.

PO2 : **Resource Utilisation.** Cultivate the skills to acquire and use appropriate learning resources including library, e-learning resources, usage of scientific sports training methods and testing methods to enhance knowledge-base and stay abreast of recent developments.

PO3 : **Analytical and Technical Skills:** Ability to handle/use appropriate tools/techniques/equipment with an understanding of the standard operating procedures, safety aspects/limitations on diverse population with specific needs

PO4 : **Critical thinking and Problem solving:** Identify and critically analyse pertinent problems in the relevant discipline using appropriate tools and techniques as well as approaches to arrive at viable conclusions/solutions.

PO5 : **Project Management**: Demonstrate knowledge and scientific understanding to identify the purpose, design training shedules, use appropriate methodologies, analyse and interpret data and provide solutions.

PO6 : **Organisational skills**: Exhibit organisational skills and the ability to manage time and resources.

PO7 : **Individual and team work**: Exhibit the potential to effectively accomplish tasks independently and as a individual/team trainer in diverse settings, and in goal specific settings.

PO8 : **Ethics**: Commitment to professional ethics and responsibilities.

PO9 : **Life-long learning:** Ability to engage in life-long learning in the context of the rapid developments in the discipline.

PO10 : **Use of Technology:** Ability to utilize the available modern technology/Equipments/Training methods in obtaining maximum positive results, demonstrate the ability to write dissertations, reports, make effective presentations and documentation.

PROGRAM SPECIFIC OUTCOMES (PSOs):

By the end of the program, the students will be able to

PSO1 : Understand principles of scientific sports training to be applied in the field of performance enhancement through diverse sports training methods.

PSO2 : Understand the principles of training and its effect on physical, physiological and psychological aspect of trainees.

PSO3 : Understand and apply the principles of Exercise physiology, Biomechanics and Nutrition and use them effectively in the training processes.

PSO4 : Provide exposure in various methods of training for team/ individual sports and to have an understanding on the effect of these methods individually and in combination on improvement of various performance capabilities.

PSO5 : Applying the knowledge gained in designing effective training programs for different population with diverse needs.

PSO6 : Provide exposure in various allied disciplines (Exercise physiology/Sports Biochemistry/Biomechanics/Sports nutrition).

PSO7 : Provide exposure to modern experimental/theoretical methods for measurement, observation and assessment of various components of health/performance related fitness.

PSO8 : Engage in research and life-long learning to adapt to changing environment.

MAPPING OF PROGRAMME SPECIFIC OUTCOMES WITH PROGRAMME OUTCOMES

By the end of the program, the students will be able to

Programme Specific Outcomes (PSOs)	**Programme Outcomes (POs)**									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
PSO1	3	3	3	2	3	3	3	3	3	3
PSO2	3	3	3	3	3		2		3	
PSO3		3		3	3	3		3		3
PSO4	3		3	3	3	3				3
P5O5	3	3	2	3	3				3	3
PSO6	3			3					3	3
PSO7		3	3		3			3	3	3
PSO8	3	3	3	3	3	3	3		2	3

Semester	**Credit**	**Internal (Marks)**	**External (Marks)**	**Total (Marks)**
I	21	180	420	600
II	24	205	495	700
III	28	230	570	800
IV	20	180	420	600
Total	93	715	1905	**2700**

SSPO25-**M.Sc. Strength and Conditioning (Semester I)**							
19MSCC101- Fundamental Of Sports Training							
Course Code.	**Course Title**	**Course Type**	**No. of Credit**			**Marks Split**	
			Theory	**Practical**	**Total**	**Int**	**Ext**
19MSCC101	**Fundamental Of Sports Training**	C – 1	4	0	4	25	75

Learning objective

- To define the concept of training and sports training.
- To develop the understanding of the load and over load.
- To describe planning and preparation of training periods of the sports

Unit I - History of science of sports training:

Introduction, position and functions - Sports areas - Definition and characteristics of sports training. Objectives of sports training - System of sports training and its components - Factors determining quality of training - Model of training - Stages of trainer and Trainee relationship: Rapport Investigation, Planning and Action

Unit II - Principles of Sports training:

Principle of variation of training - Principle of specificity - Principle of individualization - Principle of over load - Principle of diminishing return - Force-velocity - Relationship Scientific and systematic planning

Unit III - Basic Physical fitness components:

Strength, Speed, Endurance, Speed, Mobility. Introduction to methods of improving– General exercises, special exercises, competition specific exercises.

Unit IV - Sports Performance:

Nature and definition and types of sports performance - Performance Structure and performance capacity - Model of sports performance- Talent Identification - Stages of Athletic development. - Talent identification - Important Factors - Long term athlete development (LTAD)

Unit V - Tactical Preparation:

Methods of technique training - Technical Error - Location of error - Causes of Error - Methods of error correction - Feed back - Type and function of feedback - Principles for effective feedback - Internal vs external focus of attention.

Unit VI – Practical Implementations

Measurement of basic fitness components. Methods of identifying talents. Understanding attention levels of individuals.

Text Books:

Baechle T.R., Essentials Of Strength Training And Conditioning, 3/E. Human Kinetics Publishers

Dick W. Frank, Sports Training Principles 4thed. (London: A&C Black Ltd.),2002.

Anderson ,Foundations of Athletic Training, 6e (HB), Human Kinetics Publishers

Supplementary Reading:

Tuder B. Bompa & Mihal C. Carera, Periodiation Training for Sports, HumanKinetics,2005 (IInd Edition)

Sreedhar. K., Sports Training Methods, Chidambaram, Sowmi Publications, 2007.

Course Outcomes

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

CO1: Understand the history and basic concepts of sports training

CO2: Understand the principles of sports Training

CO3: Understand the basic components of fitness and methods of improving it.

CO4: Understand the concept of performance enhancement and the factors influencing it.

CO5: Understand the role of tactics in sports and training

CO6: Apply the comprehensive knowledge of science of sports training in planning and preparation of training periods.

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO1	3	3	3	-	-	-	-	3	3	-	3	-	-	3	3	3	3
CO2	3	-	2	-	-	-	3	3	-	3	3	3	-	-	3	3	-
CO3	3	-	3	-	-	-	3	2	-	3	3	3	-	-	3	3	-
CO4	3	-	3	-	-	-	3	3	-	3	3	2	-	-	3	3	-
CO5	3	-	3	-	-	-	3	3	-	3	3	3	-	-	3	3	-
CO6	3	-	3	-	-	-	2	3	-	3	3	3	-	-	3	3	-

19MSCC102-Methods Of Sports Training							
Course Code.	**Course Title**	**Course Type**	**No. of Credit**			**Marks Split**	
			Theory	**Practical**			
19MSCC102	**Methods Of Sports Training**	C – 2	4	0	4	25	75

Learning Objectives

To impart knowledge about physical performance and sports training which enables the students to understand the general principles and the effects of physical training which are fundamental in exercise and acquisition of physical skills.

Unit I - Training Means and performance:

Principal means of training. Physical activity and physical exercises. Exercise selection - General adaptation to Physical exercises . Additional means of training -Classification of Sports . Application of knowledge of sports performance .

Unit II - Nature and types of sports performance:

Performance Structure and performance capacity. Model of sports performance. Performance factors: relative dominance / weightage and their interrelationship among factors.. Inter relationships among, performance, performance capacity and raining structure.

Unit III - Plyometrics:

Definition of plyometric - Mechanism of plyometrics - Basic consideration for the effective use of plyometrics - scientific principles of plyometric training (stretch shortening cycle), basic plyometric exercises, medicine ball drills, sport-specific plyometric drills, safety considerations, designing plyometric programmes; complex and functional training Prog. Design and Technique for Plyometric Training.

Unit IV - Speed, Agility and Quickness:

Forms of speed in various sports - - Factors determining speed ability –Heredity - Reaction time - Muscle composition and elasticity - Mobility of the nervous system - Explosive strength – Technique - Biochemical reserves and metabolic power – Flexibility - Warm-up - Psychic factors - Biomechanical factors - Methods of developing speed - Load intensity - Work interval - Rest interval - Number of repetitions Way of rest - Training frequency

Unit V - Mode of work/ contraction form and working features of muscles:

Mode of work – Static – Dynamic Type of contraction – Isometric – Isotonic – Auxotonic – Isokinetic - Stretch and shortening cycle (SSC) – Concentric – Eccentric - Stretch and shortening cycle (SSC) - Post-activation potentiation (PAP) - Underlying mechanisms - Methods of inducing PAP - PAP in Power and Endurance Sports

Over Training - Over Load, Over Reaching and Overtraining - Functional over-reaching - Non-functional over-reaching - Types of overtraining - Reasons of over training, - Remedies of overtraining - Prevention of overtraining

Unit VI – Practical Implementations

Usage of different tools for plyometrics training. Usage of different tools for speed training. Different methods of jump training. Measuring foot contacts.

Text Books:

NASM , NASM Essentials of Sports Performance Training, First Edition Revised, Human Kinetics Publishers

Derek Hansen, Steve Kennelly, Plyometric Anatomy, Human Kinetics Publishers

Supplementary Reading:

Liebenson , Functional Training Handbook (PB), Human Kinetics Publishers

Potrac ,The Routledge Handbook Of Sports Coaching, Human Kinetics Publishers

Course Outcomes

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

CO1: Understand the principles and means of sports training.

CO2: Understand the relationship between physical activity and adaptation process.

CO3: Have an in-depth knowledge on plyometrics and its features

CO4: Understand the components and method of improving speed

CO5: Understand the different types of muscle contraction and its mechanism.

CO6: Compare and contrast the mechanisms of various factors and their applications and make recommendations for enhancing the training effect after analyzing sports training plans.

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO1	3	3	-	3	-	-	3	3	3	-	3	3	-	3	3	-	-
CO2	3	3	-	2	3	3	3	3	-	3	3	3	-	3	3	3	-
CO3	3	-	3	3	-	3	3	3	-	3	2	3	-	3	3	-	3
CO4	3	-	3	3	-	-	3	3	3	3	3	2	3	3	3	3	-
CO5	3	3	-	3	-	-	3	3	3	3	3	3	-	3	3	-	3
CO6	3	3	-	3	-	-	2	3	3	3	3	3	-	3	2	-	3

19MSCC103:Physiology of Exercise and Adaptation							
Course Code.	**Course Title**	**Course Type**	**No. of Credit**			**Marks Split**	
			Theory	**Practical**	**Total**	**CIA**	**ESE**
19MSCC103	**Physiology of exercise and adaptation**	C – 3	4	0	4	25	75

Learning objective

To develop the knowledge, understanding on the functioning of different systems of the body and to have in depth knowledge on the effect of different training modalities on these systems

Unit I - Psychology of Athletic Preparation & Performance:

Energy for Sport Performance - Anaerobic Phosphate System - Anaerobic Lactic Energy System - Aerobic Energy - Target Heart Rate - Muscle Contractions (Slow & Fast Twitch Fibers).

Unit II - Effect of environment on Performance:

Work Capacity under Different Environmental Conditions : Hot – Humid – Cold – High Altitude.

Unit III - Effect of exercise on different systems of the body:

Effect of Exercise on Circulatory system – Respiratory system – Oxygen debt, forced expiratory volume, Breathing capacity, Vital Capacity, Recovery and second wind, Endocrine system. Effect of aerobic endurance training on Heart rate, Heart size, Blood Pressure, Blood Distribution, Lungs Volume, Respiratory Rate, Maximal Oxygen uptake and Lactic Acid.

Unit IV - Fatigue and its management:

Fatigue definition, types of fatigue, central, peripheral, mental, depletion hypothesis, accumulation hypothesis, fatigue management.

Unit V - Ergogenic Aids:

Meaning, Effect of Drugs – Alcohol, Caffine- and Smoking on performance. Blood doping, arabolic steroid, Drug abuses in athletics. Effect of climatic Changes – High altitude Training for Long Distance runner.

Unit VI – Practical Implementations

Measurement of resting heart rate. Measurement of maximum heart rate.. Measurement of recovery heart rate. Recording and plotting heart rate. Variations. Measurment of systolic and diastolic blood pressure.

Text Books:

Gardiner , Neuromuscular Aspects Of Physical Activity, Human Kinetics Publishers

Vern Gambetta ,Athletic Development:The Art & Science of Functional Sports Conditioning, Human Kinetics Publishers.

Kang **,** Nutrition and Metabolism in Sports, Exercise and Health, Human Kinetics Publishers.

Supplementary Reading:

Greg Shepard, Kim Goss, Bigger Faster Stronger,Third Edition, Human Kinetics Publishers

Mottram, ed. et al., Drugs in Sport, Human Kinetics Publishers.

Kimberly Mueller; Josh Hingst, Athlete's Guide to Sports Supplements, Human Kinetics Publishers.

Course Outcomes

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

CO1: Understand the physiology of exercise performance and energy system.

CO2: Understand the different environmental factors on performance.

CO3: Understand the effect of systematic physical activity on different systems of the body

CO4: Understand what is fatigue and its effect on performance.

CO5: Understand the effect of drugs on performance its abuse

CO6: Understands the physiological changes influenced by systematic physical activity and its mechanism as well as the process of positive physiological adaptation and how it can be achieved .

Outcome Mapping

CO/ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PS O1	PS O2	PS O3	PS O4	PS O5	PS O6	PS O7
CO1	3	2	-	3	-	-	3	3	-	3	3	-	3	3	3	3	3
CO2	3	3	-	3	-	-	3	3	-	3	3	3	-	-	3	3	-
CO3	3	-	-	3	-	-	3	2	-	3	3	3	-	3	3	3	-
CO4	3	-	-	3	-	-	3	3	-	3	2	3	-	3	3	3	-
CO5	3	-	-	3	-	-	3	3	-	3	3	2	-	3	3	3	-
CO6	3	-	-	3	-	-	3	3	-	3	3	3	-	-	3	2	-

19MSCP104:General Conditioning and Flexibility (Practical)							
Course Code.	**Course Title**	**Course Type**	**No. of Credit**			**Marks Split**	
			Theory	**Practical**	**Total**	**CIA**	**ESE**
19MSCP104	**General Conditioning and Flexibility**	C – 4	0	3	3	40	60

Learning objective

To gain insight in to strategies for developing flexibility and mobility through diverse methods and means

Content

Selection of exercise for various muscles, joints and sport disciplines - Fundamentals of stretching - Stretching the basics - Starting position - Using partner for stretching - using machines and apparatus for stretching

Flexibility Programme Design - Type of stretching - Selection of exercise - Order of stretching - Intensity of exercise - Duration of stretch - Number of repetitions and sets of stretching - Stretching frequency - When not to stretch - Where to stretch - What to wear - Stretching position.

Course Outcomes

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

CO1: Understand the types of exercises for various joints and muscles

CO2: Understand the different types of Stretching exercises.

CO3: Gain knowledge on the most effective types of flexibility training and prescribe stretches for each major muscle group.

CO4: Design and execute structured conditioning program based on scientific sports training principles to develop flexibility and mobility for effective functioning as well as improved performance

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO1	3	3	3	-	3	-	3	2	-	3	3	3	-	-	3	-	3
CO2	3	3	3	-	-	-	3	3	-	2	3	3	-	-	3	-	3
CO3	3	3	3	-	-	-	3	3	-	3	3	2	-	-	3	-	3
CO4	3	3	3	-	-	-	3	3	-	3	3	3	-	-	3	-	3

19MSSP105:Sports and Games (Practical)							
Course Code.	**Course Title**	**Course Type**	**No. of Credit**			**Marks Split**	
			Theory	**Practical**	**Total**	**CIA**	**ESE**
19MSSP105	**Sports and Games**	C-5	0	3	3	40	60

Learning objective

To gain understanding and knowledge on different types of sports and games which will help the students to understand the predominating factors which will contribute to success in that particular game or event.

Course Outcomes

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

CO1: Understands the Rules and their interpretations, of major Olympic games and events

CO2: Understands the Measurement and methodology of play of major Olympic games and events

CO3: Understands the different surfaces on which sporting events are conducted.

CO4: Understands the Advantages of different surface of play field for the above games – Clay court, Natural grass, Cinder, Synthetic, Turf and wooden surfaces.

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO1	3	3	3	-	3	-	3	3	-	3	3	2	-	-	3	-	3
CO2	3	3	3	-	-	-	3	2	-	3	3	3	-	-	3	-	3
CO3	3	3	3	-	-	-	3	3	-	3	3	3	-	-	3	-	3
CO4	3	3	3	-	-	-	3	3	-	3	2	3	-	-	3	-	3

Inter Departmental Elective							
Course No.	**Course Title**	**Course Type**	**No. of Credit**			**Marks Split**	
			Theory	**Practical**	**Total**	**CIA**	**ESE**
	Generic Elective*	E– 1	2	0	2	25	75

*Select one from the Generic Elective list Other than that offered by his/her parent Department) of the University.

SSPO25:**M.Sc. Strength and Conditioning (Semester II)**							
19MSCC201:**Testing Procedures and Evaluation**							
Course Code.	**Course Title**	**Course Type**	**No. of Credit**			**Marks Split**	
			Theory	**Practical**	**Total**	**CIA**	**ESE**
19MSCC201	**Testing Procedures and Evaluation**	C – 6	4	0	4	25	75

Learning objective

Identify and describe the standard tests, test equipment, and testing protocols that are used for measuring fitness, body composition, posture, flexibility, muscular strength, power, speed, agility, and endurance

Unit I - Introduction and Classification of Tests :

Meaning of the terms Test, Measurement and Evaluation. Need and Importance of Test, Measurement and Evaluation in sports sciences. Classification of Tests - Objective and Subjective Tests – Standardised Skill Tests. Principles of Test Selection and Administration

Unit II – Body composition and Antropometric measurements

Skinfold measurements – locations of skinfold sites- cheek-chin-pectoral-axilla- abdomen iliac crestsupraspinale- subscapular-tricpeps-biceps-patella-mid thighproximal calf-medial calf- waist hip ratio- body mass index- fat free index - Anthropometric measurement – Heath carter somatotyping testing and classification procedure - report generation technique.

Unit III - Measurement of Physical Fitness and Motor Fitness:

Tuttle Pulse Ratio Test, Harvard Step Test, Cooper's 12 Minutes Run / Walk Test. AAHPER Youth Fitness Test – JCR Test – Kraus – Weber Muscular Fitness Test.

Unit IV - Monitoring of Sports Training:

Nature and importance - Means and types - System of monitoring sports training - Documents for monitoring of sports training - Monitoring techniques/procedures - Motor tests - Monitoring of Internal and External load - Monitoring of pre & Post training recovery - Monitoring of performance.

Unit V - Skill Tests:

Vrious types of skill tests - Tests for Muscular Strength, Power, Endurance, Power, Speed and Agility - Administration, Scoring, and Interpretation of Selected Tests - Administer and interpret fitness tests to assess a subjects physical status and readiness for physical activity

Unit VI – Practical Implementations

Preparation of tables for different assessments. Preparation and maintenance of logs for individual and for groups/teams. Measurement of skinfold thickness.. estimation of BMI. Administration of different skill and fitness tests.

Text Books:

Vivian H. Heyward, Dale R. Wagner ,Applied Body Composition Assessment, Second Edition, Human Kinetics Publishers.

ACSM, ACSM's Health-Related Physical Fitness Assessment Manual, 5Ed, Human Kinetics Publishers.

Morrow , Measurement & Evaluation In Human Performance, Human Kinetics Publishers.

Supplementary Reading:

Vivian H. Heyward, Ann L. Gibson, Advanced Fitness Assessment and Exercise Prescription, Seventh Edition, Human Kinetics Publishers.

Helen J. Hislop ,Daniels & Worthingham'S Muscle Testing 9th Edition, Human Kinetics Publishers

Course Outcomes

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

CO1: Understands the basics of test and measurement

CO2: Understands the methods of measuring the various components of body composition,

CO3: Understands the methods of measuring physical/motor fitness components

CO4: Understands the methods of recording the progress of training.

CO5: Understands the method of assessing various skills of sport and games.

CO6: Use baseline measures, pre screening tools and scholarly evidence (i.e., normative data) to design and implement training programs.

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO1	3	2	3	3	-	-	-	3	3	3	-	-	-	-	3	-	3
CO2	3	3	3	3	-	-	-	3	-	3	-	-	-	-	3	-	3
CO3	3	3	3	3	-	-	-	3	-	3	-	-	-	-	3	-	3
CO4	3	3	3	3	-	2	3	3	-	3	-	-	-	-	3	-	-
CO5	3	3	-	3	-	3	3	3	-	3	-	-	-	-	3	-	3
CO6	3	3	-	3	-	3	3	3	3	3	3	-	-	-	2	-	3

19MSCC202:Functional Anatomical Kinesiology							
Course Code.	Course Title	Course Type	No. of Credit			Marks Split	
			Theory	Practical	Total	CIA	ESE
19MSCC202	**Functional Anatomical Kinesiology**	C – 7	4	0	4	25	75

Learning objective

The module objective to apply theoretical concepts of Anatomy and Kinesiology to the analysis of strength and conditioning training exercises during the training session.

Unit I - **General Anatomy Terms:**

Structure and Function of Body Systems - Movement Terminology - Musculoskeletal Anatomy Endocrine system- Muscular Junction and Co-ordination of Muscular Activity: Neuron and Motor Unit – Bio-Electrical Potential – Neuro-muscular junction and transmission of nerve impulse.

Unit II - Structure of the Skeletal Muscle:

Functions of the Skeleton - Bones of the Body – Classification of Joints and Its structure – Kinds of joint movement and range of motion. Chemical Composition of the muscles – Microscopic structure of the myofibril contractile mechanism – Molecular basis of muscular contraction – Sliding filament theory.

Unit-III - Bone Tissue Function:

Composition of Bone Tissue, Macroscopic Structure of Bone, Bone Formation- Structure and functions of cartilages, tendons – ligaments - Articular Cartilage, Fibro cartilage, Ligaments; Bony Articulations.

Unit-IV - Muscular consideration for movement:

Muscle Tissue Properties – Muscles: Types of Muscles – Role of Muscles – Kinds of Muscle Actions – Mechanics of muscles- Co-ordinated action of Muscles – Muscles function in relation to Posture. - Skeletal Muscle Structure.

Unit-V -**Muscle mechanics:**

Origin versus Insertion, Developing Torque, Muscle Role versus Angle of Attachment, Muscle Actions Creating, Opposing, and Stabilizing Movements, Net Muscle Actions, One- and Two-Joint Muscles; Force–Velocity Relationships in Skeletal Muscle.

Unit VI – Practical Implementations

Identification different body parts. Identification different joints and bones associated with the joints

Text Books:

Edward Far, Richard Bowers and Merle Foss, The Physiological Basis for Exercise and Sports, New York : Brown & Benchmark, 1993.

Jack H. Wilmore and David L.Costill, Physiology of Sports and Exercise, USA : Human Kinetics, 1994.

Supplementary Reading:

Thibodean and Patton, “Structure and Function of the Body”, St. Louis Philadelphia: Lea & Febiger.
Peter N Sperryn, “Sports and Medicine”, New Jersy : Prentice Hall Inc.,

Course Outcomes

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

CO1: Understand the anatomical components of the body.

CO2: Understand the structure of the muscular system.

CO3: Understand the composition and functions of the bones

CO4: Understand the types and functions of the muscle

CO5: Understand the effect of physical activity on different systems of the body.

CO6: Develop the knowledge and appreciation of the importance of the study of kinesiology as a foundation for further studies. Describe organization of the human body and its regulation. Understand the support and movement of systems of the body.

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO1	3	3	-	-	-	-	-	3	3	3	3	3	3	-	3	3	3
CO2	3	3	-	-	-	-	3	3	-	3	3	3	3	-	3	3	3
CO3	3	-	-	-	-	-	3	3	-	3	3	3	3	-	3	3	-
CO4	3	-	-	-	-	-	3	3	-	3	3	2	3	-	3	3	3
CO5	3	-	-	-	-	-	3	3	-	3	3	3	3	-	3	3	3
CO6	3	-	-	-	-	-	3	3	-	3	3	3	3	-	3	2	3

19MSCC203: Sports and Fitness Administration.							
Course Code.	**Course Title**	**Course Type**	**No. of Credit**			**Marks Split**	
			Theory	**Practical**	**Total**	**CIA**	**ESE**
19MSCC203	**Sport and Fitness Administration**	C – 8	4	0	4	25	75

Learning objective

Comply with safety and regulatory standards regarding use of equipment and rehabilitation tools in the athletic training setting.

Discuss the specific components of planning and designing a strength and conditioning facility including the development of policies and procedures, and facility maintenance and risk management.

Unit I - Scope and Concept of Sports Management :

Management – Meaning, Definition – Functions of Sports Management – Importance –Role of Manager and Interpersonal Roles – Manpower planning – Meaning of Recruitment – Sports Organisation.

Unit II - Principles, Nature, Purpose of Organisation:

Systems of organization – Leadership: Meaning, Personal traits – Qualities of a Leader – Organization Facilities: Indoor Stadium, Dressing Room, Free Zone, Natures Call Area, Rest Room, Power Room, Water Facilities, VIP Gallery and Media Zone.

Unit III - Concepts and Need of Motivation in Sports Organisation:

Task as a Motivation – Job feed back – Types of Public Relation – Role of Government, Press, Media –Conference – Finances – Qualities of Good Public Relation Organisation.

Unit IV - Organization & Administration of the Strength Training & Conditioning Facility:

Facility Layout and Scheduling - Developing a Policies and Procedures Manual - Facility Maintenance and Risk Management - Facility Design, Layout and Organization

Unit V - Finance and Budget for Sports:

Infrastructure – Equipment – Salaries and Wages – Raising of Funds – Budget, Record maintenance and Purchase of Equipment. – Advantages – Essentials – Types of Budget – Research and Development – Funds Collection prices.

Unit VI – Practical Implementations

Designing fitness improvement facilities for different purposes and budgets. Lay outing equipments. Lay outing indoor and outdoor facilities on different space availability. Budget preparation and account maintenance. Maintenances of stock register.

Text Books:

S.S. Roy, Sports Management : Friends Publications : New Delhi.
Samiran Chakrabarty, Sports Management : Sports Publications : Delhi, 1998.

Supplementary Reading:

Canfitpro ,Foundations of Professional Personal Training, Second Edition With Web Resource, Human Kinetics Publishers.

Riva L. Rahl,, Physical Activity and Health Guidelines: Recommendations for Various Ages, Fitness Levels, and Conditions from 57 Authoritative Sources, Human Kinetics Publishers.

Course Outcomes

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

CO1: Understand the scope and concept of sports management.

CO2: Understand the organizational principles, nature and purpose.

CO3: Understand the role of motivation in sports management.

CO4: Understand the means and ways of administering a fitness facility.

CO5: Understand the methods of budgeting and accounting

CO6: Understand the importance of organization, administration and leadership and their importance in the development of a safe (ethical) and effective training program.

Outcome Mapping

CO/ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PS O1	PS O2	PS O3	PS O4	PS O5	PS O6	PS O7
CO1	3	3	-	2	3	3	3	3	3	-	-	-	-	-	3	-	3
CO2	3	3	-	3	3	3	3	3	3	-	-	-	-	-	3	-	3
CO3	3	3	-	3	3	3	3	3	3	-	-	-	-	-	3	-	3
CO4	3	-	-	3	3	-	3	2	3	-	-	-	-	-	3	-	3
CO5	3	3	-	3	3	3	3	3	3	-	-	-	-	-	3	-	3
CO6	3	3	3	3	3	-	3	3	3	-	3	-	-	-	2	-	3

19MSCX-206- Fundamentals of Sports Sciences

(Inter Departmental Elective -Semester-II)

Course Code.	Course Title	Course Type	No. of Credit			Marks Split	
			Theory	Practical	Total	CIA	ESE
19MSCX206	**Fundamentals of Sports Sciences**	E – 2	3	0	3	25	75

Learning objective

To examine the fundamental concepts of different disciplines of Sports Sciences

To understand the basics of Sports training, Sports Nutrition, Exercise Physiology, Biomechanics and related disciplines.

Unit I - Effect of exercise on different systems of the body:

Effect of Exercise on Circulatory system – Respiratory system – Oxygen debt, forced expiratory volume, Breathing capacity, Vital Capacity, Recovery and second wind, Endocrine system. Effect of aerobic endurance training on Heart rate, Heart size, Blood Pressure, Blood Distribution, Lungs Volume, Respiratory Rate, Maximal Oxygen uptake and Lactic Acid.

Unit II - Metabolism during exercise:

Energy substances - Basic energy systems: ATP-PC, glycolysis and oxidative phosphorylation - Aerobic and anaerobic power—concept, factors affecting it - Respiratory quotient, O_2 debt. Metabolic Equivalent - Energy expenditure during rest and exercise - Techniques to measure energy expenditure - Muscle fatigue and recovery - Lactate threshold, OBLA, Lactate tolerance. Work Capacity under Different Environmental Conditions : Hot – Humid – Cold – High Altitude

Unit III - Fundamentals of Nutrition:

Energy - Classifications of Nutrition (Carbohydrates, Proteins, Fats, Vitamins, Minerals & Water) - Basic Nutrition Factors in Health - Hydration recommendations - eating disorders. Life style modifications – Diet therapy.

Unit IV – Components of Sports Training:

Meaning of the terms Unit, Session, Micro Cycle, Meso Cycle and Macro Cycle - Periodization of training process - Nature and Definition of Peak form, Training state and Periodization - Peaking and Periodization - Physiologic al basis of Periodization - Periodization models - Types of Periodization - Aims and contents of different periods - Periodization of strength training - Periodization of speed training - Periodization of endurance training - Integrated Periodization.

Unit V – Weight management and Injury Prevention/Rehabilitation:

The concepts of Fitness, physical activity and fatness - Role of total daily activity in weight maintenance. Managing injuries (types of injuries, preventing injuries, treating & rehabilitating injuries. - Overtraining, preventing overtraining and treating overtraining - Rehabilitation & Reconditioning.

Unit VI – Practical Implementations

Preparation of logs for body weight and body composition measurements. Preparation of training schedule. Scheduling activities with progression in load.. Measurement of aerobic and anaerobic power,

Text Books:

Hoeger W.W.K, Fitness and Wellness, Human Kinetics Publishers.

Tuder B. Bompa & Mihal C. Carera, Periodiation Training for Sports, HumanKinetics,2005 (IInd Edition)

Sreedhar. K., Sports Training Methods, Chidambaram, Sowmi Publications, 2007.

Supplementary Reading:

Maria A. Spano, Laura J. Kruskall, D.Travis Thomas, ,Nutrition for Sport, Exercise, and Health, Human Kinetics Publishers.

Vassilis Mougios, PhD Exercise Biochemistry, Human Kinetics Publishers.

Course Outcomes

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

CO1: Understand the effect of exercise training on different systems of the body.

CO2: Understand the metabolic changes happens due to physical training.

CO3: Understand the fundamentals of nutrition.

CO4: Understand the fundamental concepts of sports training

CO5: Understand the fundamentals of weight management and injury rehabilitation.

CO6: Have an understanding of the necessity and benefits of habitual Physical activity and understand the composition of a training schedule and how to design one.

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO1	3	3	-	**-**	**-**	**-**	**-**	3	3	3	3	3	3	-	3	3	3
CO2	3	3	**-**	-	-	-	3	3	-	3	3	3	3	-	3	3	3
CO3	3	-	**-**	-	-	-	3	3	-	3	2	3	3	-	3	3	-
CO4	3	-	**-**	**2**	-	-	3	3	-	3	3	3	3	-	3	3	3
CO5	3	-	**-**	-	-	-	3	3	-	3	3	3	3	-	3	3	3
CO6	3	-	**-**	-	-	-	3	3	-	3	3	3	3	-	2	3	3

19MSCE207.1: Sports Nutrition and Energy Metabolism							
Course Code.	**Course Title**	**Course Type**	**No. of Credit**			**Marks Split**	
			Theory	**Practical**	**Total**	**CIA**	**ESE**
19MSCS207.1	**Sports Nutrition and Energy Metabolism**	E – 4	3	0	3	25	75

Learning objective

Recognize and apply the principles of nutrition, hydration, macro and micronutrients for the physically active population at various time intervals related to training (e.g., prevent, recovery, etc.).

Unit I

Nutrition and Health – Elements of good nutrition – Balance diet – Food handling – Food poisoning – Causes of overweight – Effects of overweight – Effects of diet and Exercise - Weight Control (General guidelines for body fat loss, general guidelines for bulking up

Unit II

Nutrition Fundamentals -Energy - Classifications of Nutrition (Carbohydrates, Proteins, Fats, Vitamins, Minerals & Water) - Basic Nutrition Factors in Health - Hydration recommendations - eating disorders

Unit III

Competition diet (Carb loading, pre-competition meal, eating during exercise, eating between exercise and recovery) - Nutrition Strategies for Maximizing Performance - Substances and Methods -, Nutrition/Supplements/Performance Enhancing Substances

Unit IV

Metabolism during exercise - Energy substances - Basic energy systems: ATP-PC, glycolysis and oxidative phosphorylation - Aerobic and anaerobic power—concept, factors affecting it - Respiratory quotient, O_2 debt. Metabolic Equivalent - Energy expenditure during rest and exercise - Techniques to measure energy expenditure - Muscle fatigue and recovery - Lactate threshold, OBLA, Lactate tolerance

Unit V

Ergogenic aids- Drugs and Doping **-** Various ergogenic aids and their role in Performance enhancement, safety and efficacy of performance enhancing drugs. Hazards of taking performance enhancing drugs - Doping - Doping control, results management, sanctions and appeals. List of Prohibited substances, hazards of doping. Therapeutic use exemption - Anti doping awareness and education

Unit VI – Practical Implementations

Planning the components of diet for weight reduction. Planning the components of diet for specific performance related factors. Understanding the methods of measuring energy expenditure.

Text Books:

National Strength and Conditioning Association (NSCA) Bill I. Campbell, Marie A. Spano, **,**NSCA's Guide to Sport and Exercise Nutrition, Human Kinetics Publishers.

Kang **,** Nutrition and Metabolism in Sports, Exercise and Health, Human Kinetics Publishers.

Fink ,Practical Applications in Sports Nutrition, 5/Ed, Human Kinetics Publishers.

Supplementary Reading:

Kimberly Mueller,; Josh Hingst, ,Athlete's Guide to Sports Supplements, Human Kinetics Publishers.

Nanna Meyer, Janice L.Thompson,, Melinda M. Manore,, Sport Nutrition for Health and Performance, Human Kinetics Publishers.

Course Outcomes

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

CO1: Understand the elements of good nutrition.

CO2: Understand the classification of nutrients.

CO3: Understand the nutritional strategies for training and higher performance.

CO4: Understand the metabolic process of exercise training

CO5: Understand the role of drugs and ergogenic aids.

CO6: Gains insight in to nutritional and energy demands for individuals for training, higher performance, rehabilitation as well as for special population, Learn how to provide guidance regarding nutrition.

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO1	3	3	-	**-**	**-**	**-**	**-**	3	3	3	3	3	3	-	3	3	3
CO2	3	3	**-**	-	**2**	-	3	3	-	3	3	3	3	-	3	3	3
CO3	3	-	**-**	-	-	-	3	3	-	3	3	3	3	-	3	3	-
CO4	3	-	**-**	**2**	-	-	3	3	-	3	3	3	2	-	3	3	3
CO5	3	-	**-**	-	-	-	3	3	-	3	3	3	3	-	3	3	3
CO6	3	-	**-**	-	-	-	2	3	-	3	3	3	3	-	3	3	3

19MSCE207.2: Obesity and Weight Management							
Course Code.	**Course Title**	**Course Type**	**No. of Credit**			**Marks Split**	
			Theory	**Practical**	**Total**	**CIA**	**ESE**
19MSCE207.2	**Obesity and Weight Management**	E– 4	3	0	3	25	75

Learning objective

Develop a critical understanding and knowledge of the physiology and regulation of obesity and abnormal body weight

Unit I – Obesity:

Meaning and Definition of Obesity – Improved Food Guide Pyramid – Management – Exercise Issues – Exercise Prescription for Obesity.

Unit II – The physiology of the adipocyte and adipose tissue:

The role of adipose tissue as an endocrine organ as well as its role in health and disease.- The regulation of adipose tissue and energy balance - Appetite regulation and the role of adipose tissue.

Unit III – Reasons for Obesity:

Medical and genetic conditions that can cause obesity and weight gain - Other conditions predisposing to weight gain and obesity - Cushing Syndrome, hypothyroidism and pregnancy.

Unit IV - Avoidance of Obesity:

Life style modifications – Diet therapy - The concepts of Fitness , physical activity and fatness - Role of total daily activity in weight maintenance.

Unit V – Training methods for weight reduction:

Role of resistance training and endurance training in obesity reduction- designing and execution of a training program for obese population- safety precautions

Unit VI – Practical Implementations

Designing strength training schedules for weight reduction for males, females , children and older population. Understanding the sites of adipose tissues. Preparation and maintenance of body weight and body composition logs for different populations.

Text Books:

Liguori , ACSM's Resources for the Health Fitness Specialist, Human Kinetics Publishers.

Kumanyika , Handbook Of Obesity Prevention: A Resource For Health Professionals, Human Kinetics Publishers.

Supplementary Reading:

Marie Dunford, PhD, RD ,Fundamentals of Sport and Exercise Nutrition, Human Kinetics Publishers.

Kenneth L. Knight, Kirk Brumels,, Developing Clinical Proficiency in Athletic Training: A Modular Approach, Human Kinetics Publishers.

Steven B. Heymsfield, Timothy G. Lohman, ZiMian Wang, Scott B. Going, , Human Body Composition, Second Edition, Human Kinetics Publishers.

Course Outcomes

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

CO1: Understand what is obesity and effect of exercise training on weight reduction.

CO2: Understand the physiology of adiposity and weight gain.

CO3: Understand the reasons for weight gain.

CO4: Understand the ways and means of avoiding/reducing obesity

CO5: A critical awareness of the of physical training on regulation of body weight , adipc tissue and its endocrine function.

CO6: An in depth knowledge of the health benefits of exercise and its applicability in weight related

conditions.

Outcome Mapping

CO/ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PS O1	PS O2	PS O3	PS O4	PS O5	PS O6	PS O7
CO1	3	3	-	**2**	**-**	**-**	3	3	3	**-**	3	3	**-**	-	3	3	3
CO2	3	**-**	-	**-**	**-**	**-**	3	3	**-**	3	3	3	**-**	**-**	3	3	**-**
CO3	3	**-**	-	**-**	**2**	**-**	3	3	**-**	3	3	3	3	**-**	3	3	**-**
CO4	3	**2**	-	**-**	**-**	**-**	3	3	**-**	3	3	3	**-**	**-**	3	3	**-**
CO5	3	**-**	-	**2**	**-**	**-**	3	3	**-**	3	3	3	**-**	**-**	3	3	**-**
CO6	3	**-**	-	**-**	**-**	**-**	3	3	**-**	3	3	3	**-**	**-**	3	3	3

19MSCCP204 - Fitness Assessment and Recording Progress (Practical)							
Course Code.	**Course Title**	**Course Type**	**No. of Credit**			**Marks Split**	
			Theory	**Practical**	**Total**	**CIA**	**ESE**
19MSCP204	**Fitness Assessment and Recording Progress**	C-9	0	3	3	40	60

Learning objective

To Identify and describe the standard tests, test equipment, and testing protocols that are used for measuring fitness, body composition, posture, flexibility, muscular strength, power, speed, agility, and endurance.

contents

Assessment of strength abilities Assessment of maximum strength - Assessment of explosive strength - Assessment of strength endurance - Field and laboratory tests for the assessment of various types of speed - Assessment of Coordination - Tests to measure Agility and coordinative abilities - Fitness Journals - Recording Sets, Reps & Weight - Functional Movement Screening - length and breadth measurement – technique and procedures - Anthropometric measurement - **Girth**- Head Girth, Neck Girth, Arm Girth (relaxed), Arm Girth (flexed and tensed), Forearm Girth, Wrist Girth, Chest Girth, Waist Girth, Omphalion Girth (abdominal), Gluteal Girth (hip), Thigh Girth (upper), Mid-Thigh Girth, Calf Girth, and Ankle Girth.

Measurement of Motor Fitness, Motor Educability, Posture and Anthropometry - Motor Ability : Barrow Motor Ability Test – Newton Motor Ability Test – Cozen's Athletic Ability Test - Motor Educability : Johnson Motor Educability Test – Metheny – Johnson Test.

Posture : Newyork State Posture Rating Test. Anthropometric Measurements : Measurement of

Length – Girth – Circumference – Skinfold.

Assessment of strength abilities - Assessment of maximum strength - Assessment of explosive strength - Assessment of strength endurance

Course Outcomes

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

CO1: Understand the different strength capacities and methods of improving them.

CO2: Understand the methods of assessing motor ability

CO3: Understand the methods of using instruments to measure body composition.

CO4: Able to assess and record the progress and outcome of the training program specifically designed for fitness and performance component or for any other specific purpose.

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO1	3	3	3	-	3	-	3	3	-	3	3	3	-	-	3	-	3
CO2	3	3	3	-	-	-	3	3	-	3	3	3	-	-	3	-	3
CO3	3	3	3	-	-	-	3	3	-	3	3	3	-	-	3	-	3
CO4	3	3	3	-	2	-	3	3	-	3	3	3	-	-	3	-	3

19MSCP205- Weight Training Program based on Sport and Fitness Goal (Practical)							
Course Code.	**Course Title**	**Course Type**	**No. of Credit**			**Marks Split**	
			Theory	**Practical**	**Total**	**CIA**	**ESE**
19MSCP205	**Weight Training Program based on Sport and Fitness Goal**	C-10	0	3	3	40	60

Learning objective

To gain a basic knowledge of weight room equipment, various lifts/grips/technique and components of a workout

To understand what muscles are being used, their basic motor patterns and training techniques

To learn terminology, training theory and basic strength training programming

To design and implement various workouts

Learn how to design and implement safe and effective strength training and conditioning and personal training programs.

Contents

Resistance Training and Spotting Techniques - Free Weight and Machine Training - Program Design for Resistance Training

Strength training methods: Maximum strength development - Explosive strength development - Strength endurance development - Basic strength training - Sports specific strength training - Complex training - Contrast training - Velocity based training

Organisation of strength training: Set training - Station training - Circuit training Isometric training - Dynamic constant resistance training - Variable resistance training - Eccentric training - Isokinetic training

Resistance training systems: Single set system - Express circuit - Multiple set system - Bulk system - Circuit system - Tri set system - Cluster

Course Outcomes

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

CO1: To gain a basic knowledge of weight room equipment, various lifts/grips/technique and components of a workout

CO2: To understand what muscles are being used, their basic motor patterns and training techniques

CO3: To learn terminology, training theory and basic strength training programming and to design and implement various workouts

CO4: Learn how to design and implement safe and effective strength training and conditioning and personal training programs.

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO1	3	3	3	**-**	3	**-**	3	3	-	3	3	3	**-**	-	3	-	3
CO2	3	3	3	**-**	**2**	**-**	3	3	**-**	3	3	3	**-**	**-**	3	-	3
CO3	3	3	3	**-**	**2**	**-**	3	3	**-**	3	3	3	**-**	**2**	3	-	3
CO4	3	3	3	**-**	**-**	**-**	3	3	**-**	3	3	3	**-**	**-**	3	-	3

SSPO25-**M.Sc. Strength and Conditioning (Semester-III)**							
19MSCC301:Science of Sports Training -I							
Course Code.	**Course Title**	**Course Type**	**No. of Credit**			**Marks Split**	
			Theory	**Practical**	**Total**	**CIA**	**ESE**
19MSCC301	**Science of Sports Training -I**	C – 11	4	0	4	25	75

Learning objective

Learn the rules, fundamentals, skills for stretching and flexibility.

Learn how to correctly execute required skills and techniques as well as to use the equipment/facilities safely.

To gain knowledge on training methods for aerobic and anaerobic endurance training and lactate threshold training

Unit I - Motor coordination:

Model of motor coordination - Levels with definite tasks of coordination - Movement Structure - Movement phases - Functions of various Phases - Types of inter phase relationships - Types of movements - Agility, Coordination and coordinative abilities - Importance of coordinative abilities - Types of coordinative abilities - Systems of regulation Technique and coordination

Unit II - Flexibility :

Nature of Flexibility - Mobility, suppleness, stretchability - Types of Flexibility - Benefits of flexibility in sports - Physiology of stretching - Stretching Methods - Static stretching - Ballistic stretching - Proprioceptive neuromuscular facilitation (PNF) - Dynamic stretching -The role of flexibility in performance - Flexibility & injury prevention - Flexibility & muscle performance - Warm-Up Methods/Cool-down - Evaluation of Flexibility - Mobility – Definition, Classification, Factors Influencing Mobility – Role of Mobility – Training to develop Mobility

Unit III - Endurance:

Types of Endurance – Types of Endurance Training – Duration, Repetition, Competition and Testing. Short term, Medium Term and Long Term Endurance Training. Factors to be considered for Endurance Training.

Unit IV - **Speed:**

Factors influencing speed, Training for speed development, Unit construction – Activity other than running, Speed barrier, Speed endurance. Maximum speed, Acceleration, Speed-Endurance, Change-of-direction - science and application of SAQ training, sprint training, acceleration/deceleration, reaction/quickness training, application of SAQ principles to different sports - Program Design and Technique for Speed and Agility Training.

Unit V - Technical and tactical training:

Nature and Definition of Technique Skill and Style - Classification of skills - Skill teaching process, explanation, demonstration, practice, correction, feedback - Phases of Skill learning - Characteristics and training implementation of various phases - Step of skill teaching - Motor learning and Relearning - Principles of motor learning

Unit VI – Practical Implementations

Understanding coordination and coordinative abilities. Understanding static and dynamic stretching. Understanding different types of warm up and warm down procedures. Program designing for various fitness components on different targets.

Text Books:

Jay Blahnik Douglas S. Brooks,, Complete Book of Personal Training,The Full-Body Flexibility, Second Edition, Human Kinetics Publishers.

Arnold G. Nelson, Jouko Kokkonen,, Stretching Anatomy, Human Kinetics Publishers.

Dr. Pintu Modak ,Stretch and Relax, Human Kinetics Publishers.

Supplementary Reading:

Clive Brewer, Athletic Movement Skills: Training for Sports Performance, Human Kinetics Publishers.

Lee E. Brown,Vance Ferrigno ,Training for Speed, Agility, and Quickness, Human Kinetics Publishers.

Mike McGuigan, PhD, CSCS ,Monitoring Training and Performance in Athletes, Human Kinetics Publishers.

Course Outcomes

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

CO1: Understands the movement structure and coordinative abilities.

CO2: Understands the different components of flexibility and ways of improving it.

CO3: Understands the components of endurance and factors which affects it.

CO4: Understands the components of speed and methods of improving speed.

CO5: Understands the concepts of skill, tactics and skill learning.

CO6: Use the resources in planning and designing a training program for populations of different needs.

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO1	3	3	-	-	-	-	-	3	-	3	3	3	-	-	3	3	-
CO2	3	3	-	3	-	-	3	3	3	3	3	3	-	-	3	3	3
CO3	3	3	-	3	-	-	3	3	-	3	3	3	-	**2**	3	3	3
CO4	3	3	3	3	-	-	3	3	3	3	3	3	-	-	3	3	3
CO5	3	3	3	3	-	-	3	3	3	2	3	3	-	-	3	3	3
CO6	3	3	3	3	-	-	3	3	3	3	3	3	-	-	-	-	3

19MSCC302 - Research Methods and Statistics							
Course Code.	**Course Title**	**Course Type**	**No. of Credit**			**Marks Split**	
			Theory	**Practical**	**Total**	**CIA**	**ESE**
19MSCC302	**Research Methods and Statistics**	C – 12	4	0	4	25	75

Learning objective

To understand the methods and procedure used in different types of research and the statistical tools to be assed to interpret the data to arrive at meaningful scientific conclusions.

Unit I - Types of research:

Basic, Applied and Action Research. Research Problem : Criteria of Locating a Problem – Characteristics of good research – Problem – Delimiting and Limiting a Problem. Hypothesis : Meaning and Formulation of Research Hypothesis. Literature Search : Need to survey related literature – Major Literature Sources.

Unit II - Methods of Research:

Survey and Historical: Survey Research : Survey by questionnaire and interview – Opinion assessment and Observation method –Historical research : Primary and Secondary sources of data – Internal and External criticism – Steps involved in historical research.

Unit III - Variables and Experimental Research Design:

Variables : Independent, Dependent, Extraneous and Intervening variables. Experimental Control. Characteristics of experimental research. Experimental Design : Random group, Related group, Repeated Measures, Rotated group, Factorial and Static Group, Comparison design.

Unit IV - Types of Statistical Processes:

Descriptive, Comparative, Relationship, Inferential and Predictive – Quantitative data – Attributes and Variables – Continuous and Discontinuous – Role of Statistics in Research.- Measures of Central Tendency (Ungrouped and Grouped) – Mean, Median and Mode – Computation Merits, Demerits and Uses of Measures of Central Tendency – Measures of Variability (Ungrouped and Grouped) – Range, Standard Deviation, Quartile Deviation and Mean Deviation – Computation. Merits, Demerits and Uses of Measures of Variability. Percentiles and Deciles – Meaning, Uses and Computation.

Unit V - Use of Computer for Research:

Thesis format : Organisation of thesis chapters – Preparation of Research report. Line Diagram, Bar Diagram – Simple, Comparative composite and Percentile diagram, Pie Diagram – Simple, Comparative composite and Percentile, Histogram, Frequency Polygon, Ogive Curve.

Unit VI – Practical Implementations

Preparation editing and printing word documents. Preparation of excel spread sheet. Preparation of power points. Setting of computers and LCD projectors for Power point presentation. Doing simple calculations using excel. Preparation of tables for data collection

Text Books:

T.A Baumgartner, and Strong, C.H. “Conducting and Reading Research in Health and Human Performance”. New York: Brown and Benchmark: 1994

C.R Kothari. “Research Methodology Methods and Techniques”, New Delhi: Wiley Eastern Limited, 1993.

Anne Rothstein. “Research Design and Statistics for Physical Education”. New Jersey: Prentice Hall Inc. 1985.

Supplementary Reading:

John W Best,. and Khan, James V. “Research in Education”. New Delhi: Prentice Hall of India Private Limited. 1992.

David H Clarke and H. Harrison Clarke. “Research Processes in Physical Education, Recreation and Health”. Englewood Cliffs, New Jersey: Prentice Hall Inc. 1970.

Harry E. Garre. “Statistics in Psychology and Education”, Bombay : Allied Private Ltd. 1958.

Course Outcomes

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

CO1: Understand the different types of research.

CO2: Understand the different methods of research.

CO3: Understand the different types of experimental designs.

CO4: Understand the measures of central tendency and other statistical measures.

CO5: Understand the use of computers in research and the components of a thesis.

CO6: Able to design, administer, interpret and report/publish quality scientific research.

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO1	3	3	3	3	3	-	-	-	3	-	-	-	-	-	-	-	3
CO2	3	3	3	3	3	**2**	-	-	-	3	-	3	-	**2**	-	-	3
CO3	3	3	3	3	3	-	-	-	-	3	-	3	-	-	**2**	-	3
CO4	3	3	3	3	3	-	**2**	-	-	3	-	3	-	-	-	**2**	3
CO5	3	3	3	3	3	-	-	-	**2**	3	-	3	-	-	-	-	3
CO6	3	3	3	3	3	-	-	-	-	3	-	3	-	-	-	-	3

19MSCC303: Program Design and Periodization							
Course Code.	**Course Title**	**Course Type**	**No. of Credit**			**Marks Split**	
			Theory	**Practical**	**Total**	**CIA**	**ESE**
19MSCC303	**Program Design and Periodization**	C – 13	4	0	4	25	75

Learning objective

Apply knowledge of exercise physiology, muscle physiology, biomechanics and health/wellness principles when designing, implementing and modifying training programs to meet patient/athlete goals.

Develop a personal fitness program that relates to athletic conditioning and strength training.

Demonstrate an understanding of pre-season, in-season, and post-season strength and conditioning training in sports.

Unit I - Planning of sports training:

Definition, importance, requirements of Planning - Principles of planning - Step for formulating an annual plan - Planning various types of plans - Long term training plan

Periodization – Meaning, Single Periodization, Double Periodization. Different seasons – preparatory, pre competition. Competition and Transitional Period.

Unit II – Periodization:

Meaning of the terms Unit, Session, Micro Cycle, Meso Cycle and Macro Cycle - Periodization of training process - Nature and Definition of Peak form, Training state and Periodization - Peaking and Periodization - Physiologic al basis of Periodization - Periodization models - Types of Periodization - Aims and contents of different periods - Periodization of strength training - Periodization of speed training - Periodization of endurance training - Integrated Periodization..

Unit III - Training load:

Nature and Definition - Classification of Training Load - Factors of Training Load - Load and adaptation - Types of adaptation - Process of Load and Adaptation - Principles of Training load- Training Volume - Training intension - Training Density .

Unit IV- Training plans:

Early specialization vs early diversification - Models for long term developmental plan - Peaking in Sports - Peaking for competition - Factors facilitating peaking - Training condition for peaking - Identifying and maintaining Peak - Tapering, importance, types, duration, travelling and tapering and other important aspects.

Unit V- Exercise Prescription (programme designing):

Needs Analysis - Acute programme variables - Chronic programme manipulations - Administrative concerns

Unit VI – Practical Implementations

Pre planning for training schedules. Preparation of training schedulers. Maintenance of log book

Text Books:

Jared W. Coburn, Moh H. Malek,, NSCA'S Essentials of Personal Training, National Strength and Conditioning Association, Human Kinetics Publishers.

Sreedhar. K., Sports Training Methods, Chidambaram, Sowmi Publications, 2007.

Supplementary Reading:

Aurélien Broussal-Der val; Stéphane Ganneau , The Modern Art of High Intensity Training, Human Kinetics Publishers.

Vijaya Lakshmi ,Principles of Athletic Training, Human Kinetics Publishers.

Dr. Sushil Chauhan ,Science of Sports Training, Human Kinetics Publishers.

Course Outcomes

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

CO1: Understand the principles to be considered while planning a training.

CO2: Understands what is periadization and its components

CO3: Understand training load and its components.

CO4: Understand the features of a training plan.

CO5: Design a fitness program to meet the individual needs of a client/patient based on the results of standard fitness assessments and wellness screening.

CO6: Design of preparatory, competitive and transition training programmes, practical application of programme design for specific sports, application of macro, meso and micro cycles, preparation for competition, peaking and tapering

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO1	3	3	-	**-**	**-**	**-**	**-**	3	-	3	3	3	**-**	-	3	3	-
CO2	3	3	-	3	**-**	**-**	3	3	3	3	3	3	**-**	**2**	3	3	3
CO3	3	3	-	3	**-**	**-**	3	3	**-**	3	3	3	**-**	**-**	3	3	3
CO4	3	3	3	3	**-**	**-**	3	3	3	3	3	3	**-**	**-**	3	3	3
CO5	3	3	3	3	**2**	**-**	3	3	3	3	3	3	**-**	**-**	3	3	3
CO6	3	3	3	3	**-**	**-**	3	3	3	3	3	3	**-**	**-**	-	-	3

19MSCE308.1- Exercise Considerations for Special Populations

Course Code.	Course Title	Course Type	No. of Credit			Marks Split	
			Theory	Practical	Total	CIA	ESE
19MSCE308.1	**Exercise Considerations for Special Populations**	C – 13	4	0	4	25	75

Learning objective

Describe specific adaptations, advantages and precautions of various modes of training for physically active individual across the lifespan (e.g., pediatric to geriatric) and people with special needs

Unit I - Exercise Prescription for people with Hypo kinetic diseases:

Coronary artery disease,– Exercise Prescription for Heart Diseases – Weight Training guidelines for Heart Diseases - Coronary Artery Disease – Diabetes mellitus - Chronic Lung disease and Asthma – Management and Exercise Guidelines for persons with Hypertension, Diabetes mellitus and Cardiovascular Diseases– Management – Exercise Prescription for chronic lung Diseases and Asthma – Weight Training guidelines for Lung Diseases.

Unit II - Exercise issues related to Adolescence and Older adults:

Childhood and Adolescence – Old Age –– Risks of Exercise in adolescents and elderly-Need and Importance of Exercise in Healthy Elderly –Strength training for children/ older adults and women - Strength Training for children - Strength training for older adults

Unit III - Exercise issues related to Back pain and cervical spondylosis:

Meaning and Definition for Arthritis – Background – Management – Exercise Issues. Back pain and

cervical spondylosis - Exercise recommendations for people with low back pain and cervical spondylosis.

Unit IV - Exercise issues related to Females:

Limitations faced by female population on doing physical activities- Pregnancy Strength training for females - Weight Training Guidelines for Pregnant women.

Unit V - Exercise issues related to other health complications:

Need and importance of exercise training for people with AIDS and Cancer – Exercise Prescription for AIDS and Cancer – Weight Training Guidelines. - Exercise Recommendations for Physically Inactive Individuals – Training Guidelines for Physically inactive individuals.

Unit VI – Practical Implementations

Planning and Preparation of training schedule for primary prevention, secondary prevention and rehabilitation for people with hyper tension, diabetics, coronary heart disease, asthma and arthritics. Planning and Preparation of training schedule for pregnant women.

Text Books:

Dianne S. Ward, Ruth P. Saunders, Russell R. Pate, ,Physical Activity Interventions in Children and Adolescents, Human Kinetics Publishers.

Irene Lewis-McCormick , Woman's Guide to Muscle and Strength, Human Kinetics Publishers.

Cowlin ,Women's Fitness Program Development, Human Kinetics Publishers.

Supplementary Reading:

Deepak Jain , Physical and Drill Training for Children, Human Kinetics Publishers.

Dr. Pintu Modak ,Stretch and Relax, Human Kinetics Publishers.

Course Outcomes

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

CO1: Understands the different hypo kinetic disease and the prescription of exercises for people suffering from those diseases.

CO2: Understands the exercise issues related to Adolescence and Older adults.

CO3: Understands the exercise issues related to Back pain and cervical spondylosis.

CO4: Understands the exercise issues related to Females.

CO5: Understands the exercise issues related to other health complications.

CO6: Understanding the factors to be considered while designing and implementing a fitness program for special population with special needs.

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO1	3	3	-	-	-	-	-	3	3	3	3	3	3	-	3	3	3
CO2	3	3	-	-	2	-	3	3	-	3	3	3	3	-	3	3	3
CO3	3	-	-	-	-	-	3	3	-	3	3	3	3	-	3	3	-

CO4	3	**-**	**-**	**-**	**-**	**-**	3	3	**-**	3	3	3	3	**-**	3	3	3
CO5	3	**-**	**-**	**-**	**2**	**-**	3	3	**-**	3	3	3	3	**-**	3	3	3
CO6	3	**-**	**2**	**-**	**-**	**-**	3	3	**-**	3	3	3	3	**-**	3	3	3

19MSCE308.2- Sports and game specific Drills (Semester-II)

Course Code.	Course Title	Course Type	No. of Credit			Marks Split	
			Theory	Practical	Total	CIA	ESE
19MSCC308.2	**Sports and game specific Drills**	E– 6	4	0	4	25	75

Learning objective

To gain knowledge on the types and variations of sports specific drills, leadup activities and minor games.

Unit I

Types of sports and games – individual and team sports – body contact and non contact games and sports – small area and large area sports

Unit II

Factors affecting movement efficiency – Movement patterns – Role of flexibility and balance - Components of physical fitness which contribute to strength, agility, speed, endurance and coordination

Unit III

Fundamental Movement Skills -Body Management Skills: 1. Rolling, 2. Stopping, 3. Bending, 4. Twisting,5. Landing, 6. Stretching, 7. Climbing, 8. Static and Dynamic Balancing, 9. Turning - Locomotor Skills: 1. Crawling, 2. Running, 3. Galloping, 4. Walking, 5. Hopping, 6. Skipping, 7. Dodging - Object Control Skills: 1. Throwing, 2. Catching, 3. Striking, 4. Bouncing, 5. Dribbling, 6. Kicking

Unit IV

Sports drills – Types of sports drills – individual and group drills – sports specific drills – specific drills for major games (cricket, tennis, football, basketball, volleyball) and for general fitness

Unit V

Preparation and conduction of sports drills – utilization of available resources and improvisation – monitoring and recording – fixation of load and intensity.

Unit VI – Practical Implementations

Understanding the nature of different sports/game. Selection of drills on the basis of specific requirements. Modifying and improvising drills for better results.

Text Books:

Juan Carlos Santana ,Functional Training, Human Kinetics Publishers.

Tim Henriques, NPTI's Fundamentals of Fitness and Personal Training National Personal Training Institute, Human Kinetics Publishers.

Desimone G, ACSM's Resources for the Group Exercise Instructor, Human Kinetics Publishers.

SPILIO , Anatomy of Functional Training Exercise Programmes for Real Life Activities, Human Kinetics Publishers.

Supplementary Reading:

Gray Cook , Athletic Body in Balance, Human Kinetics Publishers.

Pire , ACSM'S Career & Business Guide for the Fitness Professional, Human Kinetics Publishers.

M.B. Davies, Physical Training, Games and Athletics in Schools, Human Kinetics Publishers.

Course Outcomes

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

CO1: Understand the nature of different types of sports and games.

CO2: Understand the factors affecting movement skills.

CO3: Understand the range of movement skills

CO4: Understand the different types of game specific and event specific drills.

CO5: Understand how to choose and conduct specific drills.

CO6: Effectively plan, design and execute sports and game specific drills to address specific needs

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PS O1	PS O2	PS O3	PS O4	PS O5	PS O6	PS O7
CO1	3	3	-	**-**	**-**	**-**	**-**	3	-	3	3	3	**-**	-	3	3	-
CO2	3	3	-	3	**-**	**-**	3	3	3	3	3	3	**-**	**-**	3	3	3
CO3	3	3	-	3	**-**	**-**	3	3	**-**	3	3	3	**-**	**-**	3	3	3
CO4	3	3	3	3	**-**	**2**	3	3	3	3	3	3	**-**	**-**	3	3	3
CO5	3	3	3	3	**-**	**-**	3	3	3	3	3	3	**-**	**2**	3	3	3
CO6	3	3	3	3	**-**	**-**	3	3	3	3	3	3	**-**	**-**	-	-	3

Inter departmental Elective							
Course No.	**Course Title**	**Course Type**	**No. of Credit Hours**			**Marks Split**	
			Theory	**Practical**	**Total**	**Int**	**Ext**

	Inter departmental Elective *	E– 4	3	0	3	25	75

*Select one from the Generic Elective list of the University. (Other than that offered by his/her parent Department)

19MSSP305:Endurance and Agility Training (Practical)

Course Code.	**Course Title**	**Course Type**	**No. of Credit**			**Marks Split**	
			Theory	**Practical**	**Total**	**CIA**	**ESE**
19MSCP305	**Endurance and Agility Training**	C– 5	0	3	3	100	00

Learning objective

Understand the different methods for development of endurance, agility and mobility.

Content

Endurance Training means - Training parameters for aerobic endurance - Training parameters for anaerobic endurance Long distance training methods Interval training Control and competition method - Intensity zones and endurance training - Lactic acid tolerance training - MV02 Training - Anaerobic threshold training - Phosphate system training - Aerobic threshold training - steady-state - fartlek - interval - model training - hill repetitions - sport specific drills

Course Outcomes

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

CO1: Understand the different means of endurance development.

CO2: Experience the different types of endurance training and means of conducting it

CO3: Review and conduct training methods for aerobic and anaerobic endurance training and agility training.

CO4: Design and implement effective training methods to develop endurance and agility with emphasis on specific sporting needs.

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO1	3	3	3	-	3	-	3	3	-	3	3	3	-	-	3	-	3
CO2	3	3	3	-	-	-	3	3	-	3	3	3	-	-	3	-	3
CO3	3	3	3	-	**2**	-	3	3	-	3	3	3	-	-	3	-	3
CO4	3	3	3	-	-	-	3	3	-	3	3	3	-	-	3	-	3

19MSCP307 - Fitness Drills (Practical)

Course Code.	Course Title	Course Type	No. of Credit			Marks Split	
			Theory	Practical	Total	CIA	ESE
19MSCP307	**Fitness Drills**	P– 6	0	3	3	100	00

Learning objective

To understand and design drills for the development of specific components of fitness.

Fundamental Movement Skills

Fundamental Movement Skills.

- Body Management Skills: 1. Rolling, 2. Stopping, 3. Bending, 4. Twisting,
  5. Landing, 6. Stretching, 7. Climbing, 8. Static and Dynamic Balancing, 9. Turning
- Locomotor Skills: 1. Crawling, 2. Running, 3. Galloping, 4. Walking, 5. Hopping, 6. Skipping, 7. Dodging,
- Object Control Skills: 1. Throwing, 2. Catching, 3. Striking, 4. Bouncing, 5. Dribbling, 6. Kicking

Course Outcomes

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

CO1: Understand the fundamental basic skills.

CO2: Understand the types of drills to develop specific skills.

CO3: Understand the methods of execution of combination of drills to develop specific action

CO4: Design and execute specific drills for the development of physical fitness components fitness and fictional improvement

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO1	3	3	3	**-**	3	**-**	3	3	-	3	3	3	**-**	-	3	-	3
CO2	3	3	3	-	-	-	3	3	-	3	3	3	-	-	3	-	3
CO3	3	3	3	-	**2**	-	3	3	-	3	3	3	-	-	3	-	3
CO4	3	3	3	-	-	-	3	3	-	3	3	3	-	-	3	-	3

19MSCI308 - Internship (Semester-III)							
Course Code.	**Course Title**	**Course Type**	**No. of Credit Hours**			**Marks Split**	
			Theory	**Practical**	**Total**	**CIA**	**ESE**
19MSCI308	**Internship**	I– 1	0	2	2	40	60
Learning objective							

SSPO25-**M.Sc. Strength and Conditioning**

(Semester-IV)

19MSCC401- **Science of Sports Training -I**

Course No.	**Course Title**	**Course Type**	**No. of Credit**			**Marks Split**	
			Theory	**Practical**	**Total**	**Int**	**Ext**
19MSCC401	**Science of Sports Training -I**	C – 17	4	0	4	25	75

Learning objective

To examine the advanced methods and techniques associated with the design of strength and conditioning programs to enhance human performance in sport and fitness.

Develop a sport-specific resistance training program that includes training frequency, load, exercise type, and progression

Understand how to increase in muscular strength, power, endurance and hypertrophy through a weight-training program.

Focus on how to lift weight using proper form, control, safety and full range of motion by combining multi-joint and single joint exercises.

Name and describe various weight lifting exercises as they relate to anatomical muscles groups.

Unit I - Systemic adaptations and exercise training:

Adaptations to resistance training, aerobic and anaerobic training - Long term and short term effects of exercise on neuro-muscular system - Cardiovascular adaptations due to training - Adaptive changes in the Respiratory system due to different exercise training

Unit II

Strength and strength abilities:

Definition and importance of strength - Maximum strength - Explosive strength - Strength endurance - Strength in relation to body weight - Strength in relation to work - Strength and flexibility

Unit III - Factors determining strength level:

Neural factors - Muscle fiber composition - Cross sectional area of muscle - Elastic component of muscle - Body size – Age – Gender - Psychological factors - Biomechanical factors - Nutritional and hormonal status

Unit IV - **Strength training and adaptations:**

Neural adaptation - Cardiovascular adaptation - Skeletal muscle adaptation - Connective tissue adaptation – Bone – Tendon - Ligaments Hormonal response and adaptation - Analysis of resistance exercises to develop appropriate load technique and load for muscular development and rehabilitation. ii resistance training for specific sports; iii Olympic lifts – teaching technique and progression.

.

Unit V - **Mode of strength training:**

Maximum strength & Strength endurance Training methods - Own body weight, partner, free weights, machine, natural means, elastic materials etc.- Its advantage and disadvantages - Neuromuscular Response to strength Training - Training strength and Energy system - Ballistic vs non-ballistic - Leading vs not leading to failure

Unit VI – Practical Implementations

Understanding load dynamics. Understanding the use of different machines and stations for specific strength development. Improvisation on using available resources.

Text Books:

ACSM , ACSM's Foundations of Strength Training and Conditioning, Human Kinetics Publishers.

Hesson J L ,Weight Training for Life, Human Kinetics Publishers.

LEE E , Isokinetics In Human Performance, Human Kinetics Publishers.

FREDERIC DELAVIER , Strength Training Anatomy**,** Human Kinetics Publishers.

Supplementary Reading:

NASM, NASM Essentials of Personal Fitness Training, Human Kinetics Publishers.

ANNETTE LANG , Morning Strength Workouts, Human Kinetics Publishers.

A.C. Selmon, Health and Strength, Human Kinetics Publishers.

Course Outcomes

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

CO1: Understand the process of adaptation through exercise training.

CO2: Understand the components of strength and strength abilities

CO3: Identify the major anatomical components of the muscle cell and motor neuron.

CO4: Understand the adaptations taking place due to strength training

CO5: Describe the variety of training systems used to increase power and strength.

CO6: Demonstrate and teach the proper exercise techniques using both free weights and machines.

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO1	3	3	-	-	-	-	-	3	-	3	3	3	-	-	3	3	-
CO2	3	3	2	3	-	-	3	3	3	3	3	3	-	-	3	3	3
CO3	3	3	-	3	-	-	3	3	-	3	3	3	-	-	3	3	3
CO4	3	3	3	3	-	-	3	3	3	3	3	3	-	-	3	3	3
CO5	3	3	3	3	-	-	3	3	3	3	3	3	-	-	3	3	3
CO6	3	3	3	3	-	-	3	3	3	3	3	3	-	-	-	2	3

19MSCC402 - Alternative Methods of Training							
Course Code.	**Course Title**	**Course Type**	**No. of Credit**			**Marks Split**	
			Theory	**Practical**	**Total**	**CIA**	**ESE**
19MSCC402	**Alternative Methods of Training**	C – 18	4	0	4	25	75

Learning objective

Understand the effect of alternative types of training on components of strength, cardiovascular endurance, nutrition, flexibility, and body composition all relate to a fitness goal.

Unit I – Alternative means of Training:

Exercise Techniques for Alternative Modes & Non-Traditional Training - Innovative Training interventions - Differentiate between science-based training information/practice and myths - Strongman/West Side Methods/Local Facility.

Unit II – Minor games and warmup:

- Minor games - Types of minor games - Minor games and development of motor abilities Warming up – General and Specific – Limbering down

Unit III – Types of Training:

Steady-state, fartlek, interval, model training, hill repetitions, sport specific drills

Unit IV- Yoga;

Yogasanas, history and need and importance of asanas and types of asanas - Suryanamskar, Stages of asanas, Chakra, Types of chakra, Benefits of Chakras, Yoga basics, Types of Yoga, Benefits of yoga & asanas, Yoga mudra, Types of Mudra, Benefits of mudras, Eight stages of yoga, Yama, Niyama, Asana, Pranayama, Prathyakara, Dharana, Dyana, Samadhi

Unit V- Environmental Stress:

Exercise and altitude **-** Aviation physiology, environmental conditions at high altitude - High altitude training, types and its beneficial role in sports - Health risks of acute exposure to altitude, SpO_2 abnormal breathings. Cyanosis - Deep sea diving and hyperbaric conditions - Hyperbaric oxygen therapy - Hypoxic chamber - Negative aspects of training at altitude Methods used for training in hypoxia.

Unit VI – Practical Implementations

Understanding the uses and importance of minor games, yoga, meditation and untraditional methods of training**.**

Text Books:

Hoeger W.W.K Lifetime Physical Fitness and Wellness A Personalized Program, Human Kinetics Publishers.

Kasser, Inclusive Physical Activity A Lifetime of Opportunities, Human Kinetics Publishers.

Sheela Kumari S., A Practical Workbook for Fitness, Aerobics and Gym Operations, Human Kinetics Publishers.

Supplementary Reading:

Rachna Jain, Sports Dynamics, Human Kinetics Publishers.

Torbert , Secrets To Success In Sports & Play, Human Kinetics Publishers.

Corbin, Fitness For Life - Updated 5th Edition, Human Kinetics Publishers.

Course Outcomes

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

CO1: Understand the features of alternative mode of training.

CO2: Understand the different types of minor games and warmup techniques.

CO3: Understand the different ways of training with available resources.

CO4: Understand the different techniques of yoga.

CO5: Understand the effect of various environmental conditions on physical performance.

CO6: Determine appropriate physical training strategies and attempt to challenge the traditio methods of training and incorporate new and creative ideas to enhance your ability to des physical fitness training regimens; and utilize scientific principles involving periodization develop daily training sessions and programs.

Outcome Mapping

CO/ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PS O1	PS O2	PS O3	PS O4	PS O5	PS O6	PS O7
CO1	3	3	-	-	-	-	-	3	-	3	3	3	-	-	3	3	-
CO2	3	3	-	3	-	-	3	3	3	3	3	3	-	-	3	3	3
CO3	3	3	-	3	-	-	3	3	-	3	3	3	-	-	3	2	3
CO4	3	3	3	3	-	-	3	3	3	3	3	3	-	-	3	3	3
CO5	3	3	3	3	-	-	3	3	2	3	3	3	-	-	3	3	3
CO6	3	3	3	3	-	-	3	3	3	3	3	3	-	-	-	-	3

19MSSC403 - Sport Injuries (Semester-IV)							
Course Code.	**Course Title**	**Course Type**	**No. of Credit**			**Marks Split**	
			Theory	**Practical**	**Total**	**CIA**	**ESE**
19MSCC403	**Sport Injuries**	C – 19	4	0	4	25	75

Learning objective

Identify proper technique and instruct the at hlete/patient regarding appropriate posture, muscle activation and form during performance of therapeutic/functional activities.

Unit I - Sports Injuries:

Meaning – Importance -Sports Injury – Safety in Sports – Muscle Injury – Muscle Tears: Partial and Central Muscle Tear – Treatment – Rehabilitation – Cramp – Stiffness – Tendon Injuries – Tendinitis – Total and Partial Rupture – Treatment.

Unit II-Managing injuries:

Types of injuries, preventing injuries, treating & rehabilitating injuries. - Overtraining, preventing overtraining and treating overtraining - Rehabilitation & Reconditioning.

Unit III - Mechanical Properties of Bone:

Strength and Stiffness of Bone, Loads Applied to Bone, Stress Fractures - Injury to Skeletal Muscle - Cause and Site of Muscle Injury, Preventing Muscle Injury, Inactivity, Injury, and Immobilization, Effects on Muscle **.**

Unit IV- Training related Injuries:

Pre-halation - Injuries during strength training - Prevention and relief of muscle dysfunction - Strength training for muscle soreness - How to avoid injuries

Unit V - First Aid:

Definition, Meaning – Treatment for shock, poisoning – drowning – Bleeding – Fractures – Sprain: Strain – Dislocation – Artificial respiration.

Unit VI – Practical Implementations

History taking. Understanding symptoms. Spotting different types of muscle, ten ton and ligament injuries. First aid techniques

Text Books:

Physical Rehabilitation of Injured Athlete – Andrews J.R, Hauelson GL.

Mc Comell J, Patellofemoral Pain and Soft tissue injuries.

Sports Rehabilitation - MA Hutson (Churchill Livingstone).

Clinical Sports Medicine - Isani and Melone.

Supplementary Reading:

The athlete Shoulder. Andrews J.R. WILR KE.

Frostic R.SP, Mohammed M, Ritchie. DA, Sports Injuries of Elbow.

Maitland G.D. Vertebral Manipulation.

Geraci. MC. Jr. Rehabilitation of Pelvis, hip, and thigh injuries in sports.

Course Outcomes

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

CO1: Understand the different types of sports injuries.

CO2: Understand how to manage sports injuries.

CO3: Understand bone related injuries.

CO4: Understand the different injuries related to training

CO5: Understand the different techniques of first aid

CO6: Demonstrate proficiency with selection, application and modification of various functional exercise techniques used during rehabilitation and return to sport/activity.

Outcome Mapping

CO/ PO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PS O1	PS O2	PS O3	PS O4	PS O5	PS O6	PS O7
CO1	3	3	-	3	-	-	3	3	-	3	3	-	3	3	3	3	3
CO2	3	3	-	3	-	-	3	3	-	3	2	3	-	-	3	3	-
CO3	3	-	-	3	-	-	3	3	-	3	3	3	-	3	3	3	-
CO4	3	-	-	3	-	-	3	3	-	3	3	3	-	3	3	3	-
CO5	3	-	-	3	-	-	2	3	-	3	3	3	-	3	3	3	-
CO6	3	-	-	3	-	-	3	3	-	3	3	3	-	-	3	3	-

19MSCD406 - Project Work including Presentation, Comprehensive Viva							
Course Code.	**Course Title**	**Course Type**	**No. of Credit**			**Marks Split**	
			Theory	**Practical**	**Total**	**CIA**	**ESE**
19MSCD406	**Project Work including Presentation, Comprehensive Viva**	D-1	0	4	4	25	75

Learning objective

Each student will develop a sport-specific strength & conditioning program. The project should include an introduction discussing the sport and player's nutritional need, a comprehensive analysis of the available research literature, the methodology adopted in data collection and experimentation , the analysis of the Data, Results and the final conclusion. They should design and develope a strength conditioning program with due consideration for Anatomical, neuromuscular, and physiological factors. The last section of the paper should address program development. The program will include the exercises used in the context of a periodized macrocycle that will accomplish those aspects determined in the project.

Learning outcomes

Thesis has to be taken by the student with latest problems related to sports Training methods.

The report should be structured in the following way.

- Title page
- Acknowledgements
- Abstract
- Main text
- Introduction
- Literature review
- Methods
- Results
- Discussion
- Conclusion
- Recommendations
- References
- Appendices

19MSCX307:**Basics of Strength and Conditioning** **(Inter Departmental Elective -Semester-IV)**							
Course Code.	**Course Title**	**Course Type**	**No. of Credit**			**Marks Split**	
			Theory	**Practical**	**Total**	**CIA**	**ESE**
19MSCX307	**Basics of Strength and Conditioning**	E – 4	3	0	3	25	75

Learning objective

To examine the fundamental concepts of strength and conditioning

To understand how to increase in muscular strength, power, endurance and hypertrophy through a weight-training program.

Understanding the concept of systematic conditioning program.

Unit I - Basic Physical fitness components:

Strength, Speed, Endurance, Mobility. Types of Strength, Strength development training – General exercises, special exercises, competition specific exercises.

Unit II - Strength and strength abilities:

Definition and importance of strength - Maximum strength - Explosive strength - Strength endurance - Strength in relation to body weight - Strength in relation to work - Strength and flexibility

Unit III - The role of flexibility in performance:

Flexibility & injury prevention - Flexibility & muscle performance - Types of stretching (Static, Ballistic, Dynamic, PNF) - Warm-Up Methods/Cool-down/Flexibility - Warming up – General and Specific – Limbering down - Minor games - Types of minor games - Minor games and development of motor abilities

Unit IV - Endurance:

Types of Endurance – Types of Endurance Training – Duration, Repetition, Competition and Testing. Short term, Medium Term and Long Term Endurance Training. Factors to be considered for Endurance Training.

Unit V – Obesity Prevention:

Role of resistance training and endurance training in obesity reduction- designing and execution of a training program for obese population- safety precautions.

Unit VI – Practical Implementations

Understanding different fitness components and types and methods of assessing them. Measurement of heart rate.

Text Books:

Dr. Minakshi Pathak .Complete Guide to Sports Training, Human Kinetics Publishers.

Dr. Sanjay Chaudhari, Essentials of Strength Training and Conditioning, Human Kinetics Publishers.

Sreedhar. K., Sports Training Methods, Chidambaram, Sowmi Publications, 2007.

Supplementary Reading:

Peterson , A Practical Guide to Personal Conditioning, Human Kinetics Publishers.

Pfeiffer, Concepts of Athletic Training, Human Kinetics Publishers.

Course Outcomes

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

CO1: Understand the components of fitness

CO2: Understand the strength abilities

CO3: Have an understanding of the importance of flexibility and mobility.

CO4: Understand the role of strength and conditioning in obesity reduction

CO5: Understand the features of endurance and methods of improving it

CO6: Acquire basic knowledge and applications of different types of conditioning techniques.

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO1	3	3	-	**-**	**-**	**-**	**-**	3	3	3	3	3	3	-	3	3	3
CO2	3	3	**-**	-	-	-	3	3	-	3	3	3	3	-	3	3	3
CO3	3	-	**-**	-	-	-	3	3	-	3	3	2	3	-	3	3	-
CO4	3	-	**-**	-	-	-	3	3	-	3	3	3	3	-	3	3	3
CO5	3	-	**-**	-	-	-	3	3	-	3	3	3	3	-	3	3	3
CO6	3	-	**-**	-	-	-	3	3	-	3	3	3	2	-	3	3	3

19MSCP404 Speed and Power Training (Practical)							
Course Code.	**Course Title**	**Course Type**	**No. of Credit**			**Marks Split**	
			Theory	**Practical**	**Total**	**CIA**	**ESE**
19MSSP404	**Speed and Power Training**	P– 7	0	3	3	25	75

Learning objective

To understand and practice different types of training means aimed at development of speed and power

Contents

Methods to improve speed of movement - Direct method - By repeating the movement - By practicing the movement under easier conditions - By giving slightly faster rhythm - Indirect method - Development of exp. Strength - Development of technique - Development of flexibility

Simple Reaction ability Development - Playing games (for beginners) - Reacting repeatedly on a signal (varied signals) - Part method (for reaction time & movement time separately) - Sensory method

Complex Reaction ability development - Improvement of anticipation - Knowledge of movement structure - Competition pattern of the opponent – Experience - Improvement of quickly selecting a response - Automatization - Practice of certain specific response to specific signals

Course Outcomes

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

CO1: Understand how to improve speed and its components.

CO2: Understand the method of improving power/Explosive strength.

CO3: Understand the methods of improving specific components separately or in combination.

CO4: Design and execute training programs to develop speed and power with special emphasis on specific sports needs.

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO1	3	3	3	-	3	-	3	3	-	3	3	3	-	-	3	-	3
CO2	3	3	3	-	-	-	3	3	-	3	3	3	-	-	3	-	3
CO3	3	3	3	-	-	-	3	3	-	3	2	3	-	-	3	-	3
CO4	3	3	3	-	-	-	3	3	-	3	3	3	-	-	3	-	3

MSCP405- Rehabilitation and Relaxation techniques (Practical)

Course Code.	Course Title	Course Type	No. of Credit			Marks Split	
			Theory	Practical	Total	Int	Ext
MSSP405	**Rehabilitation and Relaxation techniques**	P– 8	0	2	2	40	60
Learning objective	To understand and practice different types rehabilitation and relaxation techniques						

Course contents:

Therapeutic Exercises:

Assisted and Resisted Exercises – Progressive Resisted Exercises – Endurance exercises – balance Exercises – Agility Exercises – Plyometrics.

Modalities:

Heat and cold – Electrical – Hydrotherapy - EMG – PFT – Laser

Relaxation Techniques:

Massage techniques – sports Massage – Medical massage – Cryo massage –Different tools of Massage – Yoga therapy.

Course Outcomes

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

CO1: Understand how to perform Assisted and Resisted Exercises.

CO2: Understand the different rehabilitation techniques.

CO3: Understand the different types of relaxation techniques and to perform it.

CO4: Perform muscle relaxation and injury rehabilitation technique with special emphasis on specific sports needs.

Outcome Mapping

CO/ PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7
CO1	3	3	3	**-**	3	**-**	3	3	-	3	3	3	**-**	-	3	-	3
CO2	3	3	3	-	-	-	3	3	-	3	3	3	-	-	3	-	3
CO3	3	3	3	-	**2**	-	3	3	-	3	3	3	-	-	3	-	3
CO4	3	3	3	-	-	-	3	3	-	3	3	3	-	-	3	-	3

******