



அண்ணாமலைப் பல்கலைக்கழகம்
Annammalai University



**REGULATIONS, CURRICULA
AND SYLLABI
2023-24
FOR
M.Sc. STRENGTH AND CONDITIONING
PROGRAM CODE: SSPO25**

Approved by the Ministry of Youth Affairs & Sports
Government of India



**DIVISION OF SPORTS TRAINING AND SPORTS NUTRITION
MYAS – AU DEPARTMENT OF SPORTS SCIENCES
Centre of Excellence
Faculty of Science**



Annamalai University

Faculty of Science

MYAS-AU DEPARTMENT OF SPORTS SCIENCES

M.Sc. STRENGTH AND CONDITIONING

Programme Code:SSPO25

These rules and regulations shall govern the Two year post graduate studies leading to the award of degree of **Master of Science in Strength and Conditioning** in the Faculty of Science. These academic Regulations shall be called “**Annamalai University, Faculty of Science Two year M.Sc. Strength and Conditioning Regulations 2023**”. They shall come into force with effect from the academic year 2023 – 2024. This syllabus is approved by **Ministry of Youth Affairs and Sports, Government of India** and revised in accordance to the template prescribed by **TANSCHÉ**.

1. Definitions and Nomenclature

- 1.1 **University** refers to Annamalai University.
- 1.2 **Department** means any of the academic departments and academic centers at the University.
- 1.3 **Discipline** refers to the specialization or branch of knowledge taught and researched in higher education. For example, Sports Biomechanics is a discipline in the Natural Sciences, while Economics is a discipline in Social Sciences.
- 1.4 **Programme** encompasses the combination of courses and/or requirements leading to a Degree. For example, M.A., M.Sc., MPT
- 1.5 **Course** is an individual subject in a programme. Each course may consist of Lectures / Laboratory / Seminar / Project work / viva-voce etc. Each course has a course title and is identified by a course code.
- 1.6 **Curriculum** encompasses the totality of student experiences that occur during the educational process.
- 1.7 **Syllabus** is an academic document that contains the complete information about an academic programme and defines responsibilities and outcomes. This includes course information, course objectives, policies, evaluation, grading, learning resources and course calendar.
- 1.8 **Academic Year** refers to the annual period of sessions of the University that comprises two consecutive semesters.
- 1.9 **Semester** is a half-year term that lasts for a minimum duration of 90 days. Each academic year is divided into two semesters.
- 1.10 **Choice Based Credit System:** A mode of learning in higher education that enables a student to have the freedom to select his/her own choice of elective courses across various disciplines for completing the Degree programme.
- 1.11 **Credit** refers to the quantum of course work in terms of number of class hours in a semester required for a programme. The credit value reflects the content and duration of a particular course in the curriculum.
- 1.12 **Credit Hour** refers to the number of class hours per week required for a course

- in a semester. It is used to calculate the credit value of a particular course.
- 1.13 **Programme Outcomes** (POs) are statements that describe crucial and essential knowledge, skills and attitudes that students are expected to achieve and can reliably manifest at the end of a programme.
 - 1.14 **Programme Specific Outcomes** (PSOs) are statements that list what the graduate of a specific programme should be able to do at the end of the programme.
 - 1.15 **Course Objectives** are statements that define the expected goal of a course in course objectives in terms of demonstrable skills or knowledge that will be acquired by a student.
 - 1.16 **Course Outcomes** (COs) are statements that describe what students should be able to achieve/demonstrate at the end of a course. They allow follow-up and measurement of learning objectives.
 - 1.17 **Grade Point Average** (GPA) is the average of the grades acquired in various courses that a student has taken in a semester. The formula for computing GPA is given in section 11.3
 - 1.18 **Cumulative Grade Point Average** (CGPA) is a measure of overall cumulative performance of a student over all the semesters. The CGPA is the ratio of total credit points secured by a student in various courses in all semesters and the sum of total credits of all courses in all the semesters. Calculation of CGPA is given in section 11.4.
 - 1.19 **Letter Grade** is an index of the performance of a student in a particular course. Grades are denoted by the letters S, A, B, C, D, E, RA, and W.
2. **Programme Offered and Eligibility Criteria:**

The MYAS-AU Department of Sports Sciences offers a Two Year M.Sc. in Strength and Conditioning programme. A candidate who has passed any Bachelor degree or equivalent thereto in 10+2+3 or 10+2+4 pattern from a recognized university 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 are eligible for admission.
 3. **Reservation Policy:** Admission to the various programmes will be strictly based on the reservation policy of the Government of Tamil Nadu.
 4. **Programme Duration**
 - 4.1 The Two Year Master's Programme consist of two academic years.
 - 4.2 Each academic year is divided into two semesters, the first being from July to November and the second from December to April.
 - 4.3 Each semester will have 90 working days (18 weeks).
 5. **Programme Structure**
 - 5.1 The Two Year Master's Programme consists of Core Courses, Elective Courses Internshio, and Project.
 - 5.2 **Core courses**
 - 5.2.1 These are a set of compulsory courses essential for each programme.
 - 5.2.2 The core courses include both Theory (Core Theory) and Practical (Core Practical) courses.
 - 5.3 **Project**

- 5.3.1 Each student shall undertake a Project and submit a dissertation as per guidelines in the final semester.
- 5.3.2 The Head of the Department shall assign a Research Supervisor to the student.
- 5.3.3 The Research Supervisor shall assign a topic for research and monitor the progress of the student periodically.
- 5.3.4 Students who wish to undertake project work in recognized institutions/industry shall obtain prior permission from the Department. The Research Supervisor will be from the host institute.
- 5.4 **Elective courses**
- 5.4.1 Elective Course: Discipline Centric/ Generic is a course that a student can choose from a range of alternatives.
- 5.5 **Internship/Industrial Activity (Experiential Learning)**
- 5.5.1 Experiential learning in the form of internship/industrial activity provides opportunities to students to connect principles of the discipline with real-life situations.
- 5.5.2 In-plant training/field trips/internships/industrial visits fall under this category.
- 5.5.3 Experiential learning is categorized as non-core course.
- 5.6 **Industry/Entrepreneurship**
This course is to introduce students to the activity of setting up a business or businesses, taking on financial risks in the hope of profit.
- 5.7 **Skill Enhancement Course: SEC** is a course designed to provide value-based or skill-based knowledge. The main purpose of this course is to provide value-based or skills in the hands-on-mode to increase their employability.
Extension Activity: The basic objective of extension activity is to create social awareness and knowledge of social realities to have concern for the welfare of the community and engage in creative and constructive societal development through awareness programme on fitness and wellness through the principles of sports training and conditioning. It is mandatory for every student to participate in extension activity.
- 5.8.1 The students can also enroll under NSS/NCC/CYRC/RRC or any other service organization in the university.
- 5.8.2 Extension activity shall be conducted outside the class hours.
- 5.8.3 Extension activity is categorized as non-core course.
- 5.9 **Value Added Course (VAC)**
- 5.9.1 Student may opt to take Value Added Course beyond the minimum credits required for the award of the degree. VACs are outside the normal credit paradigm.
- 5.10 **Online Courses**
- 5.10.1 The Heads of Departments shall facilitate enrolment of students in Massive Open Online Courses (MOOCs) platform such as SWAYAM to provide academic flexibility and enhance the academic career of students.
- 5.10.2 Students who successfully complete a course in the MOOCs platform shall be exempted from one elective course of the programme.
- 5.11 **Credit Distribution:**
The credit distribution is organized as follows:

Components	Course	Credits
Part A	Core (Theory)	40
	Core (Practical)	20
	Project with Viva-Voce	7
Part B (i)	Elective (Generic/Discipline Centric)	18
Part B (ii)	Internship/Industrial Visit	2
Part B (iii)	Skill Enhancement Course/Professional Competency Skill	6
Part C	Extension Activity	1
	TOTAL CREDITS	94

Part A, Part B (i, ii, iii), and Part C will be considered for CGPA calculation and had to be complete during the duration of the programme as per norms, to be eligible for obtaining the PG degree.

5.9 Credit Assignment

Each course is assigned credits and credit hours on the following basis:

1 Credit is defined as

1 Lecture period of one hour duration per week over a semester

1 Tutorial period of one hour duration per week over a semester

1 Practical / Project period of two hours duration per week over a semester.

6 Attendance

- 6.1 Each faculty handling a course shall be responsible for the maintenance of Attendance and Assessment Record for candidates who have registered for the course.
- 6.2 The Record shall contain details of the students' attendance, marks obtained in the Continuous Internal Assessment (CIA) Tests, Assignments and Seminars. In addition the Record shall also contain the organization of lesson plan of the Course teacher.
- 6.3 The record shall be submitted to the Head of the Department and Dean once a month for monitoring the attendance and syllabus coverage.
- 6.4 At the end of the semester, the record shall be placed in safe custody for any future verification.
- 6.5 The Course teacher shall intimate to the Head of the Department at least seven calendar days before the last instruction day in the semester about the attendance particulars of all students.
- 6.6 Each student shall have a minimum of 75% attendance in all the courses of the particular semester failing which he or she will not be permitted to write the End-Semester Examination. The student has to redo the semester in the next year.
- 6.7 Relaxation of attendance requirement up to 10% may be granted for valid reasons such as illness, representing the University in extracurricular activities and participation in NCC/NSS/YRC/RRC.

7 Mentor-Mentee System

- 7.1 To help the students in planning their course of study and for general advice on the academic programme, the Head of the Department will attach certain number of students to a member of the faculty who shall function as a Mentor throughout their period of study.
- 7.2 The Mentors will guide their mentees with the curriculum, monitor their progress, and provide intellectual and emotional support.
- 7.3 The Mentors shall also help their mentees to choose appropriate electives and value-added courses, apply for scholarships, undertake projects, prepare for competitive examinations such as NET/SET, GATE etc., attend campus interviews and participate in extracurricular activities.

8 Examinations

- 8.1 The examination system of the University is designed to systematically test the student's progress in class, laboratory and field work through Continuous Internal Assessment (CIA) Tests and End-Semester Examination (ESE).
- 8.2 There will be two CIA Tests and one ESE in each semester.
- 8.3 The Question Papers will be framed to test different levels of learning based on Bloom's taxonomy viz. Knowledge, Comprehension, Application, Analysis, Synthesis and Evaluation/Creativity.

8.4 Continuous Internal Assessment Tests

- 8.4.1 The CIA Tests shall be a combination of a variety of tools such as class tests, assignments and seminars. This requires an element of openness.
- 8.4.2 The students are to be informed in advance about the assessment procedures.
- 8.4.3 The pattern of question paper will be decided by the respective faculty.
- 8.4.4 CIA Tests will be for one or two hours duration depending on the quantum of syllabus.
- 8.4.5 A student cannot repeat the CIA Test-I and CIA Test-II. However, if for any valid reason, the student is unable to attend the test, the prerogative of arranging a special test lies with the teacher in consultation with the Head of the Department.
- 8.4.6 For the CIA Tests, the assessment will be done by the Course teacher

8.5 End Semester Examinations (ESE)

- 8.5.1 The ESE for the first and third semester will be conducted in November and for the second and fourth semester in May.
- 8.6 Candidates who failed in any course will be permitted to reappear in failed course in the subsequent examinations.
- 8.7 The ESE will be of three hours duration and will cover the entire syllabus of the course.

9 Evaluation

9.1 Marks Distribution

- 9.1.1 For each course, the Theory, Practical, Project, and Field visit shall be evaluated for a maximum of 100 marks.

- 9.1.2 For the theory courses, CIA Tests will carry 25% and the ESE 75% of the marks.
- 9.1.3 For the Practical courses, the CIA Tests will carry 40% and the ESE 60% of the marks.
- 9.1.4 Field visit shall be evaluated 100% internally by the committee based on the report submitted and presented.

9.2 Assessment of CIA Tests

- 9.2.1 For the CIA Tests, the assessment will be done by the course instructor.
- 9.2.2 For the theory courses, the break-up of marks shall be as follows:

	Marks
Test-I & Test-II	15
Seminar	5
Assignment	5
Total	25

- 9.2.3 For the Practical Courses (wherever applicable), the break-up of marks shall be as follows:

	Marks
Test-I	10
Test-II	10
Viva-voce and Record	5
Total	25

9.3 Assessment of End-Semester Examinations

- 9.3.1 Evaluation for the ESE is done by Internal examiners.

9.4 Assessment of Project/Dissertation

- 9.4.1 The Project Report/Dissertation shall be submitted as per the guidelines.
- 9.4.2 The Project Work/Dissertation shall carry a maximum of 100 marks.
- 9.4.3 CIA for Project will consist of a Review of literature survey, experimentation/field work, attendance etc.
- 9.4.4 The Project Report evaluation and viva-voce will be conducted by a committee constituted by the Head of the Department.
- 9.4.5 The Project Evaluation Committee will comprise the Head of the Department, Project Supervisor, and a senior faculty.

9.4.6 The marks shall be distributed as follows:

Continuous Internal Assessment (25 Marks)		End Semester Examination (75 Marks)	
Review-I - 10	Review-II -15	Project / Dissertation Evaluation	Viva-voce
		50	25

9.5 Assessment of Value-added Courses

9.5.1 Assessment of VACs shall be internal. Two CIA Tests shall be conducted during the semester by the Department(s) offering VAC.

9.5.2 The grades obtained in VACs will not be included for calculating the GPA/CGPA.

9.6 Passing Minimum

9.6.1 A student is declared to have passed in each course if he/she secures not less than 50% marks in the ESE and not less than 50% marks in aggregate taking CIA and ESE marks together.

9.6.2 A candidate who has not secured a minimum of 50% of marks in a course (CIA + ESE) shall reappear for the course in the next semester/year.

10. Conferment of the Master's Degree

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

11. Marks and Grading

11.1 The performance of students in each course is evaluated in terms Grade Point (GP).

11.2 The sum total performance in each semester is rated by Grade Point Average (GPA) while Cumulative Grade Point Average (CGPA) indicates the Average Grade Point obtained for all the courses completed.

11.3 **The GPA** is calculated by the formula

$$GPA = \frac{\sum_{i=1}^n C_i G_i}{\sum_{i=1}^n C_i}$$

where, C_i is the Credit earned for the Course i in any semester;

G_i is the Grade Point obtained by the student for the Course i and

n is the number of Courses passed in that semester.

11.4 **CGPA** is the Weighted Average Grade Point of all the Courses passed starting from the first semester to the current semester.

$$CGPA = \frac{\sum_{i=1}^m \sum_{i=1}^n C_i G_i}{\sum_{i=1}^m \sum_{i=1}^n C_i}$$

Where, C_i is the Credit earned for the Course i in any semester;

G_i is the Grade Point obtained by the student for the Course i and

n is the number of Courses passed in that semester.

m is the number of semesters.

11.5 Evaluation:

11.5.1 Performance of the student for each course will be rated as shown in the Table.

Range of Marks	Grade Points	Letter Grade
90 and above	10	S
80-89	9	A
70-79	8	B
60-69	7	C
55-59	6	D
50-54	5	E
Less than 50	0	RA
Withdrawn from the examination	0	W

11.5.2 A ten point rating scale is used for evaluation of the performance of the student to provide overall grade for the Master's Programme.

CGPA	CLASSIFICATION OF FINAL RESULT
8.25 and above	First Class with Distinction
6.5 and above but below 8.25	First Class
5.0 and above but below 6.5	Second Class
0.0 and above but below 5.0	Re-appear

11.6 **Classification of Results.** The successful candidates are classified as follows:

11.6.1 **For First Class with Distinction:** Candidates who have passed all the courses prescribed in the Programme in the first attempt with a CGPA of 8.25 and above within the programme duration. Candidates who have withdrawn from the End Semester Examinations are still eligible for First Class with Distinction (See Section 12 for details).

11.6.2 **For First Class:** Candidates who have passed all the courses with a CGPA of 6.5 and above.

11.6.3 **For Second Class:** Candidates who have passed all the courses with a CGPA between 5.0 and less than 6.5.

11.6.4 Candidates who obtain highest marks in all examinations at the first appearance alone will be considered for University Rank.

11.6.5 **Formula for Conversion of CGPA into Percentage**

$$\text{CGPA} \times 9.5 = \text{Percentage}$$

11.7 **Course-Wise Letter Grades**

11.7.1 The percentage of marks obtained by a candidate in a course will be indicated in a letter grade.

11.7.2 A student is considered to have completed a course successfully and earned the credits if he/she secures an overall letter grade other than RA.

11.7.3 A course successfully completed cannot be repeated for the purpose of improving the Grade Point.

11.7.4 A letter grade RA indicates that the candidate shall reappear for that course. The RA 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 candidate has appeared for clearance of the arrears.

- 11.7.5 If a student secures RA grade in the Project Work/Field Work/Practical Work/Dissertation, he/she shall improve it and resubmit if it involves only rewriting/ incorporating the clarifications suggested by the evaluators or he/she can re-register and carry out the same in the subsequent semesters for evaluation.

12 Provision for Withdrawal from the End Semester Examination

12.1 The letter grade W indicates that a candidate has withdrawn from the examination.

12.2 A candidate is permitted to withdraw from appearing in the ESE for one course or courses in ANY ONE of the semesters ONLY for exigencies deemed valid by the University authorities.

12.3 Permission for withdrawal from the examination shall be granted only once during the entire duration of the programme.

12.3.1 Application for withdrawal shall be considered only if the student has registered for the course(s), and fulfilled the requirements for attendance and CIA tests.

12.4 The application for withdrawal shall be made ten days prior to the commencement of the examination and duly approved by the Controller of Examinations. Notwithstanding the mandatory prerequisite of ten days notice, due consideration will be given under extraordinary circumstances.

12.5 Withdrawal will not be granted for arrear examinations of courses in previous semesters and for the final semester examinations.

12.6 Candidates who have been granted permission to withdraw from the examination shall reappear for the course(s) when the course(s) are offered next.

12.7 Withdrawal shall not be taken into account as an appearance for the examination when considering the eligibility of the candidate to qualify for First Class with Distinction.

13. **Academic misconduct:** Any action that results in an unfair academic advantage/interference with the functioning of the academic community constitutes academic misconduct. This includes but is not limited to cheating, plagiarism, altering academic documents, fabrication/falsification of data, submitting the work of another student, interfering with other students' work, removing/defacing library or computer resources, stealing other students' notes/assignments, and electronically interfering with other students'/University's intellectual property. Since many of these acts may be committed unintentionally due to lack of awareness, students shall be sensitized on issues of academic integrity and ethics.

14. **Transitory Regulations:** Wherever there has been a change of syllabi, examinations based on the existing syllabus will be conducted for two consecutive years after implementation of the new syllabus in order to enable the students to clear the arrears. Beyond that, the students will have to take up their

examinations in equivalent subjects, as per the new syllabus, on the recommendation of the Head of the Department concerned.

15. Notwithstanding anything contained in the above pages as Rules and Regulations governing the Two Year Master's Programmes at Annamalai University, the Syndicate is vested with the powers to revise them from time to time on the recommendations of the Academic Council.

Course Code	Course Title	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
Semester-I								
23MSCC101	Fundamental of Sports Training	4	0		5	25	75	100
23MSCC102	Methods of sports training	4	0		5	25	75	100
23MSCP103	General Conditioning and Flexibility		0	10	5	25	75	100
Elective – 1 (Generic / Discipline Centric) (Choose Any One from Group A)								
23MSCE104	Physiology of exercise and adaptation	3	-	-	3	25	75	100
23MSCE105	Fundamentals of Sports Biomechanics							
Elective – 2 (Generic / Discipline Centric) (Choose Any One from Group B)								
23MSCE106	Science of Yoga	3	-	-	3	25	75	100
23MSCE107	Fundamentals of Nutrition							
		14		10	21			
Semester-II								
23MSCC201	Testing Procedures and Evaluation	4	0		5	25	75	100
23MSCC202	Functional Anatomical Kinesiology	4	0		5	25	75	100
23MSCP203	Fitness Assessment and Recording Progress	0	0	10	5	25	75	100
Elective – 3 (Generic / Discipline Centric) (Choose Any One from Group C)								
23MSCE204	Sport and Fitness Administration	3	-	-	3	25	75	100
23MSCE205	Sports Nutrition and Energy metabolism							
Elective – 4 (Generic / Discipline Centric) (Choose Any One from Group D)								
23MSCE206	Exercise and Disease Management	3	-	-	3	25	75	100
23MSCE207	Personal Hygiene and Health							
Skill Enhancement Course (SEC) – 1								
23MSCS208	Weight Training Program based on Sport and Fitness Goal	3	-	-	2	25	75	100
		17		10	23			

Semester-III								
23MSCC301	Science of Sports Training	4	0		5	25	75	100
19MSCC302	Program Design and Periodization	4	0		5	25	75	100
23MSCP303	Fitness Drills	0	0	10	5	25	75	100
<i>Elective – 5 (Generic / Discipline Centric) (Choose Any One from Group E)</i>								
23MSCE304	Research Methods and Statistics	3	-	-	3	25	75	100
23MSCE305	Environmental studies							
<i>Skill Enhancement Course (SEC) – 2 (Choose Any One from Group H)</i>								
23MSCS306	Exercise Prescription, Measurement and Evaluation	3	-	-	2	25	75	100
23MSCS307	Sports and Games Specific Drills							
23MSCI308	Internship / Institutional training	0	0	0	2	10 0		100
19PSCI300	Constitution of India*	2	0	0	-	25	75	100
		16		10	22			
Semester-IV								
23MSCC401	Alternative Methods of Training	4	0		5	25	75	100
23MSCC402	Sports injuries	4	0		5	25	75	100
23MSCP403	Rehabilitation and Relaxation techniques	0	0	9	5	25	75	100
23MSCD404	Project Work/In-plant training	7	0		7	25	75	100
<i>Elective – 6 (Generic / Discipline Centric) (Choose Any One from Group F)</i>								
23MSCE405	Exercise Considerations for Special Populations	3	-	-	3	25	75	100
23MSCE406	Obesity and Weight Management							
<i>Skill Enhancement Course (SEC) – 2</i>								
23MSCS407	Applicaation of Sports Science	3	0		2	25	75	100
23MSCE408	Extension activity			-	1	100	0	100
		21		9	28			
Total Credits					94			

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

***19PSCI300 = NON CREDIT COMPULSORY COURSE**

Compound Wise Credit Distribution

Credits	Sem I	Sem II	Sem III	Sem IV	Total
Part A	15	15	15	22	67
Part B					
i) Generic / Discipline Centric	6	6	3	3	18
ii) Soft Skill		2	2	2	6
iii) Internship			2		2
Part C				1	1
sTotal	21	23	22	28	94

Part A component and Part B (i) will be taken into account for CGPA calculation for the postgraduate programme and the other components in Part B and Part C have to be completed during the duration of the programme as per the norms, to be eligible for obtaining the PG degree.

ELECTIVE COURSES

Courses are grouped (Group A to Group F) so as to include topics from Sports training, Sports Biomechanics (SB), Sports Nutrition and Sports Science Components (SSC) courses for flexibility of choice by the stake holders institutions. Students have to choose a course from each group.

Semester I: Elective I and Elective II

Elective I to be chosen from **Group A** and **Elective II** to be chosen from **Group B**

Group A:

1. Physiology of exercise and adaptation
2. Fundamentals of Sports Biomechanics

Group B:

1. Science of Yoga
2. Fundamentals of Nutrition

Semester II: Elective III & Elective IV

Elective III to be chosen from **Group C** and **Elective IV** to be chosen from **Group D**

Group C:

1. Sport and Fitness Administration
2. Sports Nutrition and Energy metabolism

Group D:

1. Exercise and Disease Management
2. Personal Hygiene and Health

Semester III: Elective V

Elective V to be chosen from Group E

Group E:

1. Research Methods and Statistics
2. Environmental studies

Semester IV: Elective VI

Elective VI to be chosen from Group F

Group F:

1. Exercise Considerations for Special Populations
2. Obesity and Weight Management

Skill Enhancement Courses

Skill Enhancement Courses are chosen to keep in pace with the latest developments in the academic / industrial front and provides flexibility of choice by the stakeholders /institutions. They have to choose a course from each group.

Group G to I (Skill Enhancement Courses) SEC: (Practical based paper)**Semester II**

Weight Training Program based on Sport and Fitness Goal

Semester III

Exercise prescription, Measurement and Evaluation
Sports and game specific Drills

Semester IV

Exercise consideration for special population
Obesity and Weight Management

Written Examination: Theory Paper (Bloom's Taxonomy based)

Question paper Model

Intended Learning Skill	Maximum – 75 Marks
	Passing Minimum – 50%
	Duration – Three Hours
	Part – A (10 × 2 = 20) Answer <i>ALL</i> Questions Each Questions carries 2 marks
Memory Recall / Example / Counter Example Knowledge about the Concepts / Understanding	Two Questions from each UNIT
	Question 1 to Question 10
	Part – B (5 × 5 = 25) Answer <i>ALL</i> Questions Each Questions carries 5 marks
Descriptions / Application (Problem)	Either or Type Both parts of each questions from the same UNIT
	Question 11(a) or 11(b) To Question 15(a) or 15(b)
	Part – C (3 × 10 = 30) Answer any <i>THREE</i> Questions Each Questions carries 10 marks
Analysis / Synthesis / Evaluation	There shall be <i>FIVE</i> questions covering all the five units and each with a question
	Question 16 to Question 20

Methods of Assessment

Recall (K1)	Simple Definitions, MCQ, Recall Steps, Concept Definitions.
Understand / Comprehend (K2)	MCQ, True/False, Short Answer, Concept Explanations, Short Summary or Overview.
Application (K3)	Suggest idea / Concept with examples, suggest formulae, Solve problems, Observe, Explain.
Analyse (K4)	Problem Solving questions, finish a procedure in many steps, Differentiate between various ideas, map knowledge.

Evaluate (K5)	Longer essay / Evaluation essay, Critique or justify with pros and cons.
Create (K6)	Check knowledge in specific or offbeat situations, Discussion, Debating or Presentation.

In order to avoid pull the score down of each PO, it is suggested that the usage L-Low (1) or Lower to minimum, M-Medium (2) and Strong-S (3) to maximum.

The S, M, L is based on the course outcome. The mapping is based on the revised Bloom's Taxonomy Verb used to describe the course outcomes.

- Remember and Understand – Lower Level
- Apply and Analyse – Medium Level
- Evaluate and Create – Strong Level.

Each question should carry the course outcome and cognitive level for instance.

1. [CO1: K2] Question xxxx
2. [CO2: K1] Question xxxx

Introduction: PO & PSO

Programme Outcome, Programme Specific Outcome and Course Outcome

Students completing this programme will be able to present their core post-graduate discipline clearly and precisely, make abstract ideas precise by formulating them in the language of the specific discipline, describe related ideas from multiple perspectives and explain fundamental concepts. Completion of this programme will also enable the learners to join teaching profession, enhance their employability for government jobs, jobs in various other public and private enterprises.

TANSCHÉ REGULATIONS ON LEARNING OUTCOMES-BASED CURRICULUM FRAMEWORK FOR POSTGRADUATE EDUCATION	
Programme	M.Sc. STRENGTH AND CONDITIONING
Programme Code	SSPO25
Duration	2 years
Programme Outcomes (Pos)	PO1: Problem Solving Skill Apply knowledge of Management theories and Human Resource practices to solve business problems through research in Global context.
	PO2: Decision Making Skill Foster analytical and critical thinking abilities for data-based decision-making.
	PO3: Ethical Value Ability to incorporate quality, ethical and legal value-based perspectives to all organizational activities.
	PO4: Communication Skill Ability to develop communication, managerial and interpersonal skills.
	PO5: Individual and Team Leadership Skill Capability to lead themselves and the team to achieve organizational goals.
	PO6: Employability Skill Inculcate contemporary business practices to enhance employability skills in the competitive environment.
	PO7: Entrepreneurial Skill Equip with skills and competencies to become an entrepreneur.
	PO8: Contribution to Society Succeed in career endeavors and contribute significantly to society.
	PO 9 Multicultural competence Possess knowledge of the values and beliefs of multiple cultures and a global perspective.
	PO 10: Moral and ethical awareness/reasoning Ability to embrace moral/ethical values in conducting one's life.
Programme Specific Outcomes (PSOs)	PSO1 – Placement To prepare the students who will demonstrate respectful engagement with others' ideas, behaviors, beliefs and apply diverse frames of reference to decisions and actions.
	PSO 2 - Entrepreneur To create effective entrepreneurs by enhancing their critical thinking, problem solving, decision making and leadership skill that will facilitate startups and high potential organizations.

	<p>PSO3 – Research and Development Design and implement HR systems and practices grounded in research that comply with employment laws, leading the organization towards growth and development.</p>
	<p>PSO4 – Contribution to Business World To produce employable, ethical and innovative professionals to sustain in the dynamic business world.</p>
	<p>PSO 5 – Contribution to the Society To contribute to the development of the society by collaborating with stakeholders for mutual benefit.</p>

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	3	3	3	3	2	3	3
PSO2	3	3	3	3	3		3		3	
PSO3		3		3	3	3		3		3
PSO4	3		3	3	2	3				3
P5O5	3	3	3	3	3				3	3

**SSPO25-M.Sc. Strength and Conditioning
(Semester I)**

23MSCC101- Fundamental of Sports Training

Course Code.	Course Title	Course Type	Hours and Credit			Marks Split	
			Theory hours	Practical hours	Total Credit	Int	Ext
23MSCC101	Fundamental of Sports Training	C – 1	4	0	4	25	75

Learning objective

- LO1** To define the concept of training and sports training.
- LO2** To develop the understanding of the load and over load.
- LO3** To describe planning and preparation of training periods of the sports

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.

Unit I – Introduction to 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 of Scientific and systematic planning- components of training load.

Unit III - Basic Physical fitness components:

Strength, Speed, Endurance, Speed, Mobility- Types- Factor influencing these components -Means and methods of improving these components– 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 - Technical 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.

Text Books:

Baechle T.R. (2008). *Essentials of Strength Training and Conditioning*, 3/E. Human Kinetics Publishers, Champaign, Illinois.

Dick W. Frank, (2002). *Sports Training Principles*, 4th ed. , A&C Black Ltd,. London

Anderson (2016). *Foundations of Athletic Training*, Lippincott Williams and Wilkins, Philadelphia, United State

Supplementary Reading:

Tuder O. Bompa & Mihal C. Carera, (2005). *Periodization Training for Sports*, (IInd Edition), Human Kinetics, Champaign, Illinois.

Sreedhar, K. (2007). *Sports Training Methods*, Sowmi Publications, Chidambaram.

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				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	
CO5	3		3				3	3		3	3	3			3	3	
CO6	3		3				3	3		3	3	3			3	3	

23MSCC102-Methods of Sports Training							
Course Code.	Course Title	Course Type	Hours and Credit			Marks Split	
			Theory hours	Practical hours	Total Credit		
23MSCC102	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.

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, agility and quickness
- 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.

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 training 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:

Concept of SAQ training- Components of SAQ training- acceleration, maximum speed, deceleration, ground reaction force, rate of force development, stretch shortening cycle, sprint mechanics -benefits- brain signal efficiency, muscle power, muscle endurance, running economy, spatial awareness, cardio vascular fitness, coordination, proprioception- drills used in SAQ training.

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

Text Books:

NASM, (2018). *Essentials of Sports Performance Training*, First Edition Revised, Jones & Bartlett Learning; 2nd edition.

Derek Hansen, Steve Kennelly, (2017). *Plyometric Anatomy*, Human Kinetics Publishers, Champaign, Illinois.

Supplementary Reading:

Liebenson, (2014). *Functional Training Handbook* (PB), Human Kinetics Publishers, Champaign, Illinois.

Potrac Paul, Wade Gilbert and Jim Denison,(2015). *The Routledge Handbook of Sports Coaching*, Routledge and CRC press, London.

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		3	3	3	3	3		3	3	3		3	3	3	
CO3	3		3	3		3	3	3		3	3	3		3	3		3
CO4	3		3	3			3	3	3	3	2	3	3	3	3	3	
CO5	3	3		3			3	2	3	3	3	3		3	3		3
CO6	3	3		3			3	3	3	3	3	3		3	3		3

23MSCP103:General Conditioning and Flexibility (Practical)							
Course Code.	Course Title	Course Type	Hours and Credit			Marks Split	
			Theory hours	Practical hours	Total Credit	CIA	ESE
23MSCP103	General Conditioning and Flexibility	C – 3	0	10	5	40	60

Learning objective

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

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

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.

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				3	3		3	3	3			3		3

23MSCE104:Physiology of Exercise and Adaptation

Course Code.	Course Title	Course Type	Hours and Credit			Marks Split	
			Theory hours	Practical hours	Total Credit	CIA	ESE
23MSCE104	Physiology of exercise and adaptation	E – 1	3	0	3	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

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 .

Unit I - Physiology 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 –Altitude- wind – pollution- preparation of athlete for competition in various environmental condition- effect of climatic changes.

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 – strategies- exercising- eating balanced diet- sleeping habits- time

management.

Unit V - Ergogenic Aids:

Meaning, Effect of Drugs – Alcohol, Caffeine- and Smoking on performance. Blood doping, anabolic steroid, Drug abuses in athletics - Types of ergogenic aids – mechanical, physiological, pharmacological – nutritional aids.

Text Books:

Gardiner,(2001). *Neuromuscular Aspects of Physical Activity*, Human Kinetics Publishers, Champaign, Illinois.

Vern Gambetta ,(2006). *Athletic Development: The Art & Science of Functional Sports Conditioning*, Human Kinetics Publishers, Champaign, Illinois.

Kang, (2012). *Nutrition and Metabolism in Sports, Exercise and Health*, Routledge and CRC press, London.

Supplementary Reading:

Greg Shepard, Kim Goss, (2016). *Bigger Faster Stronger*, Third Edition, Human Kinetics Publishers, Champaign, Illinois.

Mottram, David (d), (2010). *Drugs in Sport*, Human Kinetics Publishers, Champaign, Illinois.

Kimberly Mueller; Josh Hingst,(2013). *Athlete’s Guide to Sports Supplements*, Human Kinetics Publishers, Champaign, Illinois.

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	3	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			3	3		3	3	3		3	3	3	
CO6	3			3			3	3		3	3	3			3	3	

23MSCE105: Fundamentals of Sports Biomechanics

Course Code.	Course Title	Course Type	Hours and Credit			Marks Split	
			Theory hours	Practical hours	Total Credit	CIA	ESE
23MSCE105	Fundamentals of Sports Biomechanics	E – 2	3	0	3	25	75

Learning Objective (LO):

LO1	The main goal of this course is to learn mechanical concepts and principles that govern human movement
LO2	To build skills in quantitative and qualitative analyses of sports and games
LO3	To link theory and practice of course concepts and application in sports

Course Outcomes (CO)

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

CO1	Use mechanical principles to describe simple sport and exercise movements
CO2	Know the key relationships within kinematics and how they interact in sport and exercise movements
CO3	Know the different aspects of kinetics in relation to sport and exercise movements
CO4	Solve basic theoretical problems in mechanics using mathematical skills
CO5	Analyse basic biomechanical data using appropriate techniques

UNIT I: Notions in biomechanics

Definition of Biomechanics, Meaning of biomechanics, History of Sport Biomechanics, Importance of Sport and Exercise Biomechanics, Planes of movement and axes of rotation – planes, types of planes, joint motion in planes, axis, types of axis, function axis with movement planes.

UNIT II: Kinematics

Linear Kinematics – Motion, Types of Motion, distance, displacement, speed, velocity, acceleration, Projectiles – horizontal and vertical components, influence of gravity, influence of air resistance, factors influencing projectile trajectory – projection angle, projection speed, relative projection height, analysing projectile motion. Angular Kinematics – Joint angles, tools to measure body angle, Angular - distance, displacement, speed, velocity, acceleration, Relationship between linear angular motion.

Unit III: Kinetics

Linear Kinetics – Newton’s laws – Law of Inertia, Law of Acceleration, Law of Reaction, Law of Gravitation. Mechanical Behaviour of bodies in contact – Force, Friction, Momentum, Impulse, Impact. Work, Power, and Energy Relationships – Work, Power, Energy, Conservation of Mechanical Energy, Principle of Work and Energy.

Unit IV: Equilibrium and Human Movement

Equilibrium, Torque, Resultant Joint Torque, Levers – Types of levers, Anatomical Levers, Equation of Static Equilibrium, Equation of Dynamic Equilibrium. Center of Gravity – Locating the Center of Gravity, Locating the human Body Center of Gravity, Stability and Balance.

Unit V: Angular Kinetics

Resistance to angular acceleration – Moment of inertia, Determining moment of inertia, Human body moment of inertia; Angular momentum – Conservation of angular momentum, transfer of angular momentum, change in angular momentum; Angular Analogues of Newton’s Laws of Motion - Newton’s First Law, Newton’s Second Law, Newton’s third law, Centripetal Force and Centrifugal force.

Text Books

1. Bunn, John W. (1972). *Scientific Principles of Coaching* (2nd Edition), Prentice Hall, Inc., USA.
2. Hall, Susan J. (2004). *Basic Biomechanics* (4th Edition), MC Graw-Hill Companies, USA.
3. Hay, James G. (1993). *The Biomechanics of Sports Techniques* (4th Edition), Prentice Hall, USA.
4. Hay, James G. and Reid J. Gavin, (1988). *Anatomy, Mechanics and Human motion* (2nd Edition), Prentice Hall, USA.
5. Kreambaum, Ellen and Barthels, (1990). *Biomechanics – A qualitative Approach for studying Human movement* (3rd Edition), MC Millan Publishing Company, USA.
6. Mc. Ginnis, Peter M., (2005). *Biomechanics of Sport and Exercise* (2nd Edition), Human Kinetics Publishers, USA.
7. Rai Ramesh, (2003). *Biomechanics – Mechanical Aspects of human motion*, Agrim Publication, India.
8. Robertson, D. Gordon E. *et al.*, (2004). *Research Methods in Biomechanics*, Human Kinetics Publishers, USA.

23MSCE106:Science of Yoga							
Course Code.	Course Title	Course Type	Hours and Credit			Marks Split	
			Theory hours	Practical hours	Total Credit	CIA	ESE
23MSCE106	Science of Yoga	E – 3	3	0	3	25	75

Learning Objective (LO):

LO1	To learn Traditional Indian Yoga systems; and understand the philosophy of Yoga systems
LO2	Will gain in-depth understanding of fundamental and applied scientific concepts and methods of Yogic Science and allied Science
LO3	To learn methods of performing asanas, pranayama, mudras and bandhas
LO4	To explain underlying mechanism of changes in body due to Yoga practice
LO5	Relate and interpret the concept of health and disease; and demonstrate understanding of the concept of ill health and their remedies through yoga

Course Outcomes (CO)

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

CO1	Explain the philosophy of Yoga systems
CO2	Describe the fundamental and applied scientific concepts and methods of Yogic Science
CO3	Demonstrate the methods of performing asanas, pranayama, mudras and bandhas
CO4	Understand the mechanisms of physiological responses to yoga practice
CO5	Discuss and devise remedial yogic practices for ill health

Unit I: Introduction to Yoga

Meaning, Definition, Aim, Concept, Scope of Yoga. Schools of Yoga -Hastangayoga: Yama, Niyama, Asana, Pranayama, Prathyahara, Dharana, Dhyana and Samadhi.

Unit II: Yoga and Physical Education

Meaning and Definition of Physical Education – Relationship between Yoga and Physical Education. Comparison of Yoga Practices and Physical Exercises.

Unit III: Asana

Asana: Meaning, Definition, Types of asanas. Benefits of Asana: Physiological, Psychological and Therapeutical values.

Unit IV: Pranayama and Meditation

Pranayama meaning., Definition, Aim, Concept of Pranayama - Types of pranayama - Physiological, psychological and Therapeutical values. Meaning, Definition, Aim, Concept of Meditation.

Unit V: Bandhas, Shatkriyas and Mudras

Bandhas and Mudras - Meaning, Definition, values. Shat kriyas Neti (Jala, Sutra) Dhauti (Varmana, Vastra) Bhasti, Nauli, Trataka, Kapalabhati. Surya Namaskar.

References :

Gharote M.L. (1982). *Guidelines for Yogic Practice*, Lonawala: Medha Publications.

Iyengar B.K.S(1985). *The Art of Yoga*; Indus: Harpic Collins P.Ltd.

Thirumalai Kumar. S and Indira S, (2011). *Yoga in Your Life*: Chennai: The Parkar Publication.

Mapping of course outcomes (COs) with programme outcomes (POs) and programme specific outcomes (PSOs)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
CO1	3	3	2			3				3				1
CO2	2		1			3				2				2
CO3	3	3	2			3				3				2
CO4	3	3	2			3				3				2
CO5			2	1	2	2		1	1	2	3	1	2	2

23MSCE107: Fundamentals of Nutrition

Course Code.	Course Title	Course Type	Hours and Credit			Marks Split	
			Theory hours	Practical hours	Total Credit	CIA	ESE
23MSCE107	Fundamentals of Nutrition	E – 4	3	0	3	25	75

Unit I: Concepts of nutritional health

- Nutrition, role of nutrition in health promotion
- General guidelines for healthy eating
- Essential and non essential nutrients
- Food pyramid, Food plate, ICMR guidelines
- What is sport nutrition, are athletes receiving adequate nutrition
- Importance of nutrition for enhancing sport performance

Unit II: Food sources of macro and micro nutrients

A. Carbohydrates

- Understanding different types of carbohydrates (mono, di, oligo, polysaccharides, fiber)

- Common food sources of carbohydrates
- Metabolism of carbohydrates
- Functions of carbohydrates in human body
- Requirement of carbohydrate in daily diet for sedentary individuals, athletes

B. Proteins

- Basics – amino acids, peptide bonds, essential and non essential amino acids
- Different types of protein
- Protein from plant, animal sources, limiting amino acids in plant foods
- Protein requirements for sedentary, physically active individuals
- Role of protein in exercise

C. Lipids

- Classification of fats, different types, importance of Omega 3, 6 fatty acids
- Understanding triglycerides, phospholipids
- Understanding cholesterol, food sources, functions in human body, health implications
- Role of fat in exercise

D. Vitamins

- Role of vitamins in general health
- Classification of vitamins
- Fat soluble vitamins & food sources
- Water soluble vitamins & food sources

E. Minerals

- Minerals and their importance to humans
- Macro minerals & food sources
- Trace minerals & food sources

F. Water, fiber, alcohol

- Functions of water for a human
- Sport drinks, energy drinks
- Being responsible with alcohol
- Alcohol – calories, effect on performance, role in blood sugar, blood lipids
- Fiber – functions, role, health implications (constipation, diverticulosis, colon cancer, dyslipidemia, irritable bowel disease)

Unit III: Nutritional measures

- A. Nutrition And energy balance
 - What is energy
- B. Growth charts (Practical -4hours)
 - Growth charts height – weight, height for age, weight for age
- C. Weight for height and gender
- D. BMI
 - Understanding BMI, values for Asians,
 - Obesity, Health implications, risk for Non communicable disease (NCD)
 - Prevalence of Non communicable disease among Indian population

Unit IV: Nutritional health

a) Obesity

-Epidemiology

- Prevalence of obesity in India
- Body composition analysis – various technique
- Causes and treatment
- Cause of obesity
- Behavior modification
- Dietary modification
- Exercise programs

Unit V: Nutritional considerations for special groups

1) Young children

- Energy , nutrient requirements for 0-6yrs, 6-12 yrs
- Nutrient needs for preschool, school going children
- Challenges faced in feeding young children

2) Young people

- Energy requirements of individuals from 13-19yrs
- Nutritional needs of adolescents
- Challenges faced by adolescents

3) Adults

- Energy requirements for sedentary, physically active adults
- Dietary guidelines for Diabetes, hypertension, Cardiovascular disease, metabolic syndrome, CVD, hypercholesterolemia

4) Elderly

- Physiological demands in elderly
- Nutrient needs for the aged
- Dietary supplements required for elderly

5) Pregnant women

- Nutrient needs of pregnant women
- Food groups essential for pregnant women
- Guidelines for eating right for pregnancy

Recommended/Suggested Textbooks:

Brooks G.A., Fahey T.D., Baldwin K.M.. (2004). *Exercise Physiology: Human Bioenergetics and its Applications*. (4th Edition). McGraw-Hill Education

Burke L. (2007). *Practical Sports Nutrition*. Human Kinetics

Louise Burke. *Clinical Sport Nutrition*.

**SSPO25:M.Sc. Strength and Conditioning
(Semester II)**

23MSCC201: Testing Procedures and Evaluation

Course Code.	Course Title	Course Type	Hours and Credit			Marks Split	
			Theory hours	Practical hours	Total Credit	CIA	ESE
23MSCC201	Testing Procedures and Evaluation	C – 4	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

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) design and implement training programs.

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 – criteria for selection of tests.

Unit II – Body composition and Antropometric measurements

Skinfold measurements – locations of skinfold sites- cheek-chin-pectoral-axilla- abdomen iliac crestsupraspinale- subscapular-triceps-biceps-patella-mid thighproximal calf-medial calf- waist hip ratio- body mass index- fat free mass – percent bodt fat- 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 – yo-yo 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:-

Various types of skill tests - Administration, Scoring, and Interpretation of Selected Tests - subjective and Objective assessment of playing ability and skill

Text Books:

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

ACSM, (2017). *Health-Related Physical Fitness Assessment Manual*, 5Ed, Lippincott Williams & Wilkins USA

Morrow, (2015). *Measurement & Evaluation In Human Performance*, Human Kinetics Publishers, Champaign, Illinois.

Supplementary Reading:

Vivian H. Heyward, Ann L. Gibson, (2014). *Advanced Fitness Assessment and Exercise Prescription*, Seventh Edition, Human Kinetics Publishers, Champaign, Illinois.

Helen J. Hislop ,Daniels & Worthingham'S, (2013). *Muscle Testing*, 9th Edition, Elsevier India; New Delhi

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
CO2	3	3	3	3				3		3					3		3
CO3	3	3	3	3				3		3					3		3
CO4	3	3	3	3		3	3	3		3					3		
CO5	3	3		3		3	3	3		3					3		3
CO6	3	3		3		3	3	3	3	3	3				3		3

23MSCC202:Functional Anatomical Kinesiology

Course Code.	Course Title	Course Type	Hours and Credit			Marks Split	
			Theory hours	Practical hours	Total Credit	CIA	ESE
23MSCC202	Functional Anatomical Kinesiology	C – 5	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.

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.

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.

Text Books:

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

Jack H. Wilmore and David L.Costill, (1994). *Physiology of Sports and Exercise*, USA : Human Kinetics, Champaign, Illinois..

Supplementary Reading:

Kevin T Patton, Gary Thibodeau,(2015). “*Structure and Function of the Body*”, Lea & Febiger. St. Louis Philadelphia

Peter N Sperryn,(1965). “*Sports and Medicine*”, Butterworth-Heinemann Ltd, London

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	3	3		3	3	3
CO5	3						3	3		3	3	3	3		3	3	3
CO6	3						3	3		3	3	3	3		3	3	3

23MSCP203 - Fitness Assessment and Recording Progress (Practical)							
Course Code	Course Title	Course Type	Hours and Credit			Marks Split	
			Theory hours	Practical hours	Total Credit	CI A	ESE
23MSCCP203	Fitness Assessment and Recording Progress	C-9	0	10	5	25	75

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.

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.

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.

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				3	3		3	3	3			3		3

23MSCE204: Sports and Fitness Administration							
Course Code.	Course Title	Course Type	Hours and Credit			Marks Split	
			Theory hours	Practical hours	Total Credit	CIA	ESE
23MSCE204	Sport and Fitness Administration	E – 5	3	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.

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.

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 - Systems of organization and Organization Facilities

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.

Text Books:

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

Supplementary Reading:

Canfitpro,(2016). *Foundations of Professional Personal Training*, Second Edition With Web Resource, Human Kinetics Publishers, Champaign, Illinois..

Riva L. Rahl,(2010). *Physical Activity and Health Guidelines: Recommendations for Various Ages, Fitness Levels and Conditions from 57 Authoritative Sources*, Human Kinetics Publishers, Champaign, Illinois.

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
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	3	3						3		3
CO5	3	3		3	3	3	3	3	3						3		3
CO6	3	3	3	3	3	-	3	3	3		3				3		3

23MSCE205: Sports Nutrition and Energy Metabolism							
Course Code.	Course Title	Course Type	Hours and Credit			Marks Split	
			Theory hours	Practical hours	Total Credit	CIA	ESE
23MSCE205.1	Sports Nutrition and Energy Metabolism	E – 6	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.).

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 into nutritional and energy demands for individuals for training, higher performance, rehabilitation as well as for special population, Learn how to provide guidance regarding nutrition.

Unit I - Nutrition and Health

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

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

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

Metabolism during exercise - Energy substances - Basic energy systems: ATP-PC, glycolysis and oxidative phosphorylation - Aerobic and anaerobic power—concept, factors affecting it - Respiratory quotient, O₂ 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

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

Text Books:

Bill I. Campbell, Marie A. Spano,(2011). *NSCA's Guide to Sport and Exercise Nutrition*, Human Kinetics Publishers, Champaign, Illinois.

Kang, (2012). *Nutrition and Metabolism in Sports*, Exercise and Health, Routledge and CRC press,

London.

Fink, (2017). *Practical Applications in Sports Nutrition*, 5/Ed, Jones and Bartlett Publishers, Inc, Burlington, Massachusetts, United States.

Supplementary Reading:

Kimberly Mueller,; Josh Hingst, (2013). *Athlete’s Guide to Sports Supplements*, Human Kinetics Publishers, Champaign, Illinois.

Nanna Meyer, Janice L.Thompson, Melinda M. Manore, (2009). *Sport Nutrition for Health and Performance*, Human Kinetics Publishers, Champaign, Illinois.

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	3	3		3	3	3
CO5	3						3	3		3	3	3	3		3	3	3
CO6	3						3	3		3	3	3	3		3	3	3

23MSCE206:Exercise and Disease Management

Course Code.	Course Title	Course Type	Hours and Credit			Marks Split	
			Theory hours	Practical hours	Total Credit	CIA	ESE
23MSCE206	Exercise and Disease management	E – 7	3	0	3	25	75

Unit I: Clinical Diseases - I

1. Epidemiology, etiopathogenesis, clinical features, complications and management overview of Obesity.
2. Epidemiology, etiopathogenesis, clinical features, complications and management overview of diabetes mellitus.

3. Epidemiology, etiopathogenesis, clinical features, complications and management overview of cardiovascular diseases and hypertension.
4. Epidemiology, etiopathogenesis, clinical features, complications and management overview of arthritis and osteoporosis.
5. Epidemiology, etiopathogenesis, clinical features, complications and management overview of cerebrovascular diseases.

Unit II: Clinical Diseases - II

1. Epidemiology, etiopathogenesis, clinical features, complications and management overview of respiratory disorders.
2. Epidemiology, etiopathogenesis, clinical features, complications and management overview of cancer.
3. Epidemiology, etiopathogenesis, clinical features, complications and management overview of HIV.
4. Epidemiology, etiopathogenesis, clinical features, complications and management overview of renal and liver disease.
5. Epidemiology, etiopathogenesis, clinical features, complications and management overview of neuromuscular disorders.

Unit III: Health screening and risk stratification before exercise. (Questionnaire vs clinical assessment and criteria for CVD risk assessment)

Unit IV: Functional tests for diseased populations – stress ECG, FVC testing, oral glucose tolerance test, EMG

Unit V: Exercise Prescription in Disease

1. Exercise rehabilitation and exercise prescription for cardiopulmonary and cerebrovascular disease:3T
 - Inpatient rehabilitation programmes
 - Outpatient exercise programmes
 - Benefits of Endurance training in cardiac patients
 - Resistance training for cardiac patients
2. Exercise rehabilitation and exercise prescription for musculoskeletal disease: 2T
 - Exercise Testing
 - Exercise Prescription
 - Special Considerations
3. Exercise rehabilitation and exercise prescription for neurological disease2T
 - Exercise Testing
 - Exercise Prescription
 - Special Considerations
4. Exercise rehabilitation and exercise prescription for metabolic disease 2T
 - Exercise Testing
 - Exercise Prescription
 - Special Considerations

Recommended Reading:*ACSM's Guidelines for Exercise Testing and Prescription. 8th Ed***Mapping of course outcomes (COs) with programme outcomes (POs)
and programme specific outcomes (PSOs)**

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	3	3		3	3	3
CO5	3						3	3		3	3	3	3		3	3	3
CO6	3						3	3		3	3	3	3		3	3	3

23MSCE207: Personal Hygiene and Health							
Course Code.	Course Title	Course Type	Hours and Credit			Marks Split	
			Theory hours	Practical hours	Total Credit	CIA	ESE
23MSCE207	Personal Hygiene and Health	E – 8	3	0	3	25	75

Unit I

- Nutrition – definition, importance, Good nutrition and mal nutrition.
- Balanced Diet: Basics of Meal Planning
- Carbohydrates – functions, dietary sources, effects of deficiency.
- Lipids – functions, dietary sources, effects of deficiency.
- Proteins – functions, dietary sources, effects of deficiency.

Unit II

- Vitamins - functions, food sources, effects of deficiency,
- Macro and micro minerals – functions, effects of deficiency; food sources of Calcium, Potassium and Sodium; food sources of Iron, Iodine and Zinc

- Importance of water– functions, sources, requirement and effects of deficiency.

Unit III

- Health - Determinants of health, Key Health Indicators.
- Environment health & Public health; Health-Education: Principles and Strategies
- Health Policy & Health Organizations: Health Indicators and National Health Policy of Govt. of India.
- Functioning of various nutrition and health organizations in India viz., NIN (National Institution of Nutrition), FNB (Food and Nutrition Board), ICMR (Indian Council of Medical Research), IDA (Indian Dietetics Association), WHO-India, UNICEF-India

Unit IV

- National Health Mission: National Rural Health Mission (NRHM) Framework, National Urban Health Mission (NUHM) Framework
- Women & Child Health Care Schemes: Reproductive, Maternal, Newborn, Child and Adolescent Health (RMNCH+); Janani Shishu Suraksha Karyakaram (JSSK); Rashtriya Bal Swasthya Karyakram (RBSK); India Newborn Action Plan (INAP); Adolescent Health - Rashtriya Kishor Swasthya Karyakram (RKSK)
- Disaster Management – Containment, Control and Prevention of Epidemics and Pandemics – Acts, Guidelines and Role of Government and Public

Unit V

- Hygiene – Definition; Personal, Community, Medical and Culinary hygiene; WASH (WATER, Sanitation and Hygiene) programme
- Rural Community Health: Village health sanitation & Nutritional committee (Roles & Responsibilities); About Accredited Social Health Activist (ASHA); Village Health Nutrition Day, Rogi Kalyan Samitis
- Community & Personal Hygiene: Environmental Sanitation and Sanitation in Public places
- Public Awareness through Digital Media - An Introduction to Mobile Apps of Government of India: National Health Policy, Swasth Bharat, No More Tension, Pradhan Mantri Surakshit Mantritva Abhiyan (PM Suman Yojana), My Hospital (Mera aspataal), India fights Dengue, JSK Helpline, Ayushman Bhava.

Textbook

1. Bamji M.S., Krishnaswamy K., Brahmam G.N.V. (2009). *Textbook of Human Nutrition* (3rd edition), New Delhi: Oxford and IBH Publishing Co. Pvt. Ltd.

References book

2. Swaminathan (1995). *Food & Nutrition* (Vol. I, Second Edition), Bangalore: The Bangalore Printing & Publishing Co Ltd.
3. Vijaya Khader (2000). *Food, nutrition & health*, New Delhi: Kalyan Publishers.
4. Srilakshmi B. (2010). *Food Science*, (5th Edition) New Delhi: New Age International Ltd.

**Mapping of course outcomes (COs) with programme outcomes (POs)
and programme specific outcomes (PSOs)**

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	3	3		3	3	3
CO5	3						3	3		3	3	3	3		3	3	3
CO6	3						3	3		3	3	3	3		3	3	3

23MSCS206- Weight Training Program based on Sport and Fitness Goal							
Course Code.	Course Title	Course Type	Hours and Credit			Marks Split	
			Theory hours	Practical hours	Total Credit	CIA	ESE
23MSCS206	Weight Training Program based on Sport and Fitness Goal	S-1	2	2	2	25	75

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.

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 which 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.

Contents

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

Weight 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

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

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

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				3	3		3	3	3			3		3

**SSPO25-M.Sc. Strength and Conditioning
(Semester-III)**

23MSCC301:Science of Sports Training

Course Code.	Course Title	Hours and Credit			Marks Split	
		Theory hours	Practical hours	Total Credit	CIA	ESE
23MSCC301	Science of Sports Training	4	0	4	25	75

Learning objective

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

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

Understand how to increase in **Motor coordination, flexibility, speed, endurance and** muscular strength through training.

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

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 IV - Strength

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- 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- Resistance training for specific sports- Olympic lifts – Teaching technique and progression- Maximum strength & Strength endurance Training methods.

Text Books:

Jay Blahnik, (2010). *Full-Body Flexibility*, Human Kinetics Publishers, Champaign, Illinois.
 Douglas S. Brooks, (2003). *Complete Book of Personal Training*, The Second Edition, Human Kinetics Publishers, Champaign, Illinois.
 Arnold G. Nelson, Jouko Kokkonen, (2006). *Stretching Anatomy*, Human Kinetics Publishers, Champaign, Illinois.

Supplementary Reading:

Clive Brewer, (2017),. *Athletic Movement Skills: Training for Sports Performance*, Human Kinetics Publishers, Champaign, Illinois.
 Vance Ferrignoand Lee E. Brown, (2006). *Training for Speed, Agility, and Quickness*, Human Kinetics Publishers, Champaign, Illinois.
 Mike McGuigan, (2017). *Monitoring Training and Performance in Athletes*, Human Kinetics Publishers, Champaign, Illinois.

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			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					3

23MSCC302: Program Design and Periodization						
Course Code.	Course Title	Hours and Credit			Marks Split	
		Theory hours	Practical hours	Total Credit	CIA	ESE
23MSCC302	Program Design and Periodization	4	0	4	25	75

Learning objective

Apply knowledge on planning of sports training, periodization, exercise prescription, principles when designing, implementing and modifying training programs to meet athlete goals.

Develop a personal fitness program that relates to athletic conditioning.

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

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 periodization 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

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 - Physiological 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

Text Books:

Jared W. Coburn, Moh H. Malek,,(2012). *NSCA’S Essentials of Personal Training*, National Strength and Conditioning Association, Human Kinetics Publishers.

Sreedhar. K., (2007). *Sports Training Methods*, Chidambaram, Sowmi Publications,.

Supplementary Reading:

Aurélien Broussal-Der val; Stéphane Ganneau, (2016). *The Modern Art of High Intensity Training*, Human Kinetics Publishers.

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			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					3

23MSCP303 - Fitness Drills

Course Code.	Course Title	No. of Credit			Marks Split	
		Theory	Practical	Credits	CIA	ESE
19MSCP303	Fitness Drills		10	5	25	75

Learning objective

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

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

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

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				3	3		3	3	3			3		3

23MSCE304 - Research Methods and Statistics						
Course Code.	Course Title	Hours and Credit			Marks Split	
		Theory hours	Practical hours	Total Credit	CIA	ESE
23MSCE304	Research Methods and Statistics	3	0	3	25	75

Learning objective

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

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.

Unit I - Types of research:

Basic, Applied and Action Research- Descriptive Study: Survey – Social survey- Comparative research – Correlation research. Historical research: Purpose- Sources of data: Primary – Secondary. Evaluation of data: Internal criticism – External criticism Experimental research: Meaning- Need-Nature. Quasi Experimental research. Philosophical research: Qualitative research: Case study.

Unit II - Variables and Research Design:

Variables: Meaning –Definition- Types of variables- Independent- Dependent _ extraneous variable
 Data: Meaning- Quantitative data- Qualitative data- Research Design: Meaning, Types of research design: Comparative research design- Experimental research design : Static group- Equivalent group, Repeated measures – True experiment design – Quasi experiment design – Pre- Post random group experimental design- Factorial research design- Type of sampling : Random- stratified random- Systematic- Probability – Applications of sampling.

Unit III - 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 IV – Inferential and Comparative Statistics

Tests of significance; Independent “t” test, Dependent “t” test – chi – square test, level of confidence and interpretation of data. Meaning of correlation – co-efficient of correlation –product moment method and rank difference method. Concept of ANOVA and ANCOVA- Graphical Representation in Statistics; Line diagram, Bar diagram, Pie Diagram, Histogram, Frequency Polygon, Ogive Curve.

Unit V - Organisation of thesis chapters:

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- Methodology- selections of samples-Variables- Collections and Treatment of data – Results and Analysis – Testing Hypothesis – Discussion on Findings - Summary – Conclusions- Future work- Bibliography- Presentation of Bibliography.

Text Books:

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

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

Anne Rothstein. (1985). “*Research Design and Statistics for Physical Education*”. y: Prentice Hall Inc. New Jerse.

Supplementary Reading:

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

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

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					3		3					3
CO3	3	3	3	3	3					3		3					3
CO4	3	3	3	3	3					3		3					3
CO5	3	3	3	3	3					3		3					3
CO6	3	3	3	3	3					3		3					3

23MSCE305:Environmental Studies

Course Code.	Course Title	Hours and Credit			Marks Split	
		Theory hours	Practical hours	Total Credit	CIA	ESE
23MSCE305	Environmental Studies	3	0	3	100	00

Unit I : Introduction to Environmental Studies

- Multidisciplinary nature of environmental studies;
- Scope and importance; Concept of sustainability and sustainable development.

Unit II : Ecosystems

What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: food chains, food webs and ecological succession. Case studies of the following ecosystems:

- Forest ecosystem
- Grassland ecosystem
- Desert ecosystem
- Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit III : Natural Resources: Renewable and Non---renewable Resources

- Land resources and land use change; Land degradation, soil erosion and desertification.
- Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations.
- Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter---state).
- Energy resources: Renewable and non renewable energy sources, use of alternate energy sources, growing energy needs, case studies.

Unit IV: Biodiversity and Conservation

- Levels of biological diversity: genetic, species and ecosystem diversity; Biogeographic zones of India; Biodiversity patterns and global biodiversity hot spots
- India as a mega-biodiversity nation; Endangered and endemic species of India
- Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.
- Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.

Unit V: Environmental Pollution

- Environmental pollution: types, causes, effects and controls; Air, water, soil and noise pollution
- Nuclear hazards and human health risks
- Solid waste management: Control measures of urban and industrial waste.
- Pollution case studies.

- Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture.
- Human population growth: Impacts on environment, human health and welfare.

Suggested Readings:

1. Carson, R. (2002). *Silent Spring*. Houghton Mifflin Harcourt.
2. Gadgil, M., & Guha, R. (1993). *This Fissured Land: An Ecological History of India*. Univ. of California Press.
3. Gleeson, B. and Low, N. (eds.) (1999). *Global Ethics and Environment*, London, Routledge.
4. Gleick, P. H. 1993. *Water in Crisis*. Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press.
5. Groom, Martha J., Gary K. Meffe, and Carl Ronald Carroll. (2006). *Principles of Conservation Biology*. Sunderland: Sinauer Associates.
6. Grumbine, R. Edward, and Pandit, M.K. (2013). Threats from India's Himalaya dams, *Science*, 339: 36--37.
7. McCully, P. (1996). *Rivers no more: The environmental effects of dams* (pp. 29-64). Zed Books.
8. McNeill, John R. (2000). *Something New Under the Sun: An Environmental History of the Twentieth Century*.
9. Odum, E.P., Odum, H.T. & Andrews, J. (1971). *Fundamentals of Ecology*. Philadelphia: Saunders.
10. Pepper, I.L., Gerba, C.P. & Brusseau, M.L. (2011). *Environmental and Pollution Science*. Academic Press.
11. Rao, M.N. & Datta, A.K. (1987). *Waste Water Treatment*. Oxford and IBH Publishing Co. Pvt. Ltd.
12. Raven, P.H., Hassenzahl, D.M. & Berg, L.R. (2012). *Environment*. 8th edition. John Wiley & Sons.
13. Rosencranz, A., Divan, S., & Noble, M. L. (2001). *Environmental law and policy in India*. Tripathi 1992.
14. Sengupta, R. (2003). *Ecology and economics: An approach to sustainable development*. OUP.
15. Singh, J.S., Singh, S.P. and Gupta, S.R.(2014). *Ecology, Environmental Science and Conservation*. S. Chand Publishing, New Delhi.
16. Sodhi, N.S., Gibson, L. & Raven, P.H. (eds). (2013). *Conservation Biology: Voices from the Tropics*. John Wiley & Sons.
17. Thapar, V. (1998). *Land of the Tiger: A Natural History of the Indian Subcontinent*.
18. Warren, C. E. (1971). *Biology and Water Pollution Control*. WB Saunders.
19. Wilson, E. O. (2006). *The Creation: An appeal to save life on earth*. New York: Norton.
20. World Commission on Environment and Development. (1987). *Our Common Future*. Oxford University Press.

23MSCS306 - EXERCISE PRESCRIPTION, MEASUREMENT AND EVALUATION						
Course Code.	Course Title	Hours and Credit			Marks Split	
		Theory hours	Practical hours	Total Credit	CIA	ESE
23MSCS306	Exercise Prescription, Measurement and Evaluation	4	0	3	25	75

Learning Objective (LO):

LO1	To understand the procedures for evaluating fitness and prescribing exercise for varying populations
LO2	To understand the theoretical issues relating to exercise prescription for varying populations
LO3	To describe the processes and practical applications involved in the development of human physical capacity including strength, power, flexibility and cardiovascular endurance.

Course Outcomes (CO)

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

CO1	Explain the fundamentals of assessment and enhancement of physical ability and focuses on the appropriateness and accuracy of methods to assess human capacity across the exercise spectrum.
CO2	Specify the type of exercise requirement for different groups of people as per their needs.
CO3	Devise effective exercise program as per the need of the individual

Unit I: Exercise prescription for healthy populations

1. Basic concepts – definitions, terminology, role of the exercise scientist-
2. Pre-exercise screening and fitness assessment-
 - Introduction to model screening,
 - purpose of fitness assessment
 - procedures for fitness assessment , tools
 - with tools model procedures
 - personal profile, Past medical history,
 - Posture assessment, girth measurement, Flexibility assessment,
 - Body mass index, Body composition test, fitness evaluation,
 - fitness goal setting, Corrective and fitness exercise programs,
 - Reviews
3. Basic principles of training
 - Principles of Exercise and Sport Training (Individuality, Specificity, Progression, Overload, Adaptation, Recovery & Reversibility)

Unit II: Specific training

1. Training for endurance-: Aerobic Endurance Training Programme Design Variables
 - Exercise Mode

- Training Frequency
 - Exercise Duration
 - Exercise Progression
2. Types of Aerobic Endurance Training Programs
 - Long, slow distance
 - Pace/tempo
 - Interval
 - Repetition
 - Fartlek
 3. Training for strength
 - Resistance Training Programme Design Variables
 - Needs Analysis
 - Exercise Selection
 - Training Frequency
 - Training Load and Repetitions
 - Volume
 - Rest Periods
 4. Training for speed
 - Movement Mechanics
 - Power
 - Running Speed (Sprints)
 5. Periodisation and progression of physical training programs
 - Periodization Cycles (Macrocycle, Mesocycle & Microcycles)
 - Periodization Periods (Preparatory, First Transition, Competition & Second Transition)

Unit III: Theory of Exercise prescription for the development of specific physical capacities -

Muscular strength and power:

- Periodization:
- Responses to training stress,
- Linear and non linear periodization models

Speed and agility:

- Running speed
- Agility
- Methods of developing speed and agility programs

Flexibility:

- Introduction
- Selection of muscles groups
- Types of stretches - Active, passive
- Programs for flexibility training
- Methods to improving flexibility

Cardio respiratory fitness:

- Factor related to cardio respiratory fitness
- Designing the programs for cardio respiratory fitness
- Types cardio respiratory fitness
- Special issue related cardio respiratory fitness

Unit IV

1. Monitoring and evaluating training
2. Implementing and evaluating health/fitness programs
3. Talent identification
4. Fitness and physical performance assessment of healthy individuals

Unit V : Theory of Measurement and evaluation

1. Anthropometry
 - Girth Measurements
2. Aerobic power assessment
 - 1.5 Mile Run
 - 12-Minute Run
3. Blood Pressure measurement
4. High intensity assessment
 - Reason for testing
 - Testing terminology
 - Evaluation of test quality
 - Test selection
 - a. 1RM power clean
 - b. Standing long jump
 - c. Vertical jump
 - d. Margarita kalamen test
5. Agility assessment
 - Introduction, purpose
 - Evaluation test quality
 - Procedures and preparation
 - Test selection
 - a. T-test
 - b. Hexagon test
 - c. Pro agility test
6. Flexibility assessment
 - Definition
 - types of flexibility
 - muscle response,
 - purpose for flexibility test
 - a. Sit and reach test- purpose, procedure, measurement and tools
 - b. Hamstring flexibility test - purpose, procedure, measurement
 - c. Quadriceps flexibility test – purpose, procedure, measurement

- d. Faber test – purpose, procedure, measurement
 - e. IT-band test – purpose, procedure, measurement
 - f. Thomas test – purpose, procedure, measurement and tools
 - g. Aply's test – purpose, procedures, measurement and tools
 - h. King cobra – purpose, procedure, measurement and tools
 - i. Calf flexibility test – purpose, procedure, measurement
 - j. Chest flexibility test – purpose, procedure, measurement
7. Muscular strength, power and endurance assessment
- Maximum Muscular Strength
- 1 RM Bench Press
 - 1 RM Bench Squat
- Maximum Muscular Power
- 1 RM Power Clean
 - Standing Long Jump
 - Vertical Jump
 - Margaria-Kalamen Test
- Local Muscular Endurance
- Partial Curl Up
 - Push Up
 - YMCA Bench Press Test
8. Isokinetic testing
9. Sport-specific tests:
- Athletics (track and field),
 - Marathon,
 - Cricket,
 - Hockey,
 - Soccer
 - Tennis

Recommended/Suggested Textbooks:

- Thomas R. Baechle, Roger W. Earle. *Essentials of Strength Training and Conditioning*. (2nd Edition).
- ACSM's Guidelines. *A Clinicians Guide to Exercise Prescription*.
- [George Brooks](#), [Thomas Fahey](#), [Kenneth Baldwin](#). *Exercise Physiology: Human Bioenergetics and Its Applications*. (4th Edition).
- ACSM (2009). *Resource Manual for Guidelines for Exercise Testing and Prescription* (6th Edition) Lippincott Williams & Wikins.

23MSCS307- Sports and game specific Drills

Course Code.	Course Title	Hours and Credit			Marks Split	
		Theory hours	Practical hours	Total Credit	CIA	ESE
23MSCS307	Sports and game specific Drills	4	0	4	25	75

Learning objective

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

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

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.

Text Books:

Juan Carlos Santana (2015). *Functional Training*, Human Kinetics Publishers, Champaign, Illinois.

Tim Henriques, (2014). *NPTI's Fundamentals of Fitness and Personal Training National Personal Training Institute*, Human Kinetics Publishers, Champaign, Illinois.

Desimone G, (2013). *ACSM's Resources for the Group Exercise Instructor*, Wolters Kluwer Health, Philadelphia, Pennsylvania, United States.

SPILIO, *Anatomy of Functional Training Exercise Programmes for Real Life Activities*, Bloomsbury Sport, New Delhi.

Supplementary Reading:

Gray Cook, (2003). *Athletic Body in Balance*, Human Kinetics Publishers, Champaign, Illinois.

Pire, (2012). *ACSM'S Career & Business Guide for the Fitness Professional*, Lippincott Williams & Wilkins, Philadelphia, Pennsylvania, United States

M.B. Davies, (2005). *Physical Training, Games and Athletics in Schools*, Khel Sahitya Kendra, New Delhi

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			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					3

23MSCI308 - Internship / Institutional Training

Course Code.	Course Title	Hours and Credit			Marks Split	
		Theory hours	Practical hours	Total Credit	CIA	ESE
23MSCI308	Internship	0	0	2	25	75

19PSCI300 – Constitution of India

Course Code.	Course Title	Course Type	No. of Credit Hours			Marks Split	
			Theory	Practical	Credits	CIA	ESE
23PSCI300	Constitution of India	Compulsory course	3	-	-	25	75

**SSPO25-M.Sc. Strength and Conditioning
(Semester-IV)**

23MSCC401 - Alternative Methods of Training

Course Code.	Course Title	Hours and Credit			Marks Split	
		Theory hours	Practical hours	Total Credit	CIA	ESE
23MSCC401	Alternative Methods of Training	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.

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 traditional methods of training and incorporate new and creative ideas to enhance the ability to design physical fitness training regimens; and utilize scientific principles involving periodization to develop daily training sessions and programs.

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 warm-up:

- 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 - environmental conditions at high altitude - High altitude training, types and its beneficial role in sports - Health risks of acute exposure to altitude, SpO2 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.

Text Books:

Hoeger W.W.K. (2015). *Lifetime Physical Fitness and Wellness A Personalized Program*, CENGAGE LEARNING, Boston, USA.

.Kasser, (2005). *Inclusive Physical Activity A Lifetime of Opportunities*, Human Kinetics Publishers, Champaign, Illinois.

Sheela Kumari S. (2009). *A Practical Workbook for Fitness, Aerobics and Gym Operations*, Khel Sahitya Kendra, New Delhi.

Supplementary Reading:

Torbert , (2011). *Secrets to Success in Sports & Play*, Human Kinetics Publishers Champaign, Illinois.

Corbin, (2006). *Fitness for Life - Updated 5th Edition*, Human Kinetics Publishers, Champaign, Illinois.

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	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					3

23MSSC402 - Sport Injuries

Course Code.	Course Title	Hours and Credit			Marks Split	
		Theory hours	Practical hours	Total Credit	CIA	ESE
23MSSC402	Sport Injuries	4	0	4	25	75

Learning objective

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

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.

Unit I - Sports Injuries:

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.

Text Books:

Andrews J.R, Huelson GL. (2012). *Physical Rehabilitation of Injured Athlete*, Saunders, Philadelphia.
 MA Hutson, *Sports Injuries: Recognition and Management*, Oxford University Press, London.
 Isani and Melone, *Clinical Sports Medicine* -

Supplementary Reading:

Andrews J.R. WILR KE. (2008). *The athlete Shoulder*. Elsevier Amsterdam, Netherlands
 Maitland G.D. *Vertebral Manipulation*. Butterworth-Heinemann, Oxford, United Kingdom

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	3	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			3	3		3	3	3		3	3	3	
CO6	3			3			3	3		3	3	3			3	3	

23MSCP403- Rehabilitation and Relaxation techniques (Practical)

Course Code.	Course Title	No. of Credit			Marks Split	
		Theory hours	Practical hours	Total Credit	Int	Ext
23MSCP403	Rehabilitation and Relaxation techniques	0	8	5	25	75

Learning objective

To understand and practice different types rehabilitation and relaxation techniques

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.

Course contents:

Therapeutic Exercises:

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

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				3	3		3	3	3			3		3

23MSCD404 - Project Work including Presentation, Comprehensive Viva						
Course Code.	Course Title	Hours and Credit			Marks Split	
		Theory hours	Practical hours	Total Credit	CIA	ESE
23MSCD404	Project Work including Presentation, Comprehensive Viva	0	14	7	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 develop 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

23MSCE405- Exercise Considerations for Special Populations

Course Code.	Course Title	Hours and Credit			Marks Split	
		Theory hours	Practical hours	Total Credit	CIA	ESE
23MSCE405	Exercise Considerations for Special Populations	3	0	3	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

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.

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- 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.

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.

Text Books:

Dianne S. Ward, Ruth P. Saunders, Russell R. Pate, (2006). *Physical Activity Interventions in Children and Adolescents*, Human Kinetics Publishers, Champaign, Illinois.

Irene Lewis-McCormick (2012). *Woman's Guide to Muscle and Strength*, Human Kinetics Publishers, Champaign, Illinois.

Supplementary Reading:

Cowlin,(2002). *Women's Fitness Program Development*, Human Kinetics Publishers, Champaign, Illinois.

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	3	3		3	3	3
CO5	3						3	3		3	3	3	3		3	3	3
CO6	3						3	3		3	3	3	3		3	3	3

23MSCE406: Obesity and Weight Management

Course Code.	Course Title	Hours and Credit			Marks Split	
		Theory hours	Practical hours	Total Credit	CIA	ESE
23MSCE406	Obesity and Weight Management	3	0	3	25	75

Learning objective

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

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 , adipose tissue and its endocrine function.
- CO6: An in depth knowledge of the health benefits of exercise and its applicability in weight related conditions.

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

Text Books:

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

Kumanyika, *Handbook of Obesity Prevention: A Resource For Health Professionals*, Human Kinetics Publishers, Champaign, Illinois.

Supplementary Reading:

Marie Dunford, (2010). *Fundamentals of Sport and Exercise Nutrition*, Human Kinetics Publishers, **Champaign, Illinois.**

Kenneth L. Knight, Kirk Brumels, (2009). *Developing Clinical Proficiency in Athletic Training: A Modular Approach*, Human Kinetics Publishers, Champaign, Illinois.

Steven B. Heymsfield, Timothy G. Lohman, ZiMian Wang, Scott B. Going, (2005). *Human Body Composition*, Second Edition, Human Kinetics Publishers, Champaign, Illinois.

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	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	
CO5	3						3	3		3	3	3			3	3	

CO6	3					3	3		3	3	3			3	3	3
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23MSCS-407- Application of Sports Sciences

Course Code.	Course Title	Hours and Credit			Marks Split	
		Theory hours	Practical hours	Total Credit	CIA	ESE
23MSCS407	Fundamentals of Sports Sciences	3	0	2	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.

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.

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, O₂ 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.

Text Books:

Hoeger W..K,Warner and Sharon A Hoger, (2014). *Fitness and Wellness*, Cengage Learning, Boston USA.

Tuder B. Bompa & Mihal C. Carera, (2005). *Periodization Training for Sports*, Human Kinetics, (11nd Edition), Champaign, Illinois.

Sreedhar. K., (2007). *Sports Training Methods*, Sowmi Publications, Chidambaram.

Supplementary Reading:

Maria A. Spano, Laura J. Kruskall, D.Travis Thomas, (2017). *Nutrition for Sport, Exercise, and Health*, Human Kinetics Publishers, Champaign, Illinois.

Vassilis Mougios, (2006). *Exercise Biochemistry*, Human Kinetics Publishers, Champaign, Illinois.

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	3	3		3	3	3

CO5	3						3	3		3	3	3	3		3	3	3
CO6	3						3	3		3	3	3	3		3	3	3

23MSCE408:Extenson Activity						
Course Code.	Course Title	Course Type	Hours and Credit			Marks
			Theory hours	Practical hours	Total Credit	
23MSCE408	Extension Activity		0	0	1	100