AnnamalaiUniversity

(Accreditedwith‘A’GradebyNAAC)

Regulations,CurriculaandSyllabi2023-24

for

M.Sc.EXERCISEPHYSIOLOGY

PROGRAMMECODE:SSPO22

Approvedbythe
MinistryofYouthAffairs&SportsGovernmentofIndia

MYAS-AUDEPARTMENTOF SPORTSSCIENCES

CentreofExcellence

DivisionofExercisePhysiology&SportsBiochemistryFacultyofScience

AnnamalaiUniversity

FacultyofScience

MYAS-AUDEPARTMENTOFSPORTSSCIENCES

DivisionofExercisePhysiologyandSportsBiochemistry

M.Sc.EXERCISEPHYSIOLOGY

ProgrammeCode:SSPO22

These rules and regulations shall govern the Two year post graduate studies leading to theaward of degree of **Master of Science in Exercise Physiology** in the Faculty of Science. Theseacademic Regulations shall be called "**Annamalai University, Faculty of Science Two year M.Sc.Exercise Physiology Regulations 2023"**. They shall come into force with effect from the academicyear 2023 – 24. This syllabus is approved by **Ministry of Youth Affairs and Sports, Government ofIndia**,wasrevisedinaccordancetotemplateprescribedby**TANSCHE**.

1. DefinitionsandNomenclature

1.1 **University**refersto AnnamalaiUniversity.

1.2 **Department**meansanyoftheacademicdepartmentsandacademiccentersattheUniversity.

1.3 **Discipline** refers to the specialization or branch of knowledge taught and researched in highereducation. For Exercise Physiology is a discipline in the Sports Sciences, while Economics is adisciplinein SocialSciences.

1.4 **Programme**encompassesthecombinationofcoursesand/orrequirementsleadingtoaDegree.Forexample,M.A.,M.Sc., MPT

1.5 **Course** is an individual subject in a programme. Each course may consist ofLectures/Laboratory /Seminar/Project work/viva-voce etc. Each course has a course title and is identifiedbya coursecode.

1.6 **Curriculum** encompasses the totality of student experiences that occur during the educationalprocess.

1.7 **Syllabus** is an academic document that contains the complete information about an academicprogrammeanddefinesresponsibilitiesandoutcomes.Thisincludescourseinformation,courseobjectives,policies,evaluation,grading,learningresourcesandcoursecalendar.

1.8 **Academic Year** refers to the annual period of sessions of the University that comprises twoconsecutivesemesters.

1.9 **Semester** is a half-year term that lasts for a minimum duration of 90 days. Each academic yearisdividedinto two semesters.

1.10 **Choice Based Credit System**: A mode of learning in higher education that enables a studentto have the freedom to select his/her own choice of elective courses across various disciplinesforcompleting theDegreeprogramme.

1.11 **Credit** refers to the quantum of course work in terms of number of class hours in a semesterrequired for a programme. The credit value reflects the content and duration of a particularcoursein thecurriculum.

1.12 **CreditHour**referstothenumberofclasshoursperweekrequiredforacourseinasemester.Itisusedtocalculatethecreditvalueofa particularcourse.

1.13 **Programme Outcomes** (POs) are statements that describe crucial and essential knowledge,skillsandattitudesthatstudentsareexpectedtoachieveandcanreliablymanifestattheendofaprogramme.

1.14 **ProgrammeSpecificOutcomes**(PSOs)arestatementsthatlistwhatthegraduateofaspecificprogrammeshould beableto doat theendoftheprogramme.

1.15 **CourseObjectives**are statementsthatdefinetheexpectedgoalofacourseincourseobjectives intermsofdemonstrableskills orknowledgethatwill beacquiredbyastudent.

1.16 **CourseOutcomes** (COs)arestatementsthatdescribewhatstudentsshouldbeabletoachieve/demonstrate at the end of a course. They allow follow-up and measurement of learningobjectives.

1.17 **Grade Point Average** (GPA) is the average of the grades acquired in various courses that astudenthastakeninasemester.TheformulaforcomputingGPAisgiveninsection11.3

1.18 **Cumulative Grade Point Average** (CGPA) is a measure of overall cumulative performance ofastudentoverallthesemesters.TheCGPAistheratiooftotalcreditpointssecuredbyastudentin various courses in all semesters and the sum of the total credits of all courses in all thesemesters,isasgivenin section 11.4.

1.19 **Letter Grade** is an index of the performance of a student in a particular course. Grades aredenotedbythelettersS, A, B,C,D, E,RA, andW.

2. ProgrammeOfferedandEligibilityCriteria:

TheDepartmentofSportsSciencesoffersaTwoYearM.Sc.inExercisePhysiologyprogramme.

A pass in Bachelor's Degree in Sports Science / Physical Education and Sports / Physiology /Humanphysiology/OccupationTherapy/Physiotherapy/Biotechnology/Zoology/Microbiology / Biochemistry / Life Sciences / MBBS or an equivalent thereto as accepted by theSyndicate of Annamalai University in 10+2+3 or 10+2+4 pattern from a recognized universitywithaminimumof50%marksinaggregate.ProficiencyinSportsisdesirable.

3. **ReservationPolicy:**Admissiontothevariousprogrammeswillbestrictlybasedonthereservationpolicyofthe GovernmentofTamilNadu.

4. ProgrammeDuration

4.1 TheTwoYearMaster'sProgrammeconsistoftwoacademic years.

4.2 Eachacademicyearisdividedintotwosemesters,thefirstbeingfromJulytoNovemberandthesecondfromDecembertoApril.

4.3 Each semesterwillhave90workingdays(18weeks).

5. ProgrammeStructure

5.1 TheTwoYear Master's Programmeconsists ofCoreCourses,ElectiveCourses (DisciplineCentricandGeneric),and Project.

5.2 CoreCourses

5.2.1 Theseareasetofcompulsorycoursesessentialfor eachprogramme.

5.2.2 ThecorecoursesincludebothTheory (CoreTheory)andPractical(CorePractical)courses.

5.3 Project

5.3.1 EachstudentshallundertakeaProjectandsubmitadissertationasperguidelinesinthefinalsemester.

5.3.2 TheHeadoftheDepartmentshallassignaResearchSupervisortothestudent.

5.3.3 TheResearchSupervisorshallassignatopicforresearchandmonitortheprogressofthestudentperiodically.

5.3.4 Studentswhowishtoundertakeprojectworkinrecognizedinstitutions/industryshallobtainpriorpermissionfromtheDepartment.TheResearchSupervisorwill befromthehostinstitute.

5.4 Elective courses

5.4.1 Elective Course: Discipline Centric/ Generic is a course that a student can choose from a rangeofalternatives.

5.5 Internship/IndustrialActivity(ExperientialLearning)

5.5.1 Experientiallearningintheformofinternship/industrialactivityprovides opportunitiestostudentstoconnectprinciplesofthedisciplinewithreal-lifesituations.

5.5.2 In-planttraining/fieldtrips/industrialvisitsfallunderthiscategory.

5.5.3 Experientiallearning iscategorizedasnon-core course.

5.6 **Industry/Entrepreneurship** This course is to introduce students to the activity of settingupabusinessorbusinesses,takingonfinancialrisksinthehopeofprofit.

5.7 **Skill Enhancement Course: SEC** is a course designed to provide value based or skill-basedknowledge. The main purpose of this course is to provide value based or skill in the hands- onmodeto increase theiremployability.

5.8 **Extension Activity:** The basic objective of extension activity is to create social awareness andknowledge of social realities to have concern for the welfare of the community and engage increativeandconstructivesocialsocietaldevelopment.

5.8.1 It is mandatoryforevery studenttoparticipateinextensionactivity.

5.8.2 AllthestudentsshouldenrollunderNSS/NCC/CYRC/RRCoranyotherserviceorganizationintheuniversity.

5.8.3 Studentshouldputaminimumattendanceof40hoursinayeardulycertifiedbytheProgrammeCo-Ordinator.

5.8.4 Extensionactivity shallbeconductedoutsidetheclasshours.

5.8.5 Extensionactivity is categorizedasnon-corecourse.

5.9 ValueAddedCourse(VAC)

5.9.1 StudentmayopttotakeValueAddedCoursebeyondtheminimumcreditsrequiredfortheawardofthe degree.VACsare outsidethe normalcreditparadigm.

5.10 OnlineCourses

5.10.1 The HeadsofDepartmentsshallfacilitateenrolmentofstudentsinMassive Open.

5.10.2 Students who successfully complete a course in the MOOCs platform shall be exempted fromoneelective course ofthe programme.

5.11 CreditDistribution:

Thecreditdistributionisorganizedasfollows:

Components	Course	Credits
PartA	Core(Theory)	45
	Core(Practical)	15
	ProjectwithViva-Voce	7
PartB (i)	Elective(Generic/DisciplineCentric)	18
PartB(ii)	Internship/IndustrialVisit	2
PartB(iii)	SkillEnhancementCourse/Professional CompetencySkill	6
PartC	ExtensionActivity	1
	TOTALCREDITS	94

PartA,PartBandPartCcomponentswillbetakenintoaccountforCGPAcalculationfortheeligibilitytoobtaindegreeinM.Sc.ExerciсePhysiology

5.12 CreditAssignment

Each course is assigned credits and credit hours on the following basis:1Creditisdefined as

1Lectureperiodofonehourduration perweekoverasemester1Tutorialperiodofonehourduration perweekoverasemester

1Practical/Projectperiodoftwohoursdurationper week overasemester.

6 Attendance

6.1 Each faculty handling a course shall be responsible for the maintenance of Attendance andAssessmentRecordforcandidateswhohaveregistered forthecourse.

6.2 The Record shall contain details of the students' attendance, marks obtained in the ContinuousInternal Assessment (CIA) Tests, Assignments and Seminars. In addition the Record shall alsocontaintheorganizationoflesson plan oftheCourseteacher.

6.3 The record shall be submitted to the Head of the Department and Dean once a month formonitoringtheattendanceandsyllabuscoverage.

6.4 Attheendofthesemester,therecordshallbeplacedinsafecustodyforanyfutureverification.

6.5 The Course teacher shall intimate to the Head of the Department at least seven calendar daysbeforethelastinstructiondayinthesemesteraboutheattendanceparticulars ofallstudents.

6.6 Each student shall have a minimum of 75% attendance in all the courses of the particularsemester failing which he or she will not be permitted to write the End-Semester Examination.Thestudent hastoredothesemesterinthenext year.

6.7 Relaxation of attendance requirement up to 10% may be granted for valid reasons such asillness,representingtheUniversityinextracurricularactivitiesandparticipationinNCC/NSS/YRC/ RRC.

7 Mentor-MenteeSystem

7.1 To help the students in planning their course of study and for general advice on the academicprogramme, the Head of the Department will attach certain number of students to a member ofthefacultywhoshallfunctionasaMentorthroughout theirperiod ofstudy.

7.2 The Mentors will guide their mentees with the curriculum, monitor their progress, and provideintellectualand emotionalsupport.

7.3 The Mentors shall also help their mentees to choose appropriate electives and value-addedcourses, apply for scholarships, undertake projects, prepare for competitive examinations suchasNET/SET, GATEetc.,attendcampusinterviewsandparticipateinextracurricularactivities.

8 Examinations

8.1 The examination system ofthe Universityis designed to systematically test thestudent'sprogressinclass,laboratoryandfieldworkthroughContinuousInternalAssessment(CIA)TestsandEnd-SemesterExamination(ESE).

8.2 TherewillbetwoCIATestsandoneESEineachsemester.

8.3 The Question Papers will be framed to test different levels of learning basedon Bloom'staxonomyviz.Knowledge,Comprehension,Application,Analysis,SynthesisandEvaluation /Creativity.

8.4 ContinuousInternalAssessmentTests

8.4.1 The CIA Tests shall be a combination of a variety of tools such as class tests, assignments andseminars.Thisrequiresan elementofopenness.

8.4.2 Thestudentsaretobeinformedinadvanceabouttheassessmentprocedures.

8.4.3 Thepatternofquestionpaperwillbedecidedbytherespectivefaculty.

8.4.4 CIATest-Iwillcoverthesyllabusof thefirsttwounitswhileCIA Test-IIwillcoverthelastthreeunits.

8.4.5 CIATestswill beforoneor two hoursdurationdependingonthequantum ofsyllabus.

8.4.6 A student cannot repeat the CIA Test-I and CIA Test-II. However, if for any valid reason, thestudent is unable to attend the test, the prerogative of arranging a special test lies with theteacherinconsultation withtheHeadoftheDepartment.

8.4.7 For theCIATests,theassessmentwill bedonebytheCourseteacher

8.5 EndSemesterExaminations(ESE)

8.5.1 TheESEfor thefirstandthirdsemester will beconductedinNovember andforthesecondandfourthsemesterin May.

8.6 Candidateswhofailedinanycoursewillbepermittedtoreappearinfailedcourseinthesubsequentexaminations.

8.7 TheESEwillbeofthreehoursdurationandwillcovertheentiresyllabusofthecourse.

9 Evaluation

9.1 MarksDistribution

9.1.1 For each course, the Theory, Practical and project shall be evaluated for a maximum of 100marks. The Project / Dissertation shall be evaluated in the final semester for a maximum of 100marks, by carrying forward the credits registered in the first three semesters to the fourthsemester.

9.1.2 Forthetheorycourses,CIATestswill carry25%andtheESE75%ofthemarks.

9.1.3 ForthePractical courses,theCIATestswillcarry40%andtheESE60%ofthemarks.

9.2 AssessmentofCIATests

9.2.1 For theCIATests,theassessmentwill bedonebytheCourseInstructor

9.2.2 For theTheoryCourses,thebreak-upofmarksshall beasfollows:

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

9.2.3 ForthePracticalCourses(whereverapplicable),thebreak-upofmarksshallbeasfollows:

	Marks
Test-I	10
Test-II	10
Viva-voceand Record	5
Total	25

9.3 AssessmentofEnd-SemesterExaminations

9.3.1 Evaluationfor theESEisdonebyInternal examiners.

9.4 AssessmentofProject/Dissertation

9.4.1 TheProjectReport/Dissertationshallbesubmittedaspertheguidelines.

9.4.2 TheProjectWork/Dissertationshallcarryamaximumof100marks.

9.4.3 CIA for Project will consist of a Review of literature survey, experimentation/field work,attendanceetc.

9.4.4 The Project Report evaluation and viva-voce will be conducted by a committee constituted bytheHead oftheDepartment.

9.4.5 The Project Evaluation Committee will comprise the Head of the Department, ProjectSupervisor,and aseniorfaculty.

9.4.6 Themarksshallbedistributedasfollows:

ContinuousInternalAssessment (25Marks)		EndSemesterExamination (75Marks)	
Review-I -10	Review-II-15	Project/ Dissertation Evaluation	Viva-voce
		50	25

9.5 AssessmentofValue-addedCourses

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

9.5.2 ThegradesobtainedinVACswill notbeincludedfor calculatingtheGPA/CGPA.

9.6 PassingMinimum

9.6.1 A student is declared to have passed in each course if he/she secures not less than 50% marksintheESEandnotlessthan50%marksinaggregatetakingCIAandESEmarkstogether.

9.6.2 A candidate who has not secured a minimum of 50% of marks in a course (CIA + ESE) shallreappearforthecoursein thenext semester/year.

10. ConfermentoftheMaster'sDegree

Acandidatewho has secured aminimum of50% marks in all courses prescribedin theprogramme and earned the minimum required credits shall be considered to have passed theMaster'sProgramme.

11. MarksandGrading

11.1 Theperformanceofstudents ineachcourseis evaluatedintermsGradePoint(GP).

11.2 The sum total performance in each semester is rated by Grade Point Average (GPA) whileCumulativeGradePointAverage(CGPA)indicatesthe AverageGradePointobtainedforallthecoursescompleted.

11.3 **The GPA**iscalculatedbytheformula

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

where,$C_i$isthe Credit earnedforthe Course$i$inanysemester;

$G_i$isthe Grade Point obtainedbythestudent fortheCourse$i$and

$n$isthenumber ofCoursespassedinthatsemester.

11.4 **CGPA** is the WeightedAverageGradePoint of all theCourses passedstarting from the firstsemestertothe currentsemester.

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

Where,$C_i$istheCreditearnedfortheCourse$i$inanysemester;

$G_i$isthe Grade Point obtainedbythestudent fortheCourse$i$and

$n$isthenumber ofCoursespassedinthatsemester.

$m$isthenumberofsemesters.

11.5 Evaluation:

11.5.1 Performance ofthe student foreachcoursewillbe ratedasshowninthe Table.

RangeofMarks	Grade Points	LetterGrade
90andabove	10	S
80-89	9	A
70-79	8	B
60-69	7	C
55-59	6	D
50-54	5	E
Lessthan50	0	RA
Withdrawnfromthe examination	0	W

11.5.2 Atenpointratingscaleisusedforevaluationoftheperformanceofthestudenttoprovideoverallgradefort heMaster'sProgramme.

11.6 **ClassificationofResults**. Thesuccessfulcandidatesareclassifiedasfollows:

11.6.1 **For First Class with Distinction:** Candidates who have passed all the courses prescribed inthe Programme in the first attempt with a CGPA of 8.25 and above within the programmeduration.CandidateswhohavewithdrawnfromtheEndSemesterExaminationsarestilleli gibleforFirstClasswithDistinction(SeeSection 12fordetails).

CGPA	CLASSIFICATIONOFFINALRESULT
8.25andabove	FirstClasswithDistinction
6.5andabovebutbelow8.25	FirstClass
5.0andabovebutbelow6.5	SecondClass
0.0and abovebut below5.0	Re-appear

11.6.2 **ForFirstClass:**CandidateswhohavepassedallthecourseswithaCGPAof6.5andabove.

11.6.3 **ForSecondClass:**CandidateswhohavepassedallthecourseswithaCGPAbetween5.0andlesstha n6.5.

11.6.4 Candidates who obtain overall highest CGPA in all examinations in the First Appearance ItselfareeligibleforUniversityRank.

11.6.5 **Formula forConversionofCGPAintoPercentage**
CGPAx9.5=Percentage

11.7 Course-WiseLetterGrades

11.7.1 Thepercentageofmarksobtainedbyacandidateinacoursewillbeindicatedinalettergrade.

11.7.2 Astudentisconsideredtohavecompletedacoursesuccessfullyandearnedthecreditsifhe/shesecure san overalllettergradeotherthan RA.

11.7.3 AcoursesuccessfullycompletedcannotberepeatedforthepurposeofimprovingtheGradePoint.

11.7.4 AlettergradeRAindicatesthatthecandidateshallreappearforthatcourse.TheRAGradeonceawarde dstaysinthegradecardof thestudentandis not deletedevenwhenhe/shecompletes

the course successfully later. The grade acquired later by the student will be indicated in thegradesheetoftheOdd/Evensemesterinwhichthecandidatehasappearedforclearanceofthearrears.

11.7.5 IfastudentsecuresRAgradeintheProjectWork/FieldWork/PracticalWork/Dissertation,he/sheshallimproveitandresubmitifitinvolvesonlyrewriting/incorporatingtheclarificationssuggestedbytheevaluatorsorhe/shecanre-registerandcarryoutthesameinthesubsequentsemestersforevaluation.

12. ProvisionforWithdrawalfromtheEndSemesterExamination

12.1 Theletter gradeWindicatesthatacandidatehaswithdrawnfromtheexamination.

12.2 A candidate is permitted to withdraw from appearing in the ESE for one course or courses inANYONEofthesemestersONLYforexigenciesdeemedvalidbytheUniversityauthorities.

12.3 Permission for withdrawal from the examination shall be granted only once during the entiredurationofthe programme.

12.4 Applicationforwithdrawalshallbeconsideredonlyifthestudenthasregisteredforthecourse(s),andfulfilled therequirementsforattendance andCIAtests.

12.5 The application for withdrawal shall be made ten days prior to the commencement of theexaminationanddulyapprovedbytheControllerofExaminations.Notwithstandingthemandatory prerequisite of ten days notice, due consideration will be given under extraordinarycircumstances.

12.6 Withdrawal will not be granted for arrear examinations of courses in previous semestersandforthe finalsemesterexaminations.

12.7 Candidateswhohavebeengrantedpermissiontowithdrawfromtheexaminationshallreappearforthe course(s)whenthecourse(s)are offerednext.

12.8 Withdrawalshallnotbetakenintoaccountasanappearance fortheexaminationwhenconsideringtheeligibilityofthecandidatetoqualifyforFirstClasswithDistinction.

13. **Academic Misconduct:** Any action that results in an unfair academic advantage/interferencewiththefunctioningoftheacademiccommunityconstitutesacademicmisconduct.Thisincludesbut is not limited to cheating, plagiarism, altering academic documents, fabrication/falsificationofdata,submittingtheworkofanotherstudent,interferingwithotherstudents'work,removing/defacing library or computer resources, stealing other students' notes/assignments,and electronically interfering with other students'/University's intellectual property. Since manyof these acts may be committed unintentionally due to lack of awareness, students shall besensitizedonissuesofacademicintegrityandethics.

14. **TransitoryRegulations:**Whereverthereh asbeenachangeofsyllabi,examinationsbasedontheexistingsyllabuswillbeconductedfortwoconsecutiveyearsafterimplementationofthenewsyllabus in order to enable the students to clear the arrears. Beyond that, the students will havetotakeuptheirexaminationsinequivalentsubjects,asperthenewsyllabus,ontherecommendationofthe Head oftheDepartmentconcerned.

15. NotwithstandinganythingcontainedintheabovepagesasRulesandRegulationsgoverningtheTwo Year Master's Programmes at Annamalai University, the Syndicate is vested with thepowerstorevisethemfromtimetotime ontherecommendationsoftheAcademicCouncil.

TemplateforPGProgrammeinExercisePhysiology

M.Sc. Exercise Physiology (Two Years)CurriculumDesign

Semester-I	C	H	Semester-II	C	H	Semester-III	C	H	Semester-IV	C	H
1.1.Core-I **FundamentalsofExercise Physiology**	5	5	2.1.Core-IV **Cardio-respiratoryPhysiology**	5	5	3.1.Core-VII **ExerciseandFitness-HealthandSkill-RelatedComponents**	5	5	4.1.Core-XI **AppliedExercisePhysiology**	5	5
1.2.Core-II **Kinesiologyand Biomechanics**	5	5	2.2.Core-V **Exercise and EnvironmentalPhysiology**	5	5	3.2.Core-VIII **ExerciseandSportsNutrition**	5	5	4.2.Core-XII **MethodsofExercisePrescription**	5	5
1.3.Core-III-Practicall **FieldTestingofPhysical and PhysiologicalFitness**	5	10	2.3.Core-VI-Practical II **LaboratoryTechniquesinFitness Testing**	5	10	3.3.Core-IX **NeuroMusculoskeletalsystemin Exerciseandtraining**	5	5	4.3.**CoreProjectwithViva-Voce**	7	14
1.4. Elective (Generic / DisciplineCentric)–I(GroupA) **a. GeneticsinSports Performance** **b. ScienceofExercise**	3	4	2.4. Elective(Generic/DisciplineCentric)–III(GroupC) **a. Women Health andExercise** **b. Physiological Testing andSportsPerformanceEvaluation**	3	3	3.4.Core-XPractical III **AdvanceLaboratoryTechniquesin ExercisePhysiology**	5	10	4.4. Elective(Generic/DisciplineCentric)–VI(GroupF) **a. Sports Psychology andPhysiologicalAspects** **b. ErgogenicAidsand DopinginSports**	3	3
1.5 Elective(Generic/DisciplineCentric)–II(GroupB) **a. ResearchMethodologyandStatistics** **b. Evidence BasedPractice in Allied HealthSciences**	3	4	2.5. Elective(Generic/DisciplineCentric)–IV(GroupD) **a. SportsBiochemistry** **b. ExerciseandObesity**	3	3	3.5.Internship	2		4.5. Skill Enhancement CourseSEC III(GroupI) **a. Biomechanics andExercisePhysiologyofRunning** **b. Fatigue Injuries and Rehabilitation**	2	3
			2.6. Skill Enhancement CourseSEC I(GroupG) **a. Kinanthropometryand ExercisePhysiology** **b. BiosensorsforSports**	2	3	3.6. Elective (Generic/DisciplineCentric)–V(GroupE) **a. ExerciseConsiderations forSpecial Populations** **b. Motor Learning andControl inSports**	3	3	4.6.ExtensionActivity	1	-
						3.7. SkillEnhancementCourseSEC II(GroupH) **a. Clinical ExercisePhysiology** **b. Nutrition Counselling andEducation**	2	3			
						3.8.Non-CreditCourse **ConstitutionofIndia**	-	-			
	21	**28**		**23**	**29**		**27**	**31**		**23**	**30**
									TotalCredits	**94**	**118**

CreditDistributionforPGProgrammeinExercisePhysiologyM.Sc.ExercisePhysiology(TwoYears)

First YearSemester–I

Courses	Credit	Hours/Week
1.1. Core-I **FundamentalsofExercisePhysiology**	5	5
1.2. Core-II **KinesiologyandBiomechanics**	5	5
1.3. Core-III-PracticalI **FieldTestingofPhysicalandPhysiologicalFitness**	5	10
1.4. Elective(Generic/DisciplineCentric)-I(GroupA) **a. GeneticsinSportsPerformance** **b. ScienceofExercise**	3	4
1.5 Elective(Generic/DisciplineCentric)-II(GroupB) **a. ResearchMethodologyandStatistics** **b. EvidenceBasedPracticeinAlliedHealthSciences**	3	4
Total	**21**	**28**

Semester–II

Courses	Credit	Hours/Week
2.1.Core-IV **Cardio-respiratoryPhysiology**	5	5
2.2.Core-V **ExerciseandEnvironmentalPhysiology**	5	5
2.3. Core-VI-Practical II **LaboratoryTechniquesinFitnessTesting**	5	10
2.4. Elective(Generic/DisciplineCentric)-III(GroupC) **a. WomenHealthandExercise** **b. Physiological Testing and Sports PerformanceEvaluation**	3	3
2.5. Elective(Generic/DisciplineCentric)-IV(GroupD) **a. SportsBiochemistry** **b. ExerciseandObesity**	3	3
2.6. SkillEnhancementCourseSECI(Group G) **a. KinanthropometryandExercisePhysiology** **b. BiosensorsforSports**	2	3
Total	**23**	**29**

Second

YearSemeste

r–III

Courses	Credit	Hours/Week
3.1.Core-VII **ExerciseandFitness-HealthandSkill-Related Components**	5	5
3.2.Core-VIII **ExerciseandSportsNutrition**	5	5
3.3.Core-IX **NeuroMusculoskeletalSysteminExerciseandTraining**	5	5
3.4. Core-XPracticalIII **AdvanceLaboratoryTechniquesinExercisePhysiology**	5	10
3.5.Internship	2	
3.6. Elective(Generic/DisciplineCentric)-V(GroupE) **a. ExerciseConsiderationsforSpecialPopulations** **b. MotorLearningandControlinSports**	3	3
3.7. SkillEnhancementCourse SECII(GroupH) **a. ClinicalExercisePhysiology** **b. NutritionCounsellingandEducation**	2	3
3.8. **ConstitutionofIndia***	-	-
Total	**27**	**31**

*NonCreditCourse

Semester–IV

Courses	Credit	Hours/Week
4.1.Core-XI **AppliedExercisePhysiology**	5	5
4.2.Core-XII **MethodsofExercisePrescription**	5	5
4.3.**CoreProjectwithViva-Voce**	7	14
4.4. Elective(Generic/DisciplineCentric)-VI(GroupF) **a. SportsPsychologyandPhysiologicalAspects** **b. ErgogenicAidsandDopinginSports**	3	3
4.5. SkillEnhancementCourseSECIII(GroupI) **a. BiomechanicsandExercisePhysiologyofRunning** **b. FatigueInjuriesandRehabilitation**	2	3
4.6.Extension Activity	1	-
Total	**23**	**30**

M.Sc.ExercisePhysiology(TwoYear)Programme

ProgrammeCode:SSPO22

CurriculaandSchemeofExamination

(Forstudentsadmitted fromtheacademicyear2023-2024)

Course Code	CourseTitle	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
SemesterI								
23MEPC101	FundamentalsofExercisePhysiology	4	1		5	25	75	100
23MEPC102	KinesiologyandBiomechanics	4	1		5	25	75	100
23MEPP103	Field Testing of Physical andPhysiologicalFitness			10	5	25	75	100
	Elective–1 (Generic/DisciplineCentric)(ChooseAny**One**from**GroupA**)							
23MEPE104	Genetics inSportsPerformance	2		2	3	25	75	100
23MEPE105	Science ofExercise							
	Elective–2(Generic /DisciplineCentric) (ChooseAny **One**from**GroupB**)							
23MEPE106	ResearchMethodologyandStatistics	2		2	3	25	75	100
23MEPE107	Evidence Based Practice inAlliedHealthSciences							
TotalCreditsand Marksin Semester-I		**28**			**21**	**125**	**375**	**500**

CourseCode	CourseTitle	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
SemesterII								
23MEPC201	Cardio-respiratoryPhysiology	4	1		5	25	75	100
23MEPC202	ExerciseandEnvironmental Physiology	4	1		5	25	75	100
23MEPP203	Laboratory Techniques in FitnessTesting			10	5	25	75	100
	Elective–3(Generic /DisciplineCentric) (ChooseAny **One**from**GroupC**)							
23MEPE204	WomenHealthandExercise	3			3	25	75	100
23MEPE205	PhysiologicalTestingandSportsPerformance Evaluation							
	Elective–4(Generic /DisciplineCentric) (ChooseAny **One**from**GroupD**)							
23MEPE206	SportsBiochemistry	3			3	25	75	100
23MEPE207	Exerciseand Obesity							
	SkillEnhancementCourse(SEC)–1(ChooseAny**One**from **GroupG**)							
23MEPS208	Kinanthropometry and exercisePhysiology	1		2	2	25	75	100
23MEPS209	BiosensorsforSports							
TotalCreditsandMarksinSemester-II		**29**			**23**	**150**	**450**	**600**

CourseCode	CourseTitle	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
SemesterIII								
23MEPC301	Exercise and Fitness-HealthandSkill-RelatedComponents	4	1		5	25	75	100
23MEPC302	ExerciseandSportsNutrition	4	1		5	25	75	100
23MEPC303	Neuro MusculoskeletalSysteminExerciseandTraining	4	1		5	25	75	100
23MEPP304	Advance Laboratory Techniques inExercisePhysiology			10	5	25	75	100
23MEPI305	Internship/Institutionaltraining*				2	25	75	100
	Elective–5(Generic /DisciplineCentric) (ChooseAny **One**from**GroupE**)							
23MEPE306	ExerciseConsiderationsforSpecial Populations	3			3	25	75	100
23MEPE307	MotorLearningand ControlinSports							
	SkillEnhancementCourse (SEC)–2(ChooseAny**One**from **GroupH**)							
23MEPS308	ClinicalExercisePhysiology	2			2	25	75	100
23MEPS309	NutritionCounsellingandEducation							
19PCI406	ConstitutionofIndia#					25	75	100
TotalCreditsandMarksinSemester-III		**30**			**27**	**175**	**525**	**700**

Course Code	CourseTitle	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
SemesterIV								
23MEPC401	AppliedExercisePhysiology	4	1		5	25	75	100
23MEPC402	MethodsofExercise Prescription	4	1		5	25	75	100
23MEPD403	Dissertation withVivaVoce			14	7	25	75	100
	Elective–6(Generic /DisciplineCentric) (ChooseAny **One**from**GroupF**)							
23MEPE404	SportsPsychologyandPhysiological Aspects	3			3	25	75	100
23MEPE405	ErgogenicAidsandDopinginSports							
	SkillEnhancementCourse (SEC)–3(ChooseAny**One**from **GroupI**)							
23MEPS406	BiomechanicsandExercisePhysiologyof Running	1		2	2	25	75	100
23MEPS407	FatigueInjuriesandRehabilitation							
23MEPX408	Extensionactivity				1	25	75	100
TotalCreditsandMarksinSemester-IV		**30**			**23**	**150**	**450**	**600**
	Total(Hours, CreditsandMarks)	**117**			**94**	**600**	**1800**	**2400**

#NonCreditCourse; *InternshipduringSecondSemesterSummerVacation

L-Lectures;T- Tutorial,P-Practical;C-Credits;

CompoundWiseCreditDistribution

Credits		SemI	SemII	SemIII	SemIV	Total
PartA		**15**	**15**	**20**	**17**	**67**
PartB						
i)	Generic/DisciplineCentric	**6**	**6**	**3**	**3**	**18**
ii)	Internship/IndustrialVisit			**2**		**2**
iii)	SkillEnhancementCourse/ Professional Competency Skill		**2**	**2**	**2**	**6**
PartC	ExtensionActivity				**1**	**1**
STotal		**21**	**23**	**27**	**23**	**94**

PartA,PartBandPart
CcomponentswillbetakenintoaccountforCGPAcalculationfortheeligibilitytoobtaindegreeinM.Sc.ExercisePhysiology

ELECTIVECOURSES

Coursesaregrouped (GroupA toGroup F)soas to include topicsfrom ExercisePhysiology (EP), Applied Exercise Physiology (AEP) and Sports Science Components(SSC) like Sports Authority of India, State Development Authority of Tamilnadu, PrivateSportsSciencelabs,etc.,coursesforflexibilityofchoicebythestakeholders'institutions .Theyhavetochooseacoursefromeachgroup.

SemesterI:ElectiveIandElectiveII

ElectiveItobechosenfrom**GroupA**and**ElectiveII**tobechosenfrom**Group BGroup**

A:(EP/AEP/SSC)

1. GeneticsinSportsPerformance
2. ScienceofExercise

GroupB:(EP/AEP/SSC)

1. ResearchMethodologyandStatistics
2. EvidenceBasedPracticeinAlliedHealthSciences

SemesterII:ElectiveIII&ElectiveIV

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

DGroup C:**(EP/ AEP/ SSC)**

1. Women Health and Exercise
2. PhysiologicalTestingandSportsPerformanceEvaluation

GroupD:(EP/AEP/SSC)

1. SportsBiochemistry
2. Exercise and Obesity

SemesterIII:ElectiveV

ElectiveVtobechosenfromGroupE

GroupE:(EP/AEP/SSC)

1. ExerciseConsiderationsforSpecialPopulations
2. MotorLearningandControlin Sports

SemesterIV:ElectiveVI

ElectiveVItobechosenfromGroupF

GroupF:(EP/AEP/SSC)

1. SportsPsychologyand PhysiologicalAspects
2. Ergogenic Aids andDopinginSports

SkillEnhancementCourses

SkillEnhancementCoursesarechosentokeepinpacewiththelatestdevelopmentsintheacademic/industrialfrontandprovidesflexibilityofchoicebythestakeholders /institutions.They havetochooseacoursefromeachgroup.
GroupGtoI(SkillEnhancementCourses)SEC:(Practicalbasedpaper)

SemesterII
SECItobechosenfromGroupG

1. Kinanthropometryand Exercise Physiology
2. Biosensors forSports

SemesterIII
SECIItobechosenfromGroupH

1. Clinical ExercisePhysiology
2. Nutrition CounsellingandEducation

SemesterIV
SECIIItobechosenfromGroupI

1. BiomechanicsandExercisePhysiologyofRunning
2. FatigueInjuriesandRehabilitation

WrittenExamination:TheoryPaper(Bloom'sTaxonomybased)

QuestionpaperModel

IntendedLearningSkill	Maximum-75Marks
	PassingMinimum-50%
	Duration-ThreeHours
	Part- A(10×2 =20) Answer*ALL*Questions EachQuestionscarries2marks
Memory Recall / Example / Counter ExampleKnowledgeabouttheConcepts/ Understanding	TwoQuestionsfromeachUNIT
	Question1toQuestion10
	Part-B(5×5=25) Answer *ALL* QuestionsEachQuestionscarrie s5marks
Descriptions/Applicati on(Problem)	Either orType Bothpartsofeachquestionfromthe sameUNIT
	Question 11(a) or 11(b)To Question15(a)or15(b)
	Part-C(3×10=30) Answerany*THREE*QuestionsEac hQuestionscarries10marks
Analysis/Synthesis/Evaluation	ThereshallbeFIVEquestions coveringall thefiveunitsandeachwithaquestion
	Question16toQuestion20

MethodsofAssessment

Recall(K1)	SimpleDefinitions,MCQ,RecallSteps,ConceptDefinitions.
Understand/ Comprehend (K2)	MCQ, True/False, Short Answer, Concept Explanations, Short SummaryorOverview.
Application(K3)	Suggestidea/ Concept withexamples,suggestformulae,Solve problems,Observe,Explain.
Analyse(K4)	ProblemSolvingquestions,finishaprocedureinmanysteps, Differentiatebetweenvariousideas,map knowledge.
Evaluate(K5)	Longeressay /Evaluationessay,Critiqueorjustify withprosandcons.
Create(K6)	Checkknowledgein specificoroffbeatsituations,Discussion,Debating orPresentation.

InordertoavoidpullthescoredownofeachPO,itissuggestedthattheusageL-Low(1)orLowertominimum,M-Medium(2)andStrong-S (3)tomaximum. TheS,M,LisbasedonthecourseoutcomeThemappingisbasedontherevisedBloom'sTaxonomyVerbusedtodescribethecourseoutcomes.

- RememberandUnderstand-LowerLevel
- ApplyandAnalyse-MediumLevel
- EvaluateandCreate-StrongLevel.

Eachquestionshouldcarrythecourseoutcomeandcognitivelevelforinstance.

1. [CO1:K2]Questionxxxx
2. [CO2:K1]Questionxxxx

Introduction:PO&PSO

ProgrammeOutcome,ProgrammeSpecificOutcomeandCourseOutcome

Students completing this programme will be able to present their core post-graduatediscipline clearly and precisely, make abstract ideas precise by formulating them in thelanguageofthespecificdiscipline,describerelatedideasfrommultipleperspectivesandexplainfundamentalconcepts.Completionofthisprogrammewillalsoenablethelearnerstojointeachingprofession,enhancetheir employabilityforgovernmentjobs,jobsinvariousother publicandprivateenterprises.

TANSCHE REGULATIONS ON LEARNING OUTCOMES-BASED CURRICULUMFRAMEWORKFORPOSTGRADUATEEDUCATION	
Programme	**M.Sc.EXERCISEPHYSIOLOGY**
ProgrammeCode	**SSPO22**
Duration	**Twoyears**
Programme Outcomes(Pos)	**PO1:ProblemSolvingSkill** Apply knowledge of Management theories and Human Resourcepractices to solve business problems through research in Globalcontext.
	PO2:DecisionMakingSkill Fosteranalyticalandcriticalthinkingabilitiesfordata-baseddecision-making.
	PO3:EthicalValue Abilitytoincorporatequality,ethicalandperspecti legal value-based vestoallorganizationalactivities.
	PO4:CommunicationSkill Abilitytodevelopcommunication,managerialandinterpersonalskills.
	PO5:IndividualandTeamLeadershipSkill Capability to lead themselves and team to achieve theorganizationalgoals.
	PO6:EmployabilitySkill Inculcate contemporary business practices to enhanceemployabilityskillsinthecompetitiveenvironment.
	PO7:EntrepreneurialSkill Equip withskillsandcompetenciestobecomeanentrepreneur.
	PO8: ContributiontoSociety Succeedincareerendeavorsandcontributesignificantlytosociety.
	PO9Multiculturalcompetence Possessknowledgeofthevaluesandbeliefsofmultipleculturesanda globalperspective.
	PO10:Moralandethicalawareness/reasoning Abilitytoembrace moral/ethicalvaluesinconductingone'slife.

ProgrammeSpecific Outcomes(PSOs)	**PSO1–Placement** To prepare the students who will demonstrate respectful engagementwith others' ideas, behaviors, beliefs and apply diverse frames ofreferenceto decisionsand actions.
	PSO2-Entrepreneur To create effective entrepreneurs by enhancing their critical thinking,problemsolving,decisionmakingandleadershipskillthatwillfacilitatestartupsand highpotentialorganizations.
	PSO3–ResearchandDevelopment DesignandimplementHRsystemsandpracticesgroundedinresearch that comply with employment laws, leading the organizationtowardsgrowth and development.
	PSO4– ContributiontoBusinessWorld Toproduceemployable,ethicalandinnovativeprofessionalstosustainin thedynamicbusinessworld.
	PSO5–Contributiontothe Society Tocontributetothedevelopmentofthesocietybycollaboratingwithstakeholdersformutualbenefit.

Semester	23MEPC101: FUNDAMENTALS OFEXERCISEPHYSIOLOGY	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
I		4	1		5	25	75	100

LearningObjective(LO):

LO1	Theprimaryobjectiveofthiscourseistostudythesystemsthatallowphysicalactivityandtheacuteandchronicresponsestothatphysical activity.
LO2	To build skills in quantifying physiological parameters; and acquire familiarityinapplied exercise physiology.
LO3	Tolinktheoryandpracticeofcourseconceptsandapplicationinexerciseandsports performance.

Unit-I:

Cardiovascular AspectsofExercisePhysiology

1. Overview of the heart, blood vessels, and blood composition, Heart size in the athlete &normal difference in strength/power trained Vs endurance trained heart, Acute HR. BP,SV,a-v-o2difference.cardiacoutput,bloodflowresponsestoexerciseatvariousintensities,fromrest tomaximal.

2. Chronicadaptationstoenduranceexercisetraining,variousmodesoftrainingwithrespecttoHeartrate,Bloodpressure,Strokevolume,Cardiacoutput,a-v-o2difference,Vascularizationandexercisetraining,BloodPressure,responsestoexercise.Determinationoflacticacidandpyruvicacidinbloodbeforeandafterexercise,determinationofhemoglobinlevelbeforeandafterexercise,Anaerobicpowertest(Margaria method), Measurement of flexibility, agility, power and maximal work capacity.DeterminationofVo2maxby:Directmethod,Queen'scollegesteptest,12min-runtests,Non-ExerciseTest. Astrandrhyming nomogrammethod.
3. Hemodynamics: Circulation and its control, Determinants of blood flow, Cardiovascularregulation and control mechanisms, Factors determining cardiac performance: preload,afterload,contractility,HR,EDV,ESV,Regulationofbloodvolumeinsuddenlossofblood Hemostasis andcoagulationofblood,Anticlottingmechanismandanticoagulants.

Unit-II

RespiratoryAspectofExercisePhysiology

1. **The basics of Ventilation**: Pulmonary anatomy, Mechanics of Ventilation. Static anddynamiclungvolumes.Deadspaceandalveolarventilation,MinuteVentilation,Acuteandchronicresponsesto exercise.
2. **Control and regulation of ventilation**, Neutral- humoral mechanisms, Central inputs tothe inspiratory Centre. Central Command from the motor cortex Humoral & Peripheralinput.
3. Acuteresponsestoexercisefromrest tomaximal,Chroniceffectsofendurancetraining.
4. Howage,gender,andraceaffectpulmonaryventilationduringexercise.
5. Gasexchange,oxygenconsumptionfromresttomaximalexercise.

Unit- III

1. Skeletal muscle structure and contractile properties. Types of skeletal muscle and howtheyareimportantinvarioussportsactivities,Architecturalproperties.Neurons,motorunitrecruitment and integrative control of movements. Neurological control of Movement.NeuromuscularadaptionstoResistanceTraining.SizePrincipleofmotorunitrecruitment.Contractile properties. Types of contractions experimental models of muscle contraction.Length-tensionrelationship,Force-velocityrelationship.
2. Trainingformusclestrength,endurance,andpower.Principlesofskeletalmuscleadaptations. Principles of endurance conditioning. Central and neuromuscular fatigue.Ergogenicaidsthatenhancemusclesizeandfunction.Muscleglycogen:super-compensationduring/beforeathleticcompetition.
3. The tissues of the human skeletal system. Joints, Adaptive abilities and capacity of theskeletalsystemto exercise.

Unit-IV

1. Acute effects of exercise training on hormone levels and hormone activity. Control andregulationmechanismsinvolvedinhormonehomeostasisduringexercise.Chroniceffects ofexercisetrainingonhormonelevels,especiallytheeliteathlete.Measurementofbloodpressure.Sweatrate during exercise.
2. Acute and chronic effects of exercise training on immunity and immune responses. Ageand gender differences in immune responses. Strength training in distance runners:ImpactonRunning Economy.
3. Hormonesresponsiblefortheanabolicandcataboliceffectsof exerciseonmuscle.

Unit-V

AppliedExercisePhysiology

1. Bioenergetics: Human energy metabolism during exercise. Human energy systems andfatigueduring exercise.
2. Training for aerobic and anaerobic power. Training principles, Anaerobic/ Aerobicchangeswithtraining,Factorsaffectingtrainingresponse.Exercisingduringpregnancy.
3. Muscular strength, Strength and Resistance training, Structural and functionaladaptations to resistance training, Body composition and physical performance,Measurements of heart rate at rest and different exercising conditions, Classification ofworkload & continuous recording of heart rate using heart rate monitor, Determination ofmaximalheartrate.Cardiaccost&cardiacefficiency-steptest,Cycleergometer&treadmill, Measurement of body temperature, (oral. axial, skin) at rest and differentworkingcondition,RecordingandinterpretationofECG&EMGatrestandworkingcondition; effects of posture on ECG, Determination of Pulmonary ventilation; static anddynamiclung functiontests.
4. ExerciseperformanceandEnvironmentalStress,ExercisingatmediumandHighAltitude,ThermalStress(thermoregulation)during Exercise.

CurrentStreamsofthought:(Notfor finalexamonlyfordiscussion)
Contemporary methodologies in sport science for Identification of talented performers;Discussing the five most commonly used theories in physical activity (ie. functionalisttheory, criticaltheory,feministtheories,interactionist theories,andconflicttheory); Adiscussiononcriticalreadingandthinkingskills;Sport,socialisationandschoolsport;Gender issues in physical activity; Violence and deviance in sport; Race, ethnicity andreligion in physical activity; Drugs in sport; Internationalism, globalisation and sport asbigbusiness;Sport,thebodyandidentities;Sportandtheenvironment;Sportandsocialdivi

TextBooks:

1) WalterR.Thompson,NeilF.Gordon,LindaS.Pescatello(2010).*ACSM'sGuidelinesforExercisetestingandpreparation.*LippincottWilliams&Wikins., Philadelphia.(8th ed)
2) JackH.Wilmore,DavidL.Costill,W.LarryKenney(2008).*PhysiologyofSportandExercise*.HumanKineticsPublishers.(4th ed)
3) GeorgeA.Brooks,ThomasD.Fahey,KennethM.Baldwin(2005).*Exercisephysiology:HumanBioenergetics and its Applications.*NewYork,NY: McGraw-Hill.(4th ed)
4) WilliamD.McArdle,FrankI.Katch,VictorL.Katch(2014).*ExercisePhysiology:Energy,Nutrition and Humanperformance*.LippincottWilliams&Wilkins.(7th ed)
5) Per-OlofÅstrand,KaareRodahl,HansA.Dahl, Sigmund B.Strømme (2003).*Textbook ofworkphysiology:physiologicalbasesofexercise.*Champaign(Ill.):Humankinetics.(4th ed)
6) Williams,MelvinH(2005).*Nutritionforhealth,Fitness andsport.*Dubuque,IA:McGraw-Hill.(7th ed)

CourseOutcomes(CO)

Attheendofthecourse,thestudentwillbeableto

CO1	Demonstrate an understanding of the structure, function, mechanics, control,limitations, and fatigue of the cardiorespiratory system to include ventilation,gastransportandexchange,hemodynamic,andcardiacoutputduringrestandexercise;
CO2	Understandtheconceptsinvolvedinmeasuringenergy,work,andpoweranddescribe/demonstratethemeans bywhichtheenergycostofexercisecanbe estimatedandmeasured(includingmetaboliccalculations).
CO3	Demonstrateanunderstanding of homeostasis, the physiologicaland metabolicprocessesthatfacilitateexercise,recovery,andtheadaptationsthatoccur withacute andchronicexercise.
CO4	Describethevariousregulatorymechanisms(endocrine,immune,andnervous systems)andtheirinteractionswithrespecttoexercise,fatigue,andadaptation.
CO5	Predicthomeostatic,exercise,andadaptiveresponsestovariousenvironmental perturbations, i.e., temperature, barometric pressure, etc., andidentify strategies to optimize adaptation, reduce performance compromises,andlimitinjury.

MAPPINGWITHCOURSEOUTCOMES(COs)andPROGRAMMESPECIFICOUTCOMES (PSOs)inthe3–pointscale[Strong–3;Medium–2;Low–1].

	CO-POMapping(CourseArticulationMatrix										LevelofCorrelationbetweenPSO's& CO's				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	3	3	3	3	3	3	3	3	3	3	3	3	3
CO2	3	2	2	3	2	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	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	3	3
CO5	3	3	3	2	3	3	3	3	3	2	3	3	3	3	3
	Weightage										15	15	15	15	15
	WeightedPercentageofCourseContributiontoPSO's										3.0	3.0	3.0	3.0	3.0

Semester	23MEPC102:KINESIOLOGYAND BIOMECHANICS	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
I		4	1		5	25	75	100

LearningObjective(LO):

LO1	The main objective of this course is to learn the scientific foundations ofhumanmovementandsuccessfullycommunicatescientificinformationaboutkinesiologyandbiomechanicsofdiversepopulation
LO2	Toenrichtheknowledgeandpracticalkinesiolo skills necessary to work in gicalandbiomechanicalfields
LO3	Tolinktheoryandpracticeofcourseconceptsandapplicationinexerciseandsports.

Unit-I:IntroductiontoKinematics

a) Definitions,aims,objectivesandroleofKinesiologyin ExercisePhysiology.
b) Reviewoffundamentalconcepts(appliedaspect).Centreofgravity,Lineofgravity,Planes,LeversysteminBody,Fundamentalstartingposition.
c) Reviewoflinearandangularkinematics

Unit-II:MechanicsofMusculoskeletalSystem

d) Tissue loads, response of tissues to forces- Stress, Strain, Stiffness and mechanicalstrength,viscoelasticity.
e) Physical Properties of bone, cartilage, tendon and ligaments, functional adaptation underpathologicalconditions.
f) Impairedneuromuscularcontrol,muscularforceregulationinFrameworkandJointsofthebody: Influenceoftraumaandclassificationofthemuscles,Relationofstructure,functions,roleofmuscles,typesofMuscle,connections(Static.ConcentricandEccentric). TwojointMuscles.Angleofpull,RoleofGravityaffectingmuscularaction.

Unit- III

a) Natureandimportanceof BiomechanicsinPhysiology.
b) PrincipleofBiomechanics.
c) Biomechanicsofshoulderandshouldercomplex,elbowcomplex,mistandhandcomplex.

Unit-IV

a) Movementanalysis.
b) Biomechanicsofpelvic,hip, knee.ankle&footcomplex.
c) Biomechanicsofspine.

Unit-V

a) Neurobiomechanics.

b) PostureandGaitanalysis.
c) BiomechanicalAnalysis&TechniquesForceplatforms.

CurrentStreamsofthought:(Notfor finalexamonlyfordiscussion)
Biomechanics, exercise physiology and skilled performance;Skillacquisition;D

ReferenceBooks/Supplementaryreading:

1. PeggyA.Houglum,DoloresB.Bertoti(2012).*Brunnstrom-clinicalKinesiology*.Philadelphia:F.A.Davis.(6th ed)
2. LuttgensK,N.Hamilton(1997).*KinesiologyScientificBasisofHumanMotion.*Brown& Benchmark.(9th ed)
3. PhilipJ.Rasch,R.K.Burke(1978).*Kinesiologyandappliedanatomy:thescienceofhumanmovement*. Philadelphia:Lea&Febiger.(6th ed)
4. AugustusA.White,ManoharPanjabi(1978).*Clinicalbiomechanicsofthespine*.Philadelphia:Lippincot t.
5. Kapandji:*PhysiologyofJoints*Vol.I. II&111.W.B.Saunders.
6. U.K.Misra(2013).*ClinicalNeurophysiology*.ElsevierIndia.(3rd ed)

CourseOutcomes(CO)

Attheendofthecourse,thestudentwillbeableto

CO1	Understandtheanatomicalandbiomechanicalbasesofhumanmovement;
CO2	Understandthe physiologicalbasesofhuman movement.
CO3	Applytheknowledgerelatedtomechanics ofmusculoskeletalsystemtothink criticallyandethicallyinexaminingissuesandsolvingproblemsassociatedwiththeir chosendiscipline ofstudy.
CO4	Describethevariousnatureandimportanceof biomechanics.
CO5	Identifytoposture,gaitandmovement analysisvarious complex.

MAPPINGWITHCOURSEOUTCOMES(COs)andPROGRAMMESPECIFICOUTCOMES (PSOs)inthe3–pointscale[Strong–3;Medium–2;Low–1].

	CO-POMapping(CourseArticulationMatrix										**LevelofCorrelationbetweenPSO's& CO's**				
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	3	2	3	3	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	2	3	3	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	2	3	3	3	3	3	3
CO4	3	3	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	3	3
	Weightage										**15**	**15**	**15**	**15**	**15**
	WeightedPercentageofCourseContributiontoPSO's										**3.0**	**3.0**	**3.0**	**3.0**	**3.0**

Semester	23MEPE104: GENETICS INSPORTSPERFORMANCE	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
I		2		2	3	25	75	100

LearningObjective(LO):

LO1	AnunderstandingoftheSportandexercisegenetics
LO2	Anunderstandingoftheclinicalrelevance ofgeneticsconcepts
LO3	Understandsomeofthetypesofdiseasethatmightbetreatablebygenetherapy
LO4	Understandhowgeneticsmaybeusedinthedesignofdrugs

Unit-ITheScienceofGenomicsandGenetics

BasicGeneticConcepts,Mendelianinheritance,populationgenetics,HumanchromosomeKaryotype, Chromosome Disorders, Genome Structure and Genetic Mapping, MitochondrialInheritance,TheGeneticCodeandGeneticAlterations,DNAInjuriesandRepair,MonogenicandPolygeneticDiseases,MolecularDiagnostics,Epigeneticsinsports.GeneticEpidemiology,Physical Activity, and Inactivity - Role of Genetics Factors in Sport Performance: Evidence fromFamilyStudies

Unit-II: EvidencefromGeneticEpidemiologyStudies

Connecting Sports and Genetics, The Genetics of Sports Injuries and Athletic Performance,GeneticContributorstoHypertrophicCardiomyopathy,ChronicTraumaticEncephalopathy,DifferentClassesofPerformance EnhancingGeneticVariants

Unit-III:ContributionsofSpecific GenesandMarkers

Genes and Endurance Performance - Genes and Strength and Power Phenotypes - Genes andResponsetoTraining-GeneticDeterminantsofExercisePerformance:EvidencefromTransgenic and Null Mouse Models - The ACE Gene and Performance - The ACTN3 Gene andHumanPerformance-MitochondrialDNASequenceVariationandPerformance-Genes,Exercise,andLipidMetabolism-Genes,Exercise,andGlucoseandInsulinMetabolism-Genes,Exercise, and Cardiovascular Phenotypes - Genes, Exercise, and Protein Metabolism - TheRegulation of Physical Activity by Genetic Mechanisms: Is There a Drive to Be Active? - Genes,Exercise,and PsychologicalFactors

Unit-IV:SystemsBiologyofExercise andTraining

A Primer on Systems Biology, as Applied to Exercise Physiology and Metabolism - SystemsBiology Through Time Series Data — A Strength of Muscle Remodeling - Proteomics in ExerciseTrainingResearch-TheInfluenceofPhysicalExerciseonAdultStemCells

Unit-V EthicalandSocietalImplications

Ethics of Genetic Testing and Research in Sport - Genes and Talent Selection - PerformanceEnhancementbyGeneDoping-BioethicalConcernsinaCultureofHumanEnhancement,

CurrentChallengesandDirectionstotheFuture,GeneticModificationsinSports,EthicalConsideration sofGeneticManipulationinSport,GeneTherapyandGeneDoping.

Referencebooks

1. AnIOCMedicalCommissionpublication.*Geneticandmolecularaspectsofsportperformance*.Ed. BouchardC.andHoffmanE.(2010).WileyOnlineLibrary9781444327335
2. Guth,L.M.,&Roth,S.M.(2013).Geneticinfluenceonathleticperformance.Currentopinioninpedia trics, 25(6), 653.
3. Korf,B.R.,Irons,M.B.(2013).HumanGeneticsandGenomics,IncludesWileyEText.UnitedKingdo m:Wiley.
4. Lewis,R.(2017).HumanGenetics:TheBasics.United Kingdom:Routledge.
5. Maffulli, N., Margiotti, K., Longo, U. G., Loppini, M., Fazio, V. M., & Denaro, V. (2013). Thegeneticsofsportsinjuriesandathleticperformance.Muscles,ligamentsandtendonsjournal,3(3), 173.
6. Ostrander, E. A., Huson, H. J., Ostrander, G. K. (2009). Genetics of athletic performance.AnnuRevGenomicsHumGenet. PMID:19630564.
7. Posthumus,M.,Collins,M.GeneticsandSports.(2016).Germany:S.KargerAG.
8. Simmons,M.J.,Snustad,D.P.(2015).PrinciplesofGenetics.India:Wiley.

CourseOutcomes(CO)

Attheendofthecourse,thestudentwillbeableto

CO1	A working understanding of the genetic terminology required to be able tofunctionwellinthe transfusionlaboratory
CO2	Applicationofthebasicprinciplesofsportsgeneticmanipulation
CO3	An appreciation of the importance of genetics as a foundation of transfusionsciencetheoryand practice

MAPPINGWITHCOURSEOUTCOMES(COs)andPROGRAMMESPECIFICOUTCOMES (PSOs)inthe3–pointscale[Strong–3;Medium–2;Low–1].

	CO-POMapping(CourseArticulationMatrix										LevelofCorrelationbetweenPSO's&CO's				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO3	3	2	3	3	3	3	3	3	2	3	3	3	3	3	3
										Weightage	9	9	9	9	9
										WeightedPercentageofCourseContributiontoPSO's	3.0	3.0	3.0	3.0	3.0

Semester	23MEPE105: SCIENCE OFEXERCISE	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
I		2		2	3	25	75	100

LearningObjective(LO):

LO1	Understand how body responds to exercise, and will be able to identifybehaviours,choicesand environments thatimpacts athletes'healthandtraining.
LO2	Learners will explore a number of significant adjustments made by humanbody in order to properly respond o physical stress of exercise, includingchangesincarbohydrate,fat,andproteinmetabolism,nutritionalconsiderations,causesofmusclesorenessandfatigue,andtheeffectiveness of dangersof performanceenhancingdrugs.
LO3	Learner will examine and understand the scientific evidences for the healthbenefits of exercise including the prevention and treatment of heart disease,diabetes,cancer,obesity, depressionand dementia.

Unit-I

The Energetics of Exercise – introduction to exercise science, principles in exercisephysiology, calorimetry and oxygen consumption, ATP and muscle work, carbohydratemetabolism during exercise, fat metabolism during exercise, protein metabolism duringexercise.

Physiological system during exercise - skeletal muscle structure and function, respiratorysystem responses to exercise, cardiovascular system responses to exercise, endocrinesystemresponsestoexercise,immunesystemresponsetoexercise.

Unit-II

Exercise for fitness and performance – adaptation to endurance training, adaptation tostrength training, nutritional consideration for exercise, causes of muscle fatigue, causesformusclesoreness,performanceenhancingdrugs.

Unit- III

Exerciseinhealth,wellnessanddisease–exercise ismedicine,diet,exerciseandweightcontrol, exercise and risk factors for heart disease, exercise and risk factor for diabetes,exercise and risk factors for cancer, exercise and successful aging, exercise and brainfunction.

Unit-IV

Fundamentalprincipleofthe'trainingresponse'-components-neuromuscularpatterning.Monitoringandmanagingneuromuscularstressandfatiguestate.

Accumulativeimpactofdifferenttypesoftraining-strength,conditioning,skill,&tactical;ontheathlete'sstress/fatiguestate(day,week,phase,periodandsession).

Highlevelsoftraining-over-reachedstate-normalandnecessarypartsoftraining.

Unit-V

Long-termovertraining-imbalanceinthestress/fatiguestate.

Exercise tolerance after training and match-play - reduced or enhanced tolerance.Catabolicactivity–insufficientrecovery.

Emergenceoftechnologicalaidsthatmonitorstheathlete'strainingresponse.-Heartratemonitors-Powermeasurementtechnologies-GPStechnologies-Coachingsoftwaresystems.

CourseOutcomes(CO)

Attheendofthecourse,thestudentwillbeableto

CO1	Tostudyaboutthevariousmetabolicpathways thatareactivatedinorderto supply the necessary energy required for the mechanical work of skeletalmuscleduring exercise.
CO2	This will also exhibit how various physiological systems are regulated duringexerciseto help homeostasis.
CO3	It will teach about the training guidelines needed to optimize endurance andstrengthadaptationsassociatedwitharegularexerciseprogram.
CO4	It will also teach role of exercise as medicine in both the prevention andtreatmentofvariousdiseases.

MAPPINGWITHCOURSEOUTCOMES(COs)andPROGRAMMESPECIFICOUTCOMES (PSOs)inthe3–pointscale[Strong–3;Medium–2;Low–1].

	CO-POMapping(CourseArticulationMatrix										LevelofCorrelationbetweenPSO's&CO's				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	2	3	3	2	3	3	3	3	3	3	3
CO2	3	2	2	3	3	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	Weightage										12	12	12	12	12
	WeightedPercentageofCourseContributiontoPSO's										3.0	3.0	3.0	3.0	3.0

Semester	23MEPE106: RESEARCHMETHODOLOGYANDSTATISTICS	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
I		2		2	3	25	75	100

LearningObjective(LO):

LO1	Studyabouttheresearchprocesses
LO2	Tostudyabouttheliteratureresearchandpresentation
LO3	Tostudyaboutthepreparationofresearchproposalanddissertation
LO4	Tostudyabout thevariousstatisticaltechniques
LO5	Handsontraining withexceland SPSS

UnitI– Introduction

NatureandCharacteristicsofResearchProcess;Scientific&Unscientificmethods,Typesof Research: Basic & Applied, Quantitative &Qualitative Research, Nature and Type ofData, Measures of Central Tendency & Measures of Dispersion, Concept of StandardErrorofEstimates,Graphical RepresentationofData,EthicalIssuesinResearch

UnitII–Developingthe ProblemandReviewofRelatedLiterature

Identifying the Research Problem, Meaning and Formulation of Research Hypothesis,Delimitations and Limitations, Needs of Significance of the Study, Need, Purpose, Kindsand Steps of Literature Review, Methods of Data Collection- Participants, Variables &InstrumentsSelection,ResearchDesign

Unit III–StatisticalAnalysis

Parametric&Non-ParametricCorrelation;Partial&MultipleCorrelation,Chi-SquareTest,NormalDistribution,PropertiesofNormalCurve,Skewness&Kurtosis,Areasofapplication, Procedure of Testing of Hypothesis; Region of Acceptance & Rejection; null& alternative Hypotheses: Level of Significance, Type I & Type II errors, one tailed & twotailed hypothesis and Tests. Developing norms in the form of grading, Percentile Scale,T-Scale,Scalesbasedondifficultyratings.

UnitIV–InferentialStatistics

Student t-distribution, ANOVA, ANCOVA & Post- hoc Tests - LSD & Scheffe s test, DataAnalysisinQualitativeResearch,ExcelandSPSS.

UnitV–WritingaProposalandThesis

ThesisandDissertationFormat,WritingofabstractandResearchProposal,PresentationofResearchReport,Plagiarism:Copyrightviolations,ToolstoidentifyPlagiarism,ConstitutionofInstitutionalreviewBoard,EthicalCommitteeClearence.

Text Books

1. Best W. John, (1981), *Research in Education*, Prentice Hall of India Private Limited, NewDelhi.
2. BoseN.M.,(2005),*ResearchMethodology*,SherNiwasPublication,India.
3. MaleshL.M.,(1994),*MethodologyofResearchinPhysicalEducation&Sports*,MetropolitanPublishers, NewDelhi.
4. ThomasR.Jerry,Nelson.Taek,(2001),*ResearchMethodinPhysicalActivity*,HumanKinetics, USA.
5. ClarkH.David,ClarkeHarrisonH,(1970),*ResearchProcessisPhysicalEducation RecreationandHealth*,PrenticeHall Inc.,USA.
6. VermaJ.P.(2013), *DataAnalysisinManagementwithSPSSSoftware*,Springer,UK.
7. ArunArthur&Arwn. N.Elaine, (1999),*StatisticsforPsychology*,PrenticeHall,USA.
8. WriteE.Susan,(1995),*SocialScienceStatistics*,AllynandBaconINC.,USA.

CourseOutcomes(CO)

Attheendofthecourse,thestudentwillbeableto

CO1	Demonstrate Knowledge of research processes (reading, evaluating, anddeveloping).
CO2	PerformLiteraturereviews usingprintandonlinedatabase
CO3	Potentialenoughtowrite researchproposal,researcharticleandthesis
CO4	Expert inusingExcel&SPSSforstatisticalcalculation
CO5	Demonstrateparametricandnonparametricstatisticsmanually

MAPPINGWITHCOURSEOUTCOMES(COs)andPROGRAMMESPECIFICOUTCOMES (PSOs)inthe3–pointscale[Strong–3;Medium–2;Low–1].

	CO-POMapping(CourseArticulationMatrix										LevelofCorrelationbetweenPSO's&CO's				
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3
CO2	3	2	2	3	3	3	3	3	3	3	3	3	3	3	3
CO3	2	3	3	3	2	3	3	3	3	3	3	3	3	3	3
CO4	2	3	3	3	3	3	3	3	2	3	3	3	3	3	3
CO5	3	3	3	2	3	2	3	3	3	3	3	3	3	3	3
	Weightage										**15**	**15**	**15**	**15**	**15**
	WeightedPercentageofCourseContributiontoPSO's										**3.0**	**3.0**	**3.0**	**3.0**	**3.0**

Semester	23MEPE107:EVIDENCEBASED PRACTICE IN ALLIED HEALTHSCIENCES	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
I		2		2	3	25	75	100

LearningObjective(LO):

LO1	The aim of this course is to learn features related to evidence based practiceinalliedhealthsciences.
LO2	Tobuildskillsrelatedtoevidencebasedpracticeinalliedhealthsciences.
LO3	Tolinktheoryandpracticeofcourseconceptsandapplicationinexerciseandsports .

Unit-I

1. Introductiontoevidence-basedcomplementarymedicine
2. Evidence-basedhealth care
3. Evidence-basedpractices
4. Evidence-baseddecisionmakingandManagement

Unit-II

TypesofEvidence

a. Definitionofevidence
b. Forms ofevidence
c. Randomizedcontrolledtraits

Unit-III

a. Case-controlstudies
b. Cohortstudies

Unit- IV

1. Applyingevidence
   a. Pathways,guidelinesand protocols
   b. Futuredirectionsforclinicaleffectiveness
2. Evaluationofeffectivenessand efficiencyoftheprocess

Unit-V

1. Principlesof evidence-basedpractice in exercisephysiology

2. Elementsof evidenceAppraising theevidence
3. Evidenceinpractice

References:

1. MartinDawe,PhilipDaviesandAlistarGray,Evidence-BasedPractice;APrimerforHealthCareProfessionals,ElsevierPublications.
2. Albert R. Roberts and Kenneth R. Yeager, Evidence – Based Practice Manual;Research and Outcome Measures in Health and Human Services, Oxford UniversityPress.
3. AllenRubin,Practitioner'sGuidetouseResearchforEvidence-BasedPractice.JohnWilley&SonsPublication.
4. DomhnallMacAuleyThomasMBest,Evidence-basedSportsMedicineBMJBooks.
5. KatheynRefshaugeandElizabethGass,MusculoskeletalPhysiotherapy:ItsClinicalScienceandEvidence-BasedPractice,ChurchillLivingstone.
6. Allen Rubin,StatisticsforEvidence-BasedPracticeandEvaluation, CengageLearning.

CourseOutcomes(CO)

Attheendofthecourse,thestudentwillbeableto

CO1	Eliminate outdatedpracticesinfavourofmoreeffectivebasedlearning
CO2	Implementevidencebasedassessment
CO3	Applyevidencebasedmanagement
CO4	Enforceevidencebasedprofessionalethics.
CO5	Conductevidencebasedresearchandpolicymaking.

MAPPINGWITHCOURSEOUTCOMES(COs)andPROGRAMMESPECIFICOUTCOMES (PSOs)inthe3–pointscale[Strong–3;Medium–2;Low–1].

	CO-POMapping(CourseArticulationMatrix										LevelofCorrelationbetweenPSO's&CO's				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3
CO2	3	2	2	3	3	3	3	3	3	3	3	3	3	3	3
CO3	2	3	3	3	2	3	3	3	3	3	3	3	3	3	3
CO4	2	3	3	3	3	3	3	3	2	3	3	3	3	3	3
CO5	3	3	3	2	3	2	3	3	3	3	3	3	3	3	3
	Weightage										15	15	15	15	15
	WeightedPercentageofCourseContributiontoPSO's										3.0	3.0	3.0	3.0	3.0

Semester	23MEPC201:CARDIO-RESPIRATORYPHYSIOLOGY	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
II		4	1		5	25	75	100

LearningObjective(LO):

LO1	Theprincipalaim ofthiscourseistolearn featuresofcardio-respiratoryphysiology.
LO2	Todeveloptheabilitytoassess thecardio-respiratory physiologicalfitness.
LO3	Tolinktheoryandpracticeofcourseconceptsandapplicationamongsportsperson.

Unit-I

Cardiorespiratory fitness (CRF), PER-Q, resting and exercise measurement, estimating CRF,PACER, walk test, graded exercise test, RPE, VO2max, from different response, treadmill andergometerprotocols.

Unit-II

Normalheartelectrophysiology

Anatomyoftheheart,Locationofheartinchestcavity,Bloodvesselsthatsupplytheheart,Bloodflow through the heart, Electrophysiology of the heart, Normal electrical pathway, Electrical-mechanical association Relationship among electrical conduction, blood flow through the heart,pressuresinside theheartandmechanicalconnection

EKGequipmentandplacementofelectrodesinl2-leadGoldberger'sthreebasiclawsofelectrophysiologyEinthoven'striangleLeads:1,I1,III,AVR.AVE, AVL,V1V6OnecardiaccycleEKG waveforms, segments, and intervals, and their representation of electrical conduction:Resting l2-lead electrocardiogram normal limits. The difference between resting and exerciseEKG electrodesused.

Unit- III

Electrocardiogram interpretation steps Normal limits of waveforms, segments, and intervals andwhatitmeansto beout ofthe normallimit.

NormalsinusrhythmSinusBradycardia,SinusTachycardiaNormalEKGchangesduringexercise-testing. What is tah act? What are the major categories of tah act? What do the looklike?When dotheyoccur?

Unit-IV

Abnormalheartelectrophysiology

Ectopicfoci,inherentratesofsinus,atrial,junctional,andventricularrhythms,Premature:PAC,PJC, PVCescapebeats, Exerciserestrictions.
Supraventricularrhythms,sinusarrhythmias,rhythmsoriginatingfromectopicfoci:atrial,junctional ,ventricularexerciserestrictions.
AV heart blocks 1st degree, 2nd degree-two types, 3rd degree exercise restrictions.BundleBranchBlock,RightandLeft,Hemiblocks,exerciserestrictions.
Wolfe-Parkinson-white(WPW)syndrome.LGLsyndrome,exerciserestrictions.

Unit-V

Otherelectrophysiologyconsiderations

Criteriafordeterminingischemia,injury,andinfractionDetermi
nationofAxis
Quadrants: Normal, LAD, RAD, and extreme RAD
DegreesRotation-transition Zone
PacemakerrhythmsExter
nalandimplantablePace
maker codesExercise
restrictionsMonitoringlea
dsElectrodeplacement

Text Books:

1. Booth,*etal*.(2008).*Electrocardiographyforhealthcarepersonnel*.McGraw-Hill.(2nded)
2. DeLuna.(1998).*ClinicalElectrocardiography:Attextbook*.Futurapublishingcompany.(2nded)
3. Wagner,G.*(*2007).*Practicalelectrocardiography.*Marriot's,LippincottWilliams&Wilkins (11thed)

CourseOutcomes(CO)

Attheendofthecourse,thestudentwillbeableto

CO1	Identifythecomponentsofcardiorespiratoryfunctionsandexplaintheprinciplesofdiffusion.
CO2	Describethemechanismofbreathing,transportofgases,andprocessofgas exchange
CO3	Tracetheflowofblood,andidentifytheheartchambers,valvesandmajorvesselsofthe heart.
CO4	Assessthe morphology,hemodynamicactivities,and cardiorespiratoryfitness
CO5	Monitorelectrophysiologyofabnormalheart

MAPPINGWITHCOURSEOUTCOMES(COs)andPROGRAMMESPECIFICOUTCOMES (PSOs)inthe3–pointscale[Strong–3;Medium–2;Low–1].

	CO-POMapping(CourseArticulationMatrix										LevelofCorrelationbetweenPSO's&CO's				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	3	3	3	2	3	3	3	3	3	3	3	3	3
CO2	3	2	2	3	3	3	3	3	3	3	3	3	3	3	3
CO3	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO4	2	3	3	3	3	3	3	3	2	3	3	3	3	3	3
CO5	3	3	3	2	3	2	3	3	3	3	3	3	3	3	3
	Weightage										15	15	15	15	15
	WeightedPercentageofCourseContributiontoPSO's										3.0	3.0	3.0	3.0	3.0

Semester	23MEPC202: EXERCISE ANDENVIRONMENTALPHYSIOLOGY	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
II		4	1		5	25	75	100

LearningObjective(LO):

LO1	Theprimaryobjectiveofthiscourseistounderstandtherelationbetweenenvironmentandthefunctioningoftheliveorganism.
LO2	To show how life processes depend on the environment at different levelsfrom immediate environment of a cell to the impact of environment on thewholeorganism.
LO3	To examine the responses and adaptations of the human body to exerciseunderdifferent environmentalconditions

Unit-I

Concept ofaltitude and atmospheric pressure, different types ofperformance,maximal02consumptions at altitude, cardiovascular and respiratory changes at altitude, acclimatization ataltitudetraining at altitude.

Unit-II

Effect of cold exposure, wind chill factor, insulating factors, heat production and factor affectingcold,copingwithhypothermia,conceptofair pollutionanddifferentvariablesofairpollution

Unit- III

Conceptsofunderwaterphysiologyanditsapplicationinexercisescience.Zerogravityphysiologyand itsimplication on exercisephysiology

Unit-IV

Overview of heat balance during exercise, temperature measurement during exercise, overviewofheatproductionandheatloss,heatstorageinbodyduringexercise,body'sthermostat,thermaleventsduring exercise.

Unit-V

Heat index, exercise in a hot environment, sweat rate during exercise, performance changes,exercise related heal injuries, prevention of dehydration during exercise, heat acclimatization,measurementofrelative humidityandWBGTindex.

CurrentStreamsofthought:(Notforfinalexamonlyfordiscussion)
Protective gadgets – impact on cognition, coordination, and skill performance; Altitudephysiology;Hotandhumidconditionsonexercise;Coldclimateandwindbreezeonexerciseandsportsperformance

Text Books:

1. WalterR.Thompson,NeilF.Gordon,LindaS.Pescatello(2010).*ACSM'sGuidelinesforExercise testing andpreparation.*LippincottWilliams&Wikins.,Philadelphia.(8th ed)
2. Wilmore J., D.Costill and Kenney. W (2008). *Physiology of Sport and Exercise, HumanKinetics*.(4th ed)
3. McArdle. W. F.Katch, V. Katch, *Exercise Physiology: Energy, Nutrition, and HumanPerformance*,LippincottWilliams&Wilkins.

CourseOutcomes(CO)

Attheendofthecourse,thestudentwillbeableto

CO1	Enrich the knowledge on the basic principles of physiology and its connectionwithin the frame of biology and other natural sciences, understand the role ofwater,structureandfunctionofcellmembranesandtransportdependsfunctionin gofthebasiclifeprocessesasmaintainingtheionicandosmotic balance,circulation and respiration,providingofenergyetc.
CO2	Gainabroaderviewonspecificityofsingleprocessesandtheirmutualconnection.
CO3	Understand the human behaviour in connection with environment at the basisof synthesis of the knowledge on the function of processes that enable theorganismtosurvivein specificenvironment.
CO4	Understandprocessesathigherlevelincludingcontrolandconnectionoftheseproce ssesbythenervousandhormonalsystems.
CO5	Describeanddiscussthestressesplacedonthehumanbodyduringexercise performed under different environmental conditions and the adaptations madebythebodywithextendedorrepeatedexposuretothosecondition

MAPPINGWITHCOURSEOUTCOMES(COs)andPROGRAMMESPECIFICOUTCOMES (PSOs)inthe3–pointscale[Strong–3;Medium–2;Low–1].

	CO-POMapping(CourseArticulationMatrix										LevelofCorrelationbetweenPSO's&CO's				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	3	3	3	3	3	3	3	3	3	3	3	3	3
CO2	3	2	2	3	2	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	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	3	3
CO5	3	3	3	2	3	3	3	3	3	2	3	3	3	3	3
	Weightage										15	15	15	15	15
	WeightedPercentageofCourseContributiontoPSO's										3.0	3.0	3.0	3.0	3.0

Semester	23MEPE204:WOMENHEALTHANDEXERCISE	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
II		3			3	25	75	100

LearningObjective(LO):

LO1	Theprimegoalofthiscourseistostudyfeaturesofwomenhealthandexercise.
LO2	Tobuildskillstoassessthehealthofwomenandtheinfluenceofexerciseonhealth.
LO3	To link theory and practice of course concepts and application of exercise onwomenhealth.

Unit-I

1. Genderdifferenceinmusclemorphology
2. DiagnosisandTreatmentofUrinaryIncontinenceandProlapse
3. Anaemia

Unit-II

1. Hypertension inWomen
2. Bonehealth: assessmentandtreatmentof osteopeniaandosteoporosis
3. EvaluationandTreatmentofCommonMusculoskeletalComplaints

Unit-III

1.StrengthDifferences2.Effect ofweighttraining3.Physical Trainability4.GynecologicalCo nsideration

Unit-IV

1. Exerciseforthechildbearingyear
2. Exerciseforadolescence
3. Premenopausalandpost-menopausal

Unit-V

1. ExerciseinAthleticWomen
2. MedicalProblemsinSportsWomen

References:

1. NadyaSwedan(2001):Women'sSportsMedicineandRehabilitation.AnAspenPublications.
2. MaryLloydIreland&AmeliaNattiv(2002):TheFemaleAthlete.SaundersPublication.
3. Cardozo L and Staskin D (2006): Textbook of Female Urology and Urogynaecology (2nd ed)London:IsisMedicalMediaLtd
4. Mantle J, Haslam J and Barton S (2004). Physiotherapy m Obstetrics and Gynaecology(2nded)London:Butterworth-Heinemam.
5. Sapsford R. Markwell S and Bullock-Saxton J (1998): Women's Health: A Textbook forPhysiotherapists.London:WBSaundersCompanyLtd.
6. Bo. K., Berghmans. L.C.M. Van Kampen. M. Morkved. S. (2007). Evidence-Based PhysicalTherapy forthe Pelvic Floor:Bridging Science and ClinicalPractice.London:ChurchillLivingstone.

CourseOutcomes(CO)

Attheendofthecourse,thestudentwillbeableto

CO1	Demonstrateanunderstandingofthestructure,function,mechanics,control,limitations,andfatigueofthecardiorespiratorysystemtoincludeventilation, gastransportandexchange,hemodynamics,andcardiacoutputduringrestandexercise.
CO2	Understandtheconceptsinvolvedinmeasuringenergy,work, andpoweranddescribe/demonstratethemeans bywhichtheenergycost ofexercisecanbe estimatedand measured.
CO3	Recognizethedifferencesinthephysiologicalresponsetoexercisebecause ofsexandasoneprogressesthroughthelifespan.
CO4	Demonstratean understanding of the methods of body composition assessmentandrecognizehealthyvaluesforbodyfatandwhatimpactbodycompositionhasonathleticperformanceandhealth ofwomen.
CO5	Demonstrateknowledgeregardingtheeffectsofexercisetrainingonwomenbonedensityacrossthelifespan.

MAPPINGWITHCOURSEOUTCOMES(COs)andPROGRAMMESPECIFICOUTCOMES (PSOs)inthe3–pointscale[Strong–3;Medium–2;Low–1].

	CO-POMapping(CourseArticulationMatrix										LevelofCorrelationbetweenPSO's&CO's				
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	3	2	3	3	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	2	3	3	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	2	3	3	3	3	3	3
CO4	3	3	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	3	3
	Weightage										**15**	**15**	**15**	**15**	**15**
	WeightedPercentageofCourseContributiontoPSO's										**3.0**	**3.0**	**3.0**	**3.0**	**3.0**

Semester	23MEPE205:PHYSIOLOGICAL TESTINGANDSPORTSPERFORMANCEEVALUATION	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
II		3			3	25	75	100

LearningObjective(LO):

LO1	Togainknowledgeaboutbasicsof Performanceevaluationandtesting.
LO2	Tolearnthechangesinhumanbodysystemsduetoexerciseandsportingactivitiesin anintegratedmanner.
LO3	Tounderstandaboutvarious aspectsoftestconstruction.
LO4	Tostudyabout varioustestprotocolsandmodesofperformancetesting
LO5	Togainknowledgeaboutbasicsof Performanceevaluationandtesting.

Unit-I

IntroductiontoTest,Measurement,EvaluationandResearch,BasicconceptsinTests:Evaluation,Validity,Reliability,ObjectivityandNorms,TestconstructionanditsOrganisationandAdministration;Pre-testconsiderations:Risks associated andSafetyconsiderations,ACSMguidelinesforwhento stop aTest, Pre-exercise testevaluations

Unit-II

Test Order: Equations used to estimate aerobic power from TM protocols, Equations used toestimate aerobic power from Cycle ergometer protocols (arm and leg), Calculations used toestimateaerobicpowerfromothervariables

Unit-III

Modesoftesting,Muscularstrength,enduranceandflexibility,BodycompositionandAnthropometry, Balance, Agility, Coordination, Reaction time and Anaerobic power, PhysicalFitnessBatteries,SpecificSportsSkillTests(Soccer,Basketball,Volleyball,Hockey,Badminton,Tennisand othersports)

Unit-IV

Calculation of HR MAX and 85% HR max depending on protocol, Population considerations:Children, Elderly and Apparently healthy. Test protocols used for measuring the health and skill-related components of fitness, CV endurance field tests, VO2max testing, Norm tables, Maximalversussubmaximaltests

Unit-V

Adapting tests and measurements for special population – legal mandates effecting evaluation – observationaltechniques–performancetests–motorperformancetesting

Referencebooks

1. Gibson, A. L., Heyward, V. H. (2018). Advanced Fitness Assessment and Exercise Prescription. UnitedStates:HumanKinetics,Incorporated.

2. Dumke, C., Haff, G. G. (2021). Laboratory Manual for Exercise Physiology. United States: HumanKinetics.

3. Disch,J.G.,Mood,D.,Kang,M.,Morrow,J.R.(2016).MeasurementandEvaluationin HumanPerformance.UnitedStates:HumanKinetics.

4. Gore, C. J., Tanner, R. K. (2012). Physiological Tests for Elite Athletes, 2E. United States: HumanKinetics.

5. ACSM's Guidelines for Exercise Testing and Prescription. (2013). United Kingdom: Wolters KluwerHealth.

6. Kansal, D. K. (2021). A Textbook of Sports Science: Test, Evaluation, Accreditation, MeasurementsAndStandards(Teams).K.K.Publications.

7. Kansal, D. K. (2008). Textbook of Applied Measurement, Evaluation & Sports SelectionIndia: SSSPublications.

8. Gibson, A. L., Heyward, V. H. (2018). Advanced Fitness Assessment and Exercise Prescription. UnitedStates:HumanKinetics,Incorporated.

9. American College of Sports Medicine (Ed.). (2013). ACSM's health-related physical fitness assessmentmanual.LippincottWilliams&Wilkins

CourseOutcomes(CO)

Attheendofthecourse,thestudentwillbeableto

CO1	Studentswillbereadytostudyeffectofexerciseindetailandinapplicationperspective.
CO2	Studentswillbeabletomeasurethechangesandinterpretheminthecontextofsports
CO3	Improvedunderstandingofperformanceevaluation andtesting.
CO4	Studentswillbeabletodesignvarioustestprotocols
CO5	DemonstrateknowledgeregardingtheeffectsofexercisetraininganaPerformanceevaluation andtesting

MAPPINGWITHCOURSEOUTCOMES(COs)andPROGRAMMESPECIFICOUTCOMES (PSOs)inthe3–pointscale[Strong–3;Medium–2;Low–1].

	CO-POMapping(CourseArticulationMatrix										LevelofCorrelationbetweenPSO's&CO's				
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO3	3	2	3	3	3	3	3	3	2	3	3	3	3	3	3
CO4	3	3	3	2	3	3	3	3	3	3	3	3	3	3	3
CO5	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3
	Weightage										**15**	**15**	**15**	**15**	**15**
	WeightedPercentageofCourseContributiontoPSO's										**3.0**	**3.0**	**3.0**	**3.0**	**3.0**

Semester	23MEPE206: SPORTSBIOCHEMISTRY	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
II		3			3	25	75	100

Course Pre-requisite: Students should have basic knowledge of organic and biomolecules andsomeofthe functionalgroupsandstereochemistry

LearningObjective(LO):

LO1	Todevelopconceptsaboutstructuresandfunctionsofdifferentbiomolecules.
LO2	Tounderstandthereactivityofbiomoleculesandtheirroleinmetabolicpathways.
LO3	Tolinktheory andpracticeofcourseconceptsandapplication onsports andgames

Unit-I

Foundation of Biochemistry: Introduction to Biomolecules; Properties of water: Structure andproperties of water, importance of water in biological systems, Ionic product of water; Chemicalbonding: Properties of covalent bond, non-covalent bonds and their importance in biologicalsystems; Types of biochemical reactions: oxidation, reduction, condensation, rearrangement,cleavage,grouptransfer,Resonancebond,electrophilicandnucleophilic

Unit-II

Carbohydrates:Classification,characteristics,structureandfunctionsofmonosaccharides,disaccharides,trisaccharidesandpolysaccharides;aminosugars,proteoglycansandglycoproteins.;Lipids:Classification,structureandfunctionofmajorlipidsubclassesTriacylglycerols,Phospholipids,Sphingolipids,glycolipids,Lipoproteins,chylomicrons,LDL,HDLandVLDL,steroids,prostaglandinsandbileacids,rancidity.

Unit-III

Protein: Amino acids: Structure, Classification, and physico-chemical properties of amino acids,role of non-protein amino acids, peptides, peptides of physiological significance, peptide bond.;Proteins:StructuralfeaturesofproteinsandtheirbiologicalFunctions-PrimaryStructure,Secondarystructure,TertiaryStructureand Quaternarystructure.

Unit-IV

Nucleic acids: Structure and properties of nucleotides, nucleosides, purine (Adenine, Guanine)and pyrimidine (Cytosine, Thiamine, Uracil) bases. Structural features of nucleic acids (DNA &RNA) and their biological functions.; Vitamins: Structure and Classification, water soluble and fatsolublevitamins

UNIT–V

MetabolicRegulationinSportandExercise:Principlesofmetabolicregulation-Howarecatabolicand anabolicreactionscontrolled?- Hormones -Peptide hormones, neurotransmitters andregulation - Adrenaline activation of glycogenolysis and lipolysis - Insulin activation of glycogensynthase-Insulininhibitionoflipolysis-Insulinstimulationofproteinsynthesis-Steroidhormonesandregulation

Energyproductionandmetabolicregulationduringhigh-intensityexerciseandenduranceexercise - Effects of exercise duration and nutritional status - Effects of training - Mechanisms offatigue.

Referencebooks

1. David, L., Nelson, D. L., Cox, M. M., Stiedemann, L., McGlynn Jr, M. E., & Fay, M. R. (2000).Lehningerprinciplesofbiochemistry.
2. Voet, D., Voet, J. G., & Pratt, C. W. (2018). Voet's Principles of Biochemistry. Wiley GlobalEducation.
3. Poortmans,J.R.(Ed.).(2004).Principlesofexercisebiochemistry.KargerPublishers.
4. Berg, J. M., Stryer, L., Tymoczko, J. L., & Gatto, G. J. (2015). Biochemistry: MacmillanLearning.
5. West,E.S.,&Todd,W.R.(1955).TextbookofBiochemistry:Macmillan.
6. Talwar, G. P., & Srivastava, L. M. (2002). Textbook of biochemistry and human biology: PhiLearning.
7. Vasudevan, D. M., Sreekumari, S., & Vaidyanathan, K. (2019). Textbook of biochemistry formedicalstudents. JaypeebrothersMedicalpublishers.
8. Jain,J.L.(2004).FundamentalsofBiochemistry.India:S.Chand Limited.
9. Deb, A. C. (2013). Comprehensible viva and practical biochemistry. New Central BookAgency.

Course Outcomes(CO)

Attheendofthecourse,thestudentwillbeableto

CO1	Recallvariousbiomolecules,theirstructuresandfunctions.
CO2	Clarifyunderstandingofbioenergeticsinhumanbody.
CO3	Recalltheimportantcatabolicandanabolicmetabolicpathways andtheirregulation.
CO4	BriefthestructureandfunctionsofHaemoglobin,proteins,andnucleicacids
CO5	Specifythefactorsaffectingenzymeactivity,andthesourcesofvitaminsandminerals

MAPPINGWITHCOURSEOUTCOMES(COs)andPROGRAMMESPECIFICOUTCOMES (PSOs)inthe3–pointscale[Strong–3;Medium–2;Low–1].

	CO-POMapping(CourseArticulationMatrix										LevelofCorrelationbetweenPSO's&CO's				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	2	3	3	2	3	3	3	3	3	3	3
CO2	3	2	2	3	3	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO5	3	3	3	2	2	3	3	3	3	2	3	3	3	3	3
	Weightage										15	15	15	15	15
	WeightedPercentageofCourseContributiontoPSO's										3.0	3.0	3.0	3.0	3.0

Semester	23MEPE207:EXERCISEAND OBESITY	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
II		3			3	25	75	100

LearningObjective(LO):

LO1	ToEnhanceknowledgeabout Variousproblems andpropermanagement ofObesity

Unit-I:OBESITY

1. Introduction-theMeasurementof Obesity
    a. Oldernmethodof BodyCompositionAnalysis
    b. BMIand itsSignificance
    c. RecentAdvancedMethodofEvaluation
2. Aetiology,classification

Unit-II:HEALTHRISKSASSOCIATEDWITHOBESITY

1. CardiovascularDisease–Hypertension-Hyperlipidemia/hypercholesterolemia-Osteoarthritis–Psychological
2. Complication-PrevalenceofObesityandOverweight-PrevalenceofCVDandObesity

Unit-3:OBESITYMANAGEMENT

1. Scientific PrinciplesofWeightLoss
2. The RoleofNutrition/Diet andthe“nondietingapproach”
3. Theroleof Exercise/PhysicalActivity
    a. AerobicExercise
    b. ResistanceTraining
4. Therole ofBehaviorChange-schoolbasedphysicalactivityintervention

Unit-IV:WEIGHT LOSSPROGRAMS

1. CommercialWeightLossPrograms
    a. Biometrics
    b. JennyCraig
    c. Nutrasystem
    d. WeightWatchersetc
2. Non-CommercialWeightLossPrograms
    a. Medifast
    b. Optifast
3. Non-CommercialSupportGroups
    a. TakingOffPoundsSensibly (TOPS)
    b. OvereatersAnonymous

Unit-V:ExercisePrescription

a. ADA/ACSM/AMA PositionStands
b. HealthFraudandWeightLossProductsandPrograms
c. TheFutureofWeightLoss

SuggestedReadings:

- Bouchard, C.(Ed)(2000).Physicalactivityandobesity. Champaign,IL: HumanKinetics.
- Brownell, K.D. & Wadden T.A. (1999). The LEARN® Program for weight control: specialmedicationedition.Dallas:AmericanHealthPublishing

CourseOutcomes(CO)

Attheendofthecourse,thestudentwillbeableto

CO1	UtilizeacquiredKnowledgeinDecisionMakingandfurtherTreatment process
CO2	Assesshealthrisksassociatedwithobesityamongoverweightandobese
CO3	Demonstratetheunderstandingofknowledgeonobesitymanagement
CO4	Testifythecommercialandnon-commercialweight lossprograms
CO5	Prescribeexercisescheduleandproducts

MAPPINGWITHCOURSEOUTCOMES(COs)andPROGRAMMESPECIFICOUTCOMES (PSOs)inthe3–pointscale[Strong–3;Medium–2;Low–1].

	CO-POMapping(CourseArticulationMatrix										LevelofCorrelationbetweenPSO's&CO's				
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3
CO2	3	2	2	3	3	3	3	3	3	3	3	3	3	3	3
CO3	2	3	3	3	2	3	3	3	3	3	3	3	3	3	3
CO4	2	3	3	3	3	3	3	3	2	3	3	3	3	3	3
CO5	3	3	3	2	3	2	3	3	3	3	3	3	3	3	3
	Weightage										**15**	**15**	**15**	**15**	**15**
	WeightedPercentageofCourseContributiontoPSO's										**3.0**	**3.0**	**3.0**	**3.0**	**3.0**

Semester	23MEPS208: KINANTHROPOMETRYANDEXERCISEPHYSIOLOGY	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
II		1		2	2	25	75	100

LearningObjective(LO):

LO1	Thekeyfocusofthiscourseistolearnkinanthropometriccharacterizationandthechangesinitwith exercise.
LO2	Tounderstandoftheprinciplesofbodycomposition,itsassessmentanditsrelationshipwith healthandexercise.
LO3	Toexplaintherelevanceofkinanthropometryinthefieldofexercisephysiology.

Unit-I

Introduction to. Kinanthropometry, history, Human body composition, and its measurement,techniques: Somatotyping and measurement techniques, concept of growth), maturation andperformance,physicalactivityand flexibilityassessmenttheoricalbasis.

Unit-II

Multidimensional characteristics of sportsperson participating in different games and sports – Kinanthropometricmeasurementsindiscriminating elite, sub-eliteandamateursportsperson.

Unit- III

Trainingprinciples:overload,Specificity,reversibilityComponentsofatrainingsession.Warmup.Workoutandcooldown trainingto improveaerobicpower

Unit-IV

Injuriesandendurancetraining,trainingtoimproveanaerobicpower,trainingtoimprovemuscularstrength,Concurrentorstrengthandendurancetrainingprograms, nutritionalInfluenceontraininginduced skeletalmuscle adaptation.

Unit-V

Muscle soreness, training to improve flexibility, year-round conditioning for athletes. Commontrainingmistakes.

CurrentStreamsofthought:(Notfor finalexamonlyfordiscussion)
Socio-culturalandpsychologicalconstraintsinkinanthropometricandphysiologicaltestingand

Booksforstudy:

1. RogerEston*(2008).KinanthropometryandExercisePhysiologyLaboratoryManual:Tests,ProceduresandData:VolumeOne: Anthropometry:1.Routledge.*(3rded)

2. Scott K Powers *et al*., *Kinanthropometry and Exercise Physiology Laboratory ManualTests, procedures and data.* Volume Two*. Physiology Exercise Physiology: theory andApplicationtoFitnessandPerformance*. (*3rd ed*)

CourseOutcomes(CO)

Attheendofthecourse,thestudentwillbeableto

CO1	Competentlyuseandunderstand theprinciplesofanthropometricproceduresforassessing humanbodycomposition
CO2	Accuratelyuseanatomicalandphysiologicalterminology
CO3	Explainthefunction,structureandcomponentsofthemuscloskeletalandcardiopulmonarysystemsinrelationtoexerciseandsport
CO4	AssessbodycompositionandperformSomatotyping
CO5	Understand the changes in body composition with growth, maturation andphysicaltraining

MAPPINGWITHCOURSEOUTCOMES(COs)andPROGRAMMESPECIFICOUTCOMES (PSOs)inthe3–pointscale[Strong–3;Medium–2;Low–1].

	CO-POMapping(CourseArticulationMatrix										LevelofCorrelationbetweenPSO's&CO's				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	3	3	3	2	3	3	3	3	3	3	3	3	3
CO2	3	2	2	3	3	3	3	3	3	3	3	3	3	3	3
CO3	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO4	2	3	3	3	3	3	3	3	2	3	3	3	3	3	3
CO5	3	3	3	2	3	2	3	3	3	3	3	3	3	3	3
	Weightage										15	15	15	15	15
	WeightedPercentageofCourseContributiontoPSO's										3.0	3.0	3.0	3.0	3.0

Semester	23MEPS209:BIOSENSORSFORSPORTS	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
II		1		2	2	25	75	100

LearningObjective(LO):

LO1	Tounderstandtheimportanceofsensingtechnologiesforthedetectionofkeymarkersforsportsperformance
LO2	Todevelopcurrentstateofthearttoidentifythebiosensorworkanddesignforsports applications

Unit-I

Sensors:fundamentals,typesanddetectionprinciples,calibration,selectivity,sensitivity,reproducibility,detectionlimits,responsetime;electrochemicalsensors:amperometric,potentiometric, conductimetric; Chronoamperometry and Chronopotentiometry; Optical sensors:absorption, fluorescence, SPR; piezoelectric sensors; Thermal transducers; electronic sensors;modelling;economics;biosensors;techniquesemployedinfabricationofbiosensorsanddetectionofanalytes;measurementprinciples;nanobiosensors;ambientsensors

Unit-II

Biomolecules as biosensors: enzymatic, immunosensors, aptamers, peptides and whole-cell;BiorecognitionSystems:Enzymes;oligonucleotidesandnucleicacids;lipids;membranereceptorsandtransporters;tissueandorganelles(animalandplanttissue);cellculture,limitationsandproblems,immobilizationofbiomolecules;

Unit-III

DesignandFabricationofBiosensors:Self-assembledmonolayersscreenprinting,photolithography, micro-contact printing, MEMS, miniaturization-application of nano-materials,nanoparticles, carbon nanotubes (CNTs) and others; Bioelectric Tattoos; Wireless biosensornetworks;biosensorsinhealthand wellnessmonitoring

Unit-IV

Biosensors for sports and athletes; Biosensors based detection in sports: fundamentals andkinetics; biodetection principles; biosensors for monitoring the respiration, hydration, stress andwater:electrolyte ration in athletes; glucose sensors; lactate sensors; continuous glucose andlactate monitoring sensors; conductivity sensors; cortisol sensors; biosensors for monitoring thehormonal stateoftheathlete:steronebiosensors;actigraphymotionbiosensors;

Unit-V

Wearable sensors for sports: Accelerometer, gyroscope, magnetometer, heart rate sensors,pedometers;commercialsensorsavailableforsports:types,fabricationprinciples,market,importance; smart clothing: e-textile system for remote, continuous monitoring of physiologicaland movement data; monitoring the mental acuity of athletes; monitoring the biochemical statusoftheathletebydetectingbiomarkersfromsweatandsaliva;casestudies

Referencebooks

1. Sadana, N., Sadana, A. (2016). Handbook of Biosensors and Biosensor Kinetics.Netherlands:ElsevierScience.
2. Evtugyn,G.(2013).Biosensors:Essentials.Germany:SpringerBerlinHeidelberg.
3. Herold, K. E. (2009). Biosensors and biodetection. A. Rasooly, & K. E. Herold (Eds.). Totowa,NJ:Humana Press.
4. Electrochemical, Bioelectronic, Piezoelectric, Cellular and Molecular Biosensors. (2018).UnitedStates: SpringerNewYork.
5. Malhotra, B. D., & Turner, A. (2003). Advances in Biosensors: Perspectives in Biosensors:Elsevier Science. Sadana, A., Sadana, N. (2014). Biomarkers and Biosensors: Detection andBindingtoBiosensorSurfacesandBiomarkersApplications. Netherlands: ElsevierScience.
6. Lai-Kwan, C., & Chang, H. T. (2012). From Bioimaging to Biosensors: Noble MetalNanoparticlesinBiodetection:JennyStanfordPublishing.
7. Tiwari,A.,&Turner,A.P.F.(2014).BiosensorsNanotechnology:Wiley

CourseOutcomes(CO)

Attheendofthecourse,thestudentwillbeableto

CO1	Understandingthemechanismsoftransducingelements,sensinganddetection
CO2	Designanddevelopbioanalyticaldevices/biosensorforsportsperformanceevaluation
CO3	Translationalutilityofsensortechnologyforsports

MAPPINGWITHCOURSEOUTCOMES(COs)andPROGRAMMESPECIFICOUTCOMES (PSOs)inthe3–pointscale[Strong–3;Medium–2;Low–1].

	CO-POMapping(CourseArticulationMatrix										LevelofCorrelationbetweenPSO's&CO's				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	3	3	3	3	3	3	3	3	3	3	3	3	3
CO2	3	2	2	3	2	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	Weightage										9	9	9	9	9
	WeightedPercentageofCourseContributiontoPSO's										3.0	3.0	3.0	3.0	3.0

Semester	23MEPC301:EXERCISEAND FITNESS-HEALTHANDSKILL-RELATEDCOMPONENTS	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
III		4	1		5	25	75	100

LearningObjective(LO):

LO1	Theprimaryfocusofthiscourseistolearnfeaturesoffitness;andthebenefitsofexercise.
LO2	Tobuildskillsinquantifyinghealthandskillrelatedfitness;andforpre-exercisingscreening.
LO3	Tolinktheoryandpracticeofcourseconceptsandapplicationinexercisephysiologyandfitness.

Unit-I

Pre-testconsiderations

I. Benefits associated with physical activity, Physical activity and fitness terminology, Benefits ofregularphysicalactivity,Exercise doseresponserelationship.

2. Risks associated with physical activity Sudden death among young individuals and athletesExercise events in those with sickle cell trait Exercise-related cardiac events in adults Safetyconsiderations.

Unit-II

1. Pre-participation screening algorithm, Risk stratification and medical clearance Pre-exercisetestevaluationsBaselineMeasurementsCalculationofHRMAXand85%HRmaxdependingonprotocolPopulationConsiderationsChildren,elderly,apparentlyhealthy,etc.

2. Test Order Equations used to estimate aerobic power from: TM protocols Cycle ergometerprotocols(armandleg)EquationsusedtoestimateaerobicpowerfromcycleergometerprotocolsACSM guidelines for when to stop a test Calculations used to estimate aerobic power from othervariables

Unit- III

Testprotocolsusedfor mensm1ngthehealthandskill relatedcomponentsofIllness

1. CVendurancefieldtestsVO2maxtestingNormTablesMaximalvssubmaximaltests

2. Muscularstrength,enduranceandflexibility

3. Balance,agility,coordination,reactiontimeandanaerobicpower

Unit-IV

Exercisetestingmodulationsforcardiacpatients

Medical clearance Physician approval for testing Risk factor identification MedicalemergencyequipmentRisksofcardiaceventsduringexercise testing.

DiagnosticexercisetestingExercisetestingfordiseaseseverityandprognosisFunctionaltestingMeasurementsduring exercisetestingExercisetesting afteranMI

Unit-V

Exercisetestingmodulationsforcardiacpatients

RiskstratificationforcardiacpatientimpatientrehabilitationprogramsOutpatientexerciseprogramsRecommendationsforsupervisionand monitoringofexercise

SignsandsymptomsbelowwhichanupperlimitforexerciseintensityshouldbesetFITTprincipleandprogression ofexerciseforthe cardiacpatient

Benefits of endurance exercise training in cardiac patients Benefits of resistance training forcardiac patients Risks of cardiac events during cardiac rehabilitation Prevention of exercise-matedcardiaceventsExercise training forreturn towork

Text Books:

1. Heyward.Vivian.(2006).*AdvancedFitnessAssessmentandExercisePrescription*.HumanKinetics. (5th ed)
2. WalterR. Thompson,NeilF.Gordon,LindaS.Pescatello(2010).*ACSM'sGuidelinesfor Exercisetestingandpreparation.*LippincottWilliams&Wikins.,Philadelphia.(8th ed)
3. Ed. Durstine and Moore (2003). *ACSM's Exercise Management for Persons with ChronicDiseases andDisabilities*.HumanKinetics. (2nd ed)
4. *AmericanCollegeofSportsMedicine*(2009).*ACSM'sHealth-RelatedPhysicalFitnessAssessmentManual.LippincottWilliamsandWilkins.(*3rd ed)

CourseOutcomes(CO)

Attheendofthecourse,thestudentwillbeableto

CO1	Becomecompetent,independent,andcriticalthinkersbydevelopingintoallied health professionals that are proficient in the care of the physically active, anddemonstratingqualityinjuryprevention,identification,careandrehabilitation.
CO2	Acceptheroleoftheathleticandfitnesstrainingprofessionalanddemonstrateapositiveattituderegardingtheathletictrainingprofession.
CO3	AdheretotheCodeofEthicsandtheProfessionalPractice,andmaintainhighmoralstandardswhen performingprofessionalduties.
CO4	Enhancetheathleticandfitnesstrainingprofessionbysharingthatknowledgeandexpertise.
CO5	Become involved with society outside of their professional requirements asdemonstrated by assisting those in need and working to make their own pieceoftheworldabetterplacebycontributingtothecommunityinwhichhe/she lives, worksandlearns.

MAPPINGWITHCOURSEOUTCOMES(COs)andPROGRAMMESPECIFICOUTCOMES (PSOs)inthe3–pointscale[Strong–3;Medium–2;Low–1].

	CO-POMapping(CourseArticulationMatrix										LevelofCorrelationbetweenPSO's&CO's				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	3	3	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	2	3	3	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	2	3	3	3	3	3	3
CO4	3	3	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	3	3
	Weightage										15	15	15	15	15
	WeightedPercentageofCourseContributiontoPSO's										3.0	3.0	3.0	3.0	3.0

Semester	23MEPC302: EXERCISE & SPORTSNUTRITION	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
III		4	1		5	25	75	100

LearningObjective(LO):

LO1	Themainobjectiveofthiscourseistolearnfeaturesofsportsnutritionthatnourishes and energizesforexerciseperformance.
LO2	Tobuildskillsinquantifyingandprescribingpre,during,andpostcompetitiondiet.
LO3	Tolinktheoryandpracticeofcourseconceptsandapplicationsportsnutritioninexe rcise.

Unit-

INutritionBasic

WhatNourishes You?

The basic of a Healthy Diet, The food pyramids, Energy density of macronutrients andHumanDigestionandAbsorptionMetabolismoftheenergy-yieldingnutrientsBioenergetics: fuels for exercise and their pathways anaerobic metabolism, ATP-CP,Myokinase, fast glycolysis, lactic acid production Fat of lactic acid, Aerobic metabolism,Transition into the mitochondria. Kreb's cycle, ETC Macronutrients: when are they used forfuelforexercise?Carbohydrates,Lipids, Proteins

Unit-II

Researchrelatedtopre-competitionandpost-competitionmeals

1. Timing,Contentofpre-competitionandpost-competition meals
2. Glucoseand insulinresponsesof pre-competitionmeals
3. Glycogenloading (supercompensation)
4. Differentneedsfor specificsportsactivities
5. The importance ofrecovery,optimalamountofrecoverytime to training /competition

Unit- III

1. Timing,Contentofduringcompetitionnutrition
2. Differentnutrientneedsforspecificsportsactivities
3. Energyproduction,Energyexpenditure,ExhaustionandDehydration
4. Sweat rate,roleofsweat,impactofsweatonperformance
5. Importanceofwaterandsportsdrinksinreplenishingbodyfluid
6. The importanceof recovery,optimalamountof recoverytimeduringcompetition

Unit-IV

Researchrelatedtodietarysupplementsandtheireffectsonperformance

1. Vitaminsandminerals
2. Creatinephosphate;creatinemonohydrate;othercreatinesupplements
3. Sodiumbicarbandotherbufferingagents
4. Ginseng
5. Caffeine
6. Overthecounterdrugs:i.e.,amphetamines
7. Prescribeddrugs:i.e.,betablockers
8. Nutritional disorders: Anorexia Nervosa Bulimia Nervosa Binge-Eating Disorder, OtherConditions Metabolic Syndrome, Female Athlete Triad. The ethics of weight control insomesports

Unit-V

1. Illegalsubstances,Ergogenicaids
2. Substances bannedbyathleticorganizations andIOC:positionStands
3. Blood Doping
4. Drug.
5. DrugTesting.
6. EthicsandphilosophyofDrugsTesting

Text Books:

1. Ed.Burke&Deakin. *Clinicalsportsnutrition,*McGraw-Hill(3rded)
2. Burke(2007).*PracticalSportsNutrition,*HumanKinetics,
3. Ed.Gibney*etal.(*2002).*IntroductiontoHumanNutrition,*Blackwell.
4. Groff&Gropper(2000).*AdvancedNutritionandHumanMetabolism,*Wadsworth.(3rded)
5. Jeukendrup&Glesson(2004).*SportsNutrition,*HumanKinetics.
6. AnitaF.P. (1989).*'ClinicalDieteticsandnutrition'*.OxfordUniversity Press. (3rded)
7. Shils, M.E. and Young V.R (1988). *Modern Nutrition in Health and Disease*. Bombay K.MVargheseCompany(6thed).
8. Passmore,P.andM.A.Eastwork(1986).*HumanNutritionandDietetics*.ELBS,Churchill,Living stone.(8thed)
9. Shils, M.EandYoungV.R(1988).*ModernNutritioninHealthandDisease*
10. Mahan,L.K&Ecott-stump,s(2000).*Krause'sFood,NutritionandDiet,*BombayK.M.VargheseCompany. (6thed)
11. *Therapy*,W.B. SaundersPvt.Ltd.(10thed)

CourseOutcomes(CO)

Attheendofthecourse,thestudentwillbeableto

CO1	Describe contemporary dietary guidelines and demonstrate an ability to usetheseguidelinestoprovidegeneralnutritionadviceforachievingormaintaininga healthy bodyweight
CO2	Describehownutrition influenceshumandevelopment,exerciseperformance, recoveryandphysiologicaladaptations
CO3	Discussmacronutrientmetabolismduringandafterexerciseandoutlinetherequirements ofthese nutrientsforathletes
CO4	Describethephysiologicalfunctionsofvitamins,mineralsandmajornutrientsandexplainhowandwhymicronutrientrequirementsmightbealtered in athletescomparedwithnon-exercisingindividuals.
CO5	Describethecompositionofcommonsportsdrinksandergogenicaidsanddiscusshowthesecanbeusedappropriatelyandsafelybefore,duringand afterexercise

MAPPINGWITHCOURSEOUTCOMES(COs)andPROGRAMMESPECIFICOUTCOMES (PSOs)inthe3–pointscale[Strong–3;Medium–2;Low–1].

	CO-POMapping(CourseArticulationMatrix										LevelofCorrelationbetweenPSO's&CO's				
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO3	3	2	3	3	3	3	3	3	2	3	3	3	3	3	3
CO4	3	3	3	2	3	3	3	3	3	3	3	3	3	3	3
CO5	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3
	Weightage										**15**	**15**	**15**	**15**	**15**
	WeightedPercentageofCourseContributiontoPSO's										**3.0**	**3.0**	**3.0**	**3.0**	**3.0**

Semester	23MEPC303: NEURO MUSCULOSKELETAL SYSTEM IN EXERCISEANDTRAINING	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
III		4	1		5	25	75	100

LearningObjective(LO):

LO1	Thekeyfocusofthiscourseistostudyfeaturesofneuromusculoskeletalsystemin exercise andtraining.
LO2	Tobuildskillsinquantifyingfitnessandprescribingtrainingloadandexercise.
LO3	Tolinktheoryandpracticeofcourseconceptsandapplicationinexerciseandtrainin g.

Unit-I

Muscle fibre types and their influence in different kind of sports, training effects on muscledevelopment, muscle properties with changing training load, neuro muscular rehabilitation withtraining.

Unit-II

Training types and definition and their relation with exercise development, training to improveaerobic andanaerobicstrength.Concurrentstrengthandendurancetrainingprogramme.

Unit- III

Laboratoryassessmentofmuscularaspectandtrainingaspect.Muscleadaptationtoaerobicandanaer obicexercisetraining,resistanttrainingandtraininginducedincreaseinstrength.

Unit-IV

Immunologic and molecular changes during exercise and strength training, overtraining anddetrainingandtheireffectsonphysiologicalsystem.

Unit-V

Impactoffatigueandexhaustionduringshortdurationhighintensityexercisesonneuro-muscularskeletal system. – Factors limiting all-out anaerobic performances. Impact of fatigue andexhaustion during endurance activity on neuro-muscular skeletal system – Glycogen depletion indifferentmusclegroups–factorslimitingaerobicperformance.

Methodsandimportanceof recovery.

Impactofsportsinjuryonneuro-muscular skeletalsystem

CurrentStreamsofthought:(Notforfinalexamonlyfor discussion)
Fundamentalprincipleofthe‘trainingresponse’-components-neuromuscularpatterning. Monitoringand managingneuromuscularstressandfatigue state. Accumulativeimpactofdifferenttypesoftraining–strength,conditioning,skill,&tactical; ontheathlete’sstress/fatiguestate(day,week,phase,periodandsession). Highlevelsoftraining-over-reachedstate-normalandnecessarypartsoftraining.Long-termovertraining-imbalance inthestress/fatiguestate. Exercisetoleranceaftertrainingandmatch-play-reducedorenhancedtolerance.Catabolicactivity- insufficientrecovery. Emergenceoftechnologicalaidsthatmonitorstheathlete’strainingresponse.-Heart ratemonitors-Powermeasurementtechnologies-GPStechnologies-Coachingsoftware systems.

Booksforstudy:

CourseOutcomes(CO)

Attheendofthecourse,thestudentwillbeableto

CO1	Studentswillacquireknowledgeondistributionofrocktypesandtheirformationat differentages.
CO2	Understandingtheoceanmorphologyandformationalongwithmineralresourcesof marine environmentare known
CO3	Criticallyanalyseandapplyadvancedbiomechanicalevaluationmethodsandtechniquesinthecollectionofbiomechanicaldata.
CO4	Analyse intrinsic and extrinsic factors associated with sports-related injury tointegrate into practice; and critically review biomechanical principles related tothecause andtreatment ofsports-relatedinjury.
CO5	Evaluate and integrate the scope of practiceof exercise scientists in themodification of exercise prescriptions for injured populations to design andimplementreturn-to-sportplans.

MAPPINGWITHCOURSEOUTCOMES(COs)andPROGRAMMESPECIFICOUTCOMES (PSOs)inthe3–pointscale[Strong–3;Medium–2;Low–1].

	CO-POMapping(CourseArticulationMatrix										**LevelofCorrelationbetweenPSO’s&CO’s**				
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	3	3	3	3	2	3	3	2	3	3	3	3	3	3	3
CO2	3	2	2	3	3	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO5	3	3	3	2	2	3	3	3	3	2	3	3	3	3	3
	Weightage										**15**	**15**	**15**	**15**	**15**
	WeightedPercentageofCourseContributiontoPSO’s										**3.0**	**3.0**	**3.0**	**3.0**	**3.0**

Semester	23MEPE306: EXERCISECONSIDERATIONSFORSPECIALPOPULATIONS	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
III		3			3	25	75	100

LearningObjective(LO):

LO1	Describe specific adaptations, advantages and precautions of variousmodes of training for physically active individual across the lifespan (e.g.,pediatrictogeriatric)andpeoplewithspecialneeds

Unit- I: ExercisePrescriptionforpeoplewithHypokineticdiseases:

Coronary artery disease,- Exercise Prescription for Heart Diseases - Weight Training guidelinesfor Heart Diseases - Coronary Artery Disease – Diabetes mellitus - Chronic Lung disease andAsthma-ManagementandExerciseGuidelinesfor personswithHypertension,DiabetesmellitusandCardiovascularDiseases-Management-ExercisePrescriptionforchroniclungDiseasesandAsthma-WeightTrainingguidelinesforLungDiseases.

Unit-II:ExerciseissuesrelatedtoAdolescenceandOlder adults:

Childhood and Adolescence - Old Age – Risks of Exercise in adolescents and elderly-Need andImportanceofExerciseinHealthyElderly-Strengthtrainingforchildren/olderadultsandwomen -StrengthTrainingforchildren-Strengthtrainingforolderadults

Unit-III:ExerciseissuesrelatedtoBackpainandcervicalspondylosis:

MeaningandDefinitionforArthritis-Background-Management-ExerciseIssues.Backpainand cervical spondylosis - Exercise recommendations for people with low back pain and cervicalspondylosis.

Unit-IV :Exercise issuesrelatedtoFemales:

Limitations faced by female population on doing physical activities- Pregnancy Strength trainingforfemales -WeightTrainingGuidelinesforPregnant women.

Unit-V:Exerciseissuesrelatedtootherhealthcomplications:

Need and importance of exercise training for people with AIDS and Cancer–ExercisePrescriptionforAIDSandCancer -WeightTrainingGuidelines.-ExerciseRecommendationsforPhysicallyInactiveIndividuals-TrainingGuidelinesforPhysicallyinactiveindividuals

TextBooks:

Dianne S. Ward, Ruth P. Saunders, Russell R. Pate,(2006) ,Physical Activity Interventions in Children andAdolescents,HumanKineticsPublishers,Champaign, Illinois.

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

Cowlin,(2002),Women'sFitnessProgramDevelopment,HumanKineticsPublishers,Champaign,Illinois.

CourseOutcomes

Attheend ofthe course,thestudentwillbe ableto

CO1	Understandsthedifferenthypokineticdiseaseandtheprescriptionofexercisesforpeoplesufferingfromthosediseases
CO2	Understandsthe exercise issuesrelatedto AdolescenceFemalesand Olderadults.
CO3	Understandstheexercise issuesrelated to Backpainand cervicalspondylosis.
CO4	Understandsthe exercise issuesrelated to otherhealthcomplications.
CO5	Understandingthefactorstobeconsideredwhiledesigningandimplementingafitnessprogramforspecialpopulationwithspecialneeds.

MAPPINGWITHCOURSEOUTCOMES(COs)andPROGRAMMESPECIFICOUTCOMES (PSOs)inthe3–pointscale[Strong–3;Medium–2;Low–1].

	CO-POMapping(CourseArticulationMatrix										LevelofCorrelationbetweenPSO's&CO's				
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3
CO2	3	2	2	3	3	3	3	3	3	3	3	3	3	3	3
CO3	2	3	3	3	2	3	3	3	3	3	3	3	3	3	3
CO4	2	3	3	3	3	3	3	3	2	3	3	3	3	3	3
CO5	3	3	3	2	3	2	3	3	3	3	3	3	3	3	3
	Weightage										**15**	**15**	**15**	**15**	**15**
	WeightedPercentageofCourseContributiontoPSO's										**3.0**	**3.0**	**3.0**	**3.0**	**3.0**

Semester	23MEPE307:MOTORLEARNING ANDCONTROL INSPORTS	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
III		3			3	25	75	100

LearningObjective(LO):

LO1	Themotorlearningcourseaimstoacquaintstudents withthedynamicsetofinternalprocessesassociatedwithpracticeand experiencethat,articulated with the conditionsoflearning,instructions,andpractice.
LO2	Success in the learning and performance of motor skills in distinct contexts, namelysports,school,elderlypopulationsandpopulationswithspecial needs.

UnitI:Introductiontomotorskillsandabilities

The Classification of motor skills – Application, Skills, Actions, Movements, and NeuromotorProcesses, One Dimensional Classification Systems, Gentile's Two Dimensions Taxonomy; Themeasurement of motor performance – Application, Reaction time, Error measures, Kinematicmeasures, kinetic, EMG, Brain activity measures, Measuring coordination. Motor Abilities –Application,Abilityand motorability.

UnitII:IntroductiontoMotorControl

Neuromotorbasicformotorcontrol-TheNeuron,ThecentralNervoussystem,Theneuralcontrolof voluntary movement; Motor control theories - Theory and Professional practice, Motor Controltheory,Openloopandclosedloopcontrolsystem,twotheoriesofmotorcontrol,thecurrentstate of the control theory; Sensory Components of Motor Control – Touch and Motor control,Proprioception and Motor control, Vision and Motor control; Performance and motor controlcharacteristics of functional skills - Speed-Accuracy skill, Prehension, Handwriting, bimanual coordinationskills,catchingamovingobject,strikingamovingobject,locomotion;

UnitIII:Introductiontomotorcontrol–AttentionandMemory

Action preparation – Action preparation requires time, task and situation characteristicsinfluencing preparation, performer characteristics influencing preparation, what occur duringpreparation?; Attention and Memory: Attention – Attention and multiple-task performance, thedual task procedure for assessing attention demands, focusing attention, attention andautomaticity, visual selective attention, visual search and motor skill performance, training visualsearchstrategies;Memory– Memorystructure,workingmemory,longtermmemory,remembering and forgetting, assessing remembering and forgetting, the cause for forgetting,movement characteristics related to memory performance, strategies that enhance memory performance,Practice testcontexteffects.

UnitIV:Introductiontomotorskilllearning

Definingandassessinglearning-
Performancedistinguishedfromlearning,generalperformancecharacteristics of skill learning, learning assessment technique, practice performance maymisrepresent learning; The stages of learning – The Fitts and Posner Three-Stage Model,Gentile'sTwo stagemodel, Bernstein's description oflearningprocess,

performerandperformancechangesacrossthestagesoflearning,aperformercharacteristicsthatdoe
snot

change across the stages of learning; Transfer of learning – Transfer of learning, importance oftransfer oflearning,positivetransferoflearning,negativetransfer,bilateraltransfer.

UnitV:Instructionand AugmentedFeedback/PracticeConditions

Demonstration, Verbal instructions and cues, Augmented feedback – the feedback family, typesofaugmentedfeedback,therolesofaugmentedfeedbackinskillacquisition,essentialofaugmentedfeedback,contentofaugmentedfeedback,typesofknowledgeofperformance,timingissuesrelatedto augmented feedback,theKR DelayandPostKR intervals, frequency ofpresentingaugmentedfeedback,techniquesthatreducesaugmentedfeedbackfrequency;Practice conditions – practice variability and specificity, the amount and distribution of practice,wholeand part practice, mentalpractice

Textbooks

1. MagillRA,AndersonDI.(2017).MotorLearningandControl-ConceptandApplication.McGrawHillEducation,NY,USA.
2. SchmidtRA,WrisbergCA.(1941).MotorlearningandPerformance-AProblemBasedLearningApproach,HumanKinetics,NY,USA.
3. WinterDA.(2000).BiomechanicsandMotorControlofHumanMovements,JohnWiley&Sons,Inc,NY,USA.

CourseOutcomes(CO)

Attheendofthecourse,thestudentwillbeableto

CO1	Identify the strengths and limitations of techniques to assess processes of motorlearningandcontrol.
CO2	Explainthechangesinmotorfunctionormotorperformancethatmayoccurwith motorlearninganddevelopmentacrossthelifespan.
CO3	Assessaspectsof anindividual's motorfunctioninphysicalactivityandexercise contexts including applying risk management and risk assessment conceptsassociatedwiththemotorlearningandcontrolofexercisescience.
CO4	Design motor learning environments and protocols to maximise specific motorlearningand controloutcomesin arange ofphysicalactivityandexercise contexts.
CO5	Apply motor learning principles and skill acquisition principles, including theeffectiveuseoflearningcuesandmovement progressions,forteachingand correcting movementandexercise technique.

MAPPINGWITHCOURSEOUTCOMES(COs)andPROGRAMMESPECIFICOUTCOMES (PSOs)inthe3–pointscale[Strong–3;Medium–2;Low–1].

	CO-POMapping(CourseArticulationMatrix										LevelofCorrelationbetweenPSO's& CO's				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3
CO2	3	3	3	2	2	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3
CO5	3	3	3	2	2	3	3	3	3	3	3	3	3	3	3
	Weightage										15	15	15	15	15
	WeightedPercentageofCourseContributiontoPSO's										3.0	3.0	3.0	3.0	3.0

Semester	23MEPS308: CLINICAL EXERCISEPHYSIOLOGY	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
III		2			2	25	75	100

LearningObjective(LO):

LO1	Togainknowledgeonvariousdiseasesanddisorders;andthepotentialsof exerciseinthemanagementofcertainpathophysiologicalconditions

UNIT-I:IntroductiontoClinicalExercisePhysiology

The Profession of Clinical Exercise Physiology - The Past, Present, and Future ofClinicalExercise Physiology - Promoting a Physically Active Lifestyle - Benefits of Physical Activity -Participation in Regular Physical Activity - General Interview - Physical Examination Skills -GradedExerciseTesting-Indications-Contraindications-ProceduresforPreparing,Conducting,and Interpreting a Graded Exercise Test - Graded Exercise Testing with Diagnostic Imaging -Exercise Prescription - Exercise Training Sequence- Goal Setting- Principles of ExercisePrescription-CardiorespiratoryEndurance-SkeletalMuscleStrengthandEndurance-FlexibilityTraining

UNIT-II: EndocrinologyandMetabolicDisorders

MeaningandDefinitionofDiabetes,Obesity,Hypertension,MetabolicSyndrome,Hyperlipidemiaand Dyslipidemia–
Scope,Pathophysiology,ClinicalConsiderationsofDiabetes,Obesity,Hypertension,MetabolicSyndrome,HyperlipidemiaandDyslipidemia-ExercisePrescriptionandExercise Training for Diabetes, Obesity, Hypertension, Metabolic Syndrome, Hyperlipidemia andDyslipidemia.

UNIT -III:CardiovascularDiseases

AcuteCoronarySyndromes:UnstableAnginaPectorisandAcuteMyocardialInfarction-
Pathophysiology - Clinical Assessment - Exercise Training: Inpatient Cardiac Rehabilitation - ExerciseTraining:EarlyOutpatientCardiacRehabilitation-ExercisePrescription

MeaningandDefinitionofRevascularizationoftheHeart,ChronicHeartFailure,PeripheralArteryDisease,andCardiacElectricalPathophysiology-
Scope,Pathophysiology,ClinicalConsiderationsofRevascularizationoftheHeart,ChronicHeartFailure,PeripheralArteryDisease, and Cardiac Electrical Pathophysiology - Exercise Prescription and Exercise
TrainingforRevascularizationoftheHeart,ChronicHeartFailure,PeripheralArteryDisease,andCardiacElectricalPathophysiology.

UNIT-IV:DiseasesoftheRespiratorySystem

Meaning andDefinition ofChronicObstructive PulmonaryDisease, Asthma,andCysticFibrosis - Scope, Pathophysiology, Clinical Considerations of Chronic Obstructive Pulmonary Disease,Asthma,andCysticFibrosis-ExercisePrescriptionandExerciseTrainingforChronicObstructivePulmonaryDisease, Asthma, andCysticFibrosis

UNIT-V:Disordersofthe BonesandJoints

Meaning andDefinition ofArthritis, Osteoporosis,and Nonspecific Low BackPain. Scope,Pathophysiology, Clinical Considerations of Arthritis, Osteoporosis, and Nonspecific Low BackPain.Exercise Prescription and Exercise Training for Arthritis, Osteoporosis, and NonspecificLowBackPain

Text Books

JonathanK.Ehrman,PaulM.Gordon,PaulS.Visich,StevenJ.Keteyian(2019).ClinicalExercisePhysiology,Champaign,IL:Human Kinetics.

CourseOutcomes(CO)

Attheendofthecourse,thestudentwillbeableto

CO1	Understandthe natureandbenefitsofdifferentexercise modalities.
CO2	Comprehendthepathophysiologicalconditionsofendocrinologyandmetabolicissues.
CO3	Understandexercisestrainingforvariouscardiovasculardiseases
CO4	Know the different diseases affecting respiratory system, and exercise prescriptionforit.
CO5	Realizethebenefitsofexercisetrainingforboneandjointdiseases.

MAPPINGWITHCOURSEOUTCOMES(COs)andPROGRAMMESPECIFICOUTCOMES (PSOs)inthe3–pointscale[Strong–3;Medium–2;Low–1].

	CO-POMapping(CourseArticulationMatrix										LevelofCorrelationbetweenPSO's&CO's				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	3	3	3	2	3	3	3	3	3	3	3	3	3
CO2	3	2	2	3	3	3	3	3	3	3	3	3	3	3	3
CO3	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO4	2	3	3	3	3	3	3	3	2	3	3	3	3	3	3
CO5	3	3	3	2	3	2	3	3	3	3	3	3	3	3	3
	Weightage										15	15	15	15	15

	WeightedPercentageofCourseContributiontoPSO's	3.0	3.0	3.0	3.0	3.0

Semester	23MEPS309: NUTRITIONCOUNSELLINGANDEDUCATION	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
III		2			2	25	75	100

LearningObjective(LO):

LO1	Togainknowledgeabout variousnutritionalaspectassociatedwithsports ,Roleof nutritioninathleticperformances

Unit-I

FoodhabitsandneurophysiologyFoodchoices,foodPurchaseandeatingbehaviour:Psychologicalbasis;Socialinteraction;Ethnic,religiousandeconomicinfluences.Foodpsychologyforhealthmaintenanceand fitness:

Unit-II

Neurophysiology: Special senses, Sensory processing, sleep & wakefulness Neural basis ofcognition-
Learning,Memory,emotion,Neuronalcontrolofeating&drinkingbehaviour,Biologicalclock,nutrition&sportsperformancesEatingdisorderin athletes

Unit- III

Medical and Nutritional Issues for the Travelling Athlete: Nutritional problems often faced by thetravellingathletes;MonitoringandDocumentationofclimate,timezones,altitude,foodsafetyandavailabilitybythesupport staffornutritionist;

Unit-IV

Market surveys and research support for the journey (travel, accommodation, catering, trainingand event schedules); Noting vaccination and existing allergies; Hydration and supplements fortravel within country and overseas; Tips for preventing jet lag and adaptation to different timezone;

Unit-V

Nutritioncounselling:Definition;Requirement;Procedurestoadopt;RoleofaSportsDietitianandtheoriesandstrategiestobeadoptedinnutritioncounselling.Computerapplicationsandprotocolsfornutrition counselling:Counsellingsessionforindividualathlete,forteam,forcoaches

and other supporting staff. Models of health and nutrition education in sports persons: Definition;Toolsusefulforeducation;Strategiesforeffective nutritioneducation

Referencebooks

CourseOutcomes(CO)

Attheendofthecourse,thestudentwillbeableto

CO1	Studentswillacquireknowledgeonvariousnutritionalaspectassociatedwithsports, Roleofnutritionin athleticperformances
CO2	Understanding thenutritionalvalueand implementontheathletes.
CO3	Criticallyanalyseandapplyadvancednutritionalknowledgeaccordingtothedeman dofthe athleticeventsand theathlete.
CO4	Analyse intrinsic and extrinsic factors associated with sports-related injury tointegrate into practice; and critically review nutritional aspects related to thecauseandremedytosports-relatedinjury.
CO5	Evaluateandintegratethescopeofpracticeofexercisescientistsinthemodificationof dietaryprescriptionsforbetter performancelevel.

MAPPINGWITHCOURSEOUTCOMES(COs)andPROGRAMMESPECIFICOUTCOMES (PSOs)inthe3–pointscale[Strong–3;Medium–2;Low–1].

	CO-POMapping(CourseArticulationMatrix										LevelofCorrelationbetweenPSO's&CO's				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	3	3	3	3	3	3	3	3	3	3	3	3	3
CO2	3	2	2	3	2	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	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	3	3
CO5	3	3	3	2	3	3	3	3	3	2	3	3	3	3	3
	Weightage										15	15	15	15	15
	WeightedPercentageofCourseContributiontoPSO's										3.0	3.0	3.0	3.0	3.0

Semester	23MEPC401: APPLIED EXERCISEPHYSIOLOGY	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
IV		4	1		5	25	75	100

LearningObjective(LO):

LO1	Themainobjectiveofthiscourseistolearnattributesofappliedexercise physiology.
LO2	Tobuildskillsinscreeningpathophysiologicalconditionsandexerciseprescribing .
LO3	Tolinktheoryandpracticeofcourseconceptsandapplicationinappliedexercisephysiology.

Unit-I

Epidemiologyandpathophysiologyofstroke,functionalconsequencesofstroke,acuteresponsesto exercise, exercise testing and screening criteria, prescription and programing, education andcounselling

Unit-II

Epidemiology and pathophysiology of muscular dystrophy. spinal cord injury and brain injurypatients,focusofrehabilitationbyexercise.musclestrengthandflexibilitydevelopment,guidelinesforimplementing an exerciseprogram.

Unit- III

Osteoarthritis,rheumatoidarhritisandtheirphysicalexamination,exercisetestingandprescription,resistanceexercise,counsellingandeducation,exerciseandactivityfornonspecificbackpain personals,exerciseforacuteandchroniclowbackpain.

Unit-IV

Osteoporosis and its physical examination, exercise, fitness and functional testing, prescriptionandeducationalprogram,amputationanditsexercisetesting,prescriptionandprograms,exerciseimmunologyanditsfunctionunderenvironmentalstress,immunitychangesafterdifferentboutsofexercise

Unit-V

Assessmentofcardiorespiratorydisorder-prescriptionofexercisesandmonitoringphysiologicalresponses.

Diabetics - role of exercise - exercise prescription - strengthening exercises and enduranceactivities.

CurrentStreamsofthought:(Notfor finalexamonlyfordiscussion)
Biomechanics,exercisephysiologyandskilledperformance;Skillacquisition;Determinantso fperformanceinskilled athletes.

ReferenceBooks/Supplementaryreading:

1. AmericanCollegeofSportsMedicine,JonathanMyers,NiemanDavid(Editor),FreyGeorgia,PitettiKenneth (2009).*ACSM'sresourcesfor Clinical ExercisePhysiology*.LWW.(2nd ed)

CourseOutcomes(CO)

Attheendofthecourse,thestudentwillbeableto

CO1	Demonstrateknowledgeintheexercisesciencesincluding:anatomyand physiology,exercisephysiology,Kinesiologyandbiomechanics,ECGinterpretatio n,exercisetesting andprescription,motorlearningandnutrition.
CO2	Demonstrate knowledge of and clinical proficiency in the following contentareas for both apparently healthy and chronic disease populations: a) pre-participationscreening/healthriskappraisalandstratification,b)fitness assessment andevaluationc)thedesignofindividuallytailoredexerciseprescription,d)appropri ateexercise techniques
CO3	Recognize theimportanceofinterprofessionalcollaborationinthedeliveryofsafe,highqualityca rewithinthehealthcaresystem/exercisesciencefield.
CO4	Demonstratetheabilitytocommunicateeffectivelyinbothoralandwrittenformats.
CO5	Recognizetheimportanceofethically-groundedcarefordiverseclients,patientsand/orathletes.

MAPPINGWITHCOURSEOUTCOMES(COs)andPROGRAMMESPECIFICOUTCOMES (PSOs)inthe3–pointscale[Strong–3;Medium–2;Low–1].

	CO-POMapping(CourseArticulationMatrix										LevelofCorrelationbetweenPSO's&CO's				
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	3	2	3	3	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	2	3	3	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	2	3	3	3	3	3	3
CO4	3	3	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	3	3
	Weightage										**15**	**15**	**15**	**15**	**15**
	WeightedPercentageofCourseContributiontoPSO's										**3.0**	**3.0**	**3.0**	**3.0**	**3.0**

Semester	23MEPC402: METHODS OFEXERCISEPRESCRIPTION	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
IV		4	1		5	25	75	100

LearningObjective(LO):

LO1	Thekeyfocusofthis courseistolearnelementsinmethodsofexercise prescriptionforrehabilitationandexerciseperformance.
LO2	Todevelopcapabilityofdifferentmethodsofexerciseprescription.
LO3	To link theory and practice of course concepts and application in methods ofexerciseprescription.

Unit-I

GeneralprinciplesofExerciseprescription

1. Legal issues regarding Waiver, informed consent, PARQ medical clearance needed,baselinemeasurementstakenbefore exercisetests.
2. Importanceofwarmupandcooldowninstructionsinanexerciseprescription.
3. The FITTprincipleandrateof progression,principlesoftraining

Unit-II

1. Periodization-single,doubleandmultipleperiodization
2. Trainingcycles-micro,mesoandmacrocycles

Unit- III

1. Methodsofprescribingintensityofenduranceexercise
2. VO2-VO2reserve-HR-HRreserve-Ratingof perceivedexertion-Symptom-limited -Energyexpenditure

Unit-IV

Clinicalconditionsinfluencingexerciseprescriptions

1. Arthritis,osteoporosis,Hypertension
2. Obesity,metabolicdisorders,metabolicsyndrome
3. Immunologicaldiseases,exerciseandupperrespiratorytractinfections
4. Peripheralarterialdisease,pulmonarydiseases.

Unit-V

Otherspecialconditionsinthehealthypopulation

1. Pregnancy
2. Elderly
3. Children
4. Physicallyhandicapped

Booksforstudy:

1. Walter R. Thompson, Neil F. Gordon, Linda S. Pescatello (2010).*ACSM's GuidelinesforExercisetestingandpreparation.*LippincottWilliams&Wikins., Philadelphia.(8th ed)
2. Skinner,J.,(2005).*ExercisetestingandExerciseprescriptionforspecialcasestheoretical basisand clinicalapplication*.Lippincott,Williams,&Wilkins(3rd ed)

ReferenceBooks/Supplementaryreading:

CourseOutcomes(CO)

Attheendofthecourse,thestudentwillbeableto

CO1	useavarietyofmethods toidentify individualneeds andscreenfor movementdysfunction;
CO2	evaluate physiological capacities, interpret data obtained and communicatefindingsto athletesandcoaches
CO3	designand implementperiodisedtrainingprogramstoenhance physical conditioningandperformanceand reduceinjuryrisk;
CO4	monitor,evaluateandmodifyexercisetrainingprogramstomaximise physiological adaptation and performance; and implement effective recoverystrategieswithinphysicalconditioningprograms;
CO5	prescribeexercisetomaintainphysicalconditioningandsupportrehabilitationfollowinginjuryanddevelopcriteriaforsafereturntoactivity.

MAPPINGWITHCOURSEOUTCOMES(COs)andPROGRAMMESPECIFICOUTCOMES (PSOs)inthe3–pointscale[Strong–3;Medium–2;Low–1].

	CO-POMapping(CourseArticulationMatrix										LevelofCorrelationbetweenPSO's&CO's				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO3	3	2	3	3	3	3	3	3	2	3	3	3	3	3	3
CO4	3	3	3	2	3	3	3	3	3	3	3	3	3	3	3
CO5	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3
	Weightage										15	15	15	15	15
	WeightedPercentageofCourseContributiontoPSO's										3.0	3.0	3.0	3.0	3.0

Semester	23MEPE404: SPORTSPSYCHOLOGYAN DPHYSIOLOGICALASPECT S	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
IV		3			3	25	75	100

LearningObjective(LO):

LO1	Themainobjectiveofthiscourseistolearnfeaturesofpsychologicalaspectsofsportsthat formsthebasisforexercise performance.
LO2	Tobuildskillsinquantifyingpsychologicalskillsandmanipulateitforbettersportsperformance.
LO3	Tolinktheoryandpracticeofcourseconceptsandapplicationinexerciseandsports performance.

Unit-I:

1. Historyandcurrent statusofsportspsychology.
2. Personalityassessmentandsportspersonality
   a. Theories ofpersonality
   b. Personalityassessment
3. Attentionandperception in sports.
   a. Attention
   b. Perception
4. Concentrationtraininginsports
   a. Basicprinciplesofconcentration
   b. Concentrationtraining
   c. Concentrationawarenessexercises
5. Motivationalorientationinsports
   a. Athlete'sneedsofmotivation
   b. Motivationalinhibitors
   c. Motivationaltechniques

Unit-II

1. Pre-competitiveanxiety
   a. SourceofPCA
   b. EffectsofPCAonperformance
2. Relaxationtraining
   a. Definition
   b. Typesofrelaxation
      i) Progressivemusclerelaxation
      ii) Breathingexercise
      iii) Yognidra
      iv) Transcendentalmeditation
3. Aggressioninsports
   a. Theories ofaggression
   b. Managementofaggression

Unit- III

1. RoleofPsychologyinDealing with injuries.
2. Eatingdisorders.
    a. Etiologyofeatingdisorder
    b. Typesofeatingdisorders
    c. Complicationsofeatingdisorders

Unit-IV

1. Psychologicalaspectofdoping
2. Psychologicalpreparationof eliteathletes
    a. Conceptofpsychologicalpreparation
3. Biofeedbacktraining
4. Mentalimagery
5. Stressmanagement
    a. Principlesofstress
    b. Managementstress
    c. Managementtechniques

Unit-V

1. Group Behaviourandleadership
    a. Natureofgroupbehaviourandgroup
    b. Typesofgroups
    c. Educationalimplicationsofgroupbehaviour
    d. Meaningofleadership,typesofleadership,qualityofleadership,trainingandfunctioningof leadership
2. Emotion
    a. Meaningofemotion
    b. Characteristicsof emotion
    c. Meaningofcontrolling andtrainingofemotionsand itsimportance.
    d. Contributionofsportstoemotionalhealth
    e. Meaningofsentiment, itstypes, importanceandformation

Text Books:

1. MorganandKing:*Introduction to psychology*-TataMcGrawHill
2. Suinn:*Psychologyinsports:Methodsandapplications*,Surjeet Publications.
3. Grafiti:*psychologyin contemporarysports*,prentice Hall.
4. Basmajian,SanjivP.Sahni:*Handbookofsportspsychology-AcomprehensivemanualofMentalTraining* Biofeedback

CourseOutcomes(CO)

Attheendofthecourse,thestudentwillbeableto

CO1	Discussanddescribethestructures,regions,andfunctionsofthehumanbrain and associatedsensorysystems
CO2	Compareandcontrastthedataandhypothesesabouttheeffectsofexerciseandmentalactivity, andsleep disorders
CO3	Evaluatetheresearchontheimportanceofthebrainareasineatingand drinkingandthedifferencesbetweenobesity,anorexianervosa,andbulimia.
CO4	Compare and contrast the components of emotion and describe the maintheories that have been used to explain emotion and the functions, structures,andmainregionsofthebrainessentialtoemotionexpression,aswellas any culturaldifferencesinexpression.
CO5	Analyzeresearchonetiologicalandpsychopharmacologicalfindingsrelatedto Autistic spectrum disorders, Anxiety Disorders, PTSD, OCD, Schizophrenia,Alzheimer'sdisorder,ADHD,MajorDepressiveDisorder,BipolarDisorder,andaddictions. Analyze one neurological or psychological disorder in a researchpaperusingscholarlysourcestotestahypothesisrelatedtoaphysiological aspectofthatdisorder

MAPPINGWITHCOURSEOUTCOMES(COs)andPROGRAMMESPECIFICOUTCOMES (PSOs)inthe3–pointscale[Strong–3;Medium–2;Low–1].

	CO-POMapping(CourseArticulationMatrix										LevelofCorrelationbetweenPSO's&CO's				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	2	3	3	2	3	3	3	3	3	3	3
CO2	3	2	2	3	3	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO5	3	3	3	2	2	3	3	3	3	2	3	3	3	3	3
	Weightage										15	15	15	15	15
	WeightedPercentageofCourseContributiontoPSO's										3.0	3.0	3.0	3.0	3.0

Semester	23MEPE405: DOPING ANDERGOGENIC AIDSINSPORTS	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
IV		3			3	25	75	100

LearningObjective(LO):

LO1	Toknowthenumeroussupplementation,ergogenicaidsanddopingmethodsthat enhances sports performances, and those that are banned and haveseriousside-effects.

Unit-I

Definitionofdoping,supplementationandergogenicaids-Historyofdopinginsport-Determining the efficacy of performance-enhancing substances - Extent of use of doping andsupplementation - Drugs banned by major sporting organizations, including the InternationalOlympicCommittee(IOC)andUnitedStatesOlympicCommittee(USOC).

Anabolic/AndrogenicSteroidsandProhormones-Naturalandsyntheticandrogens-Tetrahydrogestrinone(THG)-Androstenedione,DHEA,andrelatedcompounds-Polypharmacy:Useofotherdrugswithanabolic/androgenicsteroids-Humanchorionicgonadotropin(hCG)andluteotrophichormone-Tamoxifen

Unit-II

β2-Agonists-Useasabronchodilatortoenhanceexerciseperformance -Usetoenhancemuscleforceandpowerproduction-Effectsoflonger-termuse onbodycomposition

GrowthHormoneandGrowthHormoneReleasers-Useofgrowthhormoneasanergogenicaid.-Arginine,ornithine,andlysine

Blood Doping and Recombinant Erythropoietin (rEPO) - Caffeine - Effects on very high intensity,short-termexercise.Effectsonhighintensityexerciseofmoderateduration.Effectsonenduranceperformance.

Creatine-Effectsonanaerobicexerciseperformance.-Effects onmusclemass.

Unit -III

HerbalsasErgogenicAidsandWeightLossAgents-Ginsengandrelatedcompounds -Chineseand Japanese ginseng - Russian or Siberian ginseng (Eleutherococcus senticosus) - Endurox - Ephedra/ephedrine and pseudoephedra - Products containing ephedrine, caffeine and aspirin - Hydroxycitrate/Garciniacambogia-CitrusAurantium-Yohimbine

AmphetaminesandCentralNervousSystemStimulants-Amphetamines-Bromantan-Mesocarb

Nutrients, Vitamins and Micronutrients As Potential Ergogenic Aids - Insulin - action enhancers:Chromium,Vanadium-Carnitine-HMB(β-hydroxy-β-methylbutyrate)-Proteinsupplementsandaminoacids1.Theimportanceofnutrienttiming-Wheyprotein-Leucine-Glutamine-Branchedchainamino acids-Antioxidants-β-AdrenergicAntagonists

Unit-IV

OtherErgogenicAidsorPractices,andAbusedDrugsinSports-Bicarbonateloading-Diuretics -Useofdiureticstoinducefluidloss-Acetozolamideandexerciseataltitude-Glycerol-Oxygenbreathing -Popular Over-The-Counter Supplements- Pyruvate - Use as weight loss agent -Potentialergogeniceffects-ConjugatedLinoleicAcid-Ribose-α-lipoicAcid-Tribestan(Tribulusterrestris)

Unit-V

TheEvolutionofAntidopinginSports-InadvertentUseofProhibitedSubstancesinSports-RoleofAthleteSupportPersonnelinPreventingDeliberateandInadvertentUseofProhibitedSubstances-DopingControlinSports- Worldanti-dopingagency(WADA)andNationalAntidoping agency (NADA), Formation, History and Standards; List of prohibited substances andDrugs; Analytical procedures and testing of samples from athletes; Drug abuse and athleticperformance; Regulations on Dietary supplements: FSSAI and NADA. Consequences of megadosagein sportsperformance

Referencebooks

1. Antonio,J.,Stout,J.R.(2002).SupplementsforEnduranceAthletes.United Kingdom:HumanKinetics.
2. Cooper, C. E. (2008). Drugs and ergogenic aids to improve sport performance. Essays in biochemistry, 44,1-10.
3. Greenwood, M., Cooke, M. B., Ziegenfuss, T., Kalman, D. S., & Antonio, J. (Eds.). (2015). Nutritionalsupplementsinsportsandexercise.HumanaPress.
4. Hackney, A. C. (2017). Doping, performance-enhancing drugs, and hormones in sport: mechanisms ofactionandmethodsofdetection.Elsevier.
5. Jason,P.(2008)Doping:athletesanddrugs,Rosenn Publishing,NewYork
6. McArdle, W.D., Katch, F.I. & Katch, V.L. (2001). Exercise physiology: Energy, nutrition and humanperformance, 5thed.Baltimore,MD:LippincottWilliams&Wilkins.
7. Mottram,D.,&Mottram,D.R.(2010).Drugsinsport.Routledge.

CourseOutcomes(CO)

Attheendofthecourse,thestudentwillbeableto

CO1	Discussanddescribethedopingthatinfluencessportsperformance
CO2	Compareandcontrasttheeffectsofdopingandexerciseonhormones
CO3	Evaluatetheherbalsandnutritionasergogenicaids.
CO4	Toexplaindrugabuseinsports.
CO5	Tonarratetheanti-dopingcontrolinsports

MAPPINGWITHCOURSEOUTCOMES(COs)andPROGRAMMESPECIFICOUTCOMES (PSOs)inthe3–pointscale[Strong–3;Medium–2;Low–1].

	CO-POMapping(CourseArticulationMatrix										LevelofCorrelationbetweenPSO's&CO's				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3
CO2	3	2	2	3	3	3	3	3	3	3	3	3	3	3	3
CO3	2	3	3	3	2	3	3	3	3	3	3	3	3	3	3
CO4	2	3	3	3	3	3	3	3	2	3	3	3	3	3	3
CO5	3	3	3	2	3	2	3	3	3	3	3	3	3	3	3
	Weightage										15	15	15	15	15
	WeightedPercentageofCourseContributiontoPSO's										3.0	3.0	3.0	3.0	3.0

Semester	23MEPS406:BIOMECHANICSAND EXERCISEPHYSIOLOGYOFRUNNI NG	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
IV		1		2	2	25	75	100

LearningObjective(LO):

LO1	Thiscourseprovidesknowledgeofvisceralorgansinvolvedduringrunningandits acuteandchronicadaptationstotraining.
LO2	This course provides the theoretical and practical basics in the running techniquesanalysis andthetoolscommonlyusedforstudyingbiomechanics andphysiology.

UnitI–Anatomyofthe locomotorapparatusandbasicprinciplesofmotion

Coordinationandrunningmechanics,Structureandwaysinwhichjointscanmove,generationofpower atmusclelevel;structureanddifferentiationofmuscles,jointmoments,andpassivetissuefunction; elasticity and reactive muscle action; Working of Biarticular joints; mechanism thatregulatesrunning.

UnitII–GenerationofEnergyandRunningTechnique

Energy, Capacity and power, cardiorespiratory system, maximal oxygen uptake; Running - Highspeedrunning,startandacceleration,constantlowspeedrunning.

UnitIII– Trainingandadaptation

Principles of sports training, derived principles of training, adaptations, means and methods oftraining

UnitIV–Runningtechniquesinpractice

Sensory system and coordination, condition and coordination, principles of overload, transfer oftraining, economy of training, Basic components of running, Constant-speed running, start andacceleration.

UnitV–Strengthtrainingforrunners

Concepts, description and definition of different forms of power training, strength training andfunctional anatomy – biomechanical aspects, strength training, muscle structure, and function;Strengthtraining(individualmusclegroups),strengthtrainingformusclechainsworkingtoget her,strengthtrainingforpatternsofmovement resemblingrunning.

Textbook

1. BoschF,KlompR.(2005).RunningBiomechanicsandExercisePhysiologyinPractice,Elsevie r,ChurchillLivingstone.
2. Ferber R, Macdonald S. (2014). Running Mechanics and Gait Analysis. Human kinetics,NJ,USA.

CourseOutcomes(CO):

Attheendofthecourse,thestudentwillbeableto

CO1	Screen sedentary and athletes with simple laboratory tests for the functionalevaluations.
CO2	Explaintheanatomyofrunning
CO2	Gainbetterinsightintorunningrelatedbiomechanicalandphysiologicalparametersinfluencesrunning.
CO3	SportsTrainingPrinciplestoenhanceperformance
CO4	Identifiesthemistakesinrunningmovement
CO5	Applytheobtainedknowledgetodesignnewtrainingregimeforathletes.

MAPPINGWITHCOURSEOUTCOMES(COs)andPROGRAMMESPECIFICOUTCOMES (PSOs)inthe3–pointscale[Strong–3;Medium–2;Low–1].

	CO-POMapping(CourseArticulationMatrix										LevelofCorrelationbetweenPSO's& CO's				
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3
CO5	3	3	3	3	2	3	3	3	2	3	3	3	3	3	3
	Weightage										**15**	**15**	**15**	**15**	**15**
	WeightedPercentageofCourseContributiontoPSO's										**3.0**	**3.0**	**3.0**	**3.0**	**3.0**

Semester	23MEPS407:FATIGUE,INJURIES ANDREHABILITATION	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
IV		1		2	2	25	75	100

LearningObjective(LO):

LO1	Togainknowledgeaboutbasicsoffatigue,overtraininganditseffects.
LO2	Studyaboutsportsinjuriesandtheirmanagement.
LO3	Tostudyaboutprinciplesofrehabilitationandvarioustherapeuticmodalities.

Unit-I

ConceptofOverloading,Overtraining,FatigueandStaleness,SymptomsandCausesofFatigue,Types of Fatigue, Theories associated with Fatigue, Definition, Types, Symptoms, Findings,UnderlyingMechanismsandFrequencyofOvertrainingandOvertrainingSyndrome.

Unit-II

Oxygen Debt Theory, Recovery Oxygen Uptake or Excess Post-exercise Oxygen Consumption(EPOC), Implications of EPOC for Exercise and Recovery, Optimal Recovery from Steady-RateExercise andNon-Steady-Rate Exercise,Intermittent ExerciseandRecovery

Unit-III

Sports Injury- Meaning, Classification, Causes, Types, General guidelines for their Prevention,Recovery Time, Introduction and Management of common Sports Injuries (Fracture, Dislocation,Laceration,Abrasion,SprainandStrain),HowtoavoidSportsInjuries,RoleofWarm-upandCoolDown

Unit-IV

Signs and symptoms of bleeding - External and Internal bleeding - Treatment of bleeding - Preventing infection; Spinal injuries - Risk factors for spinal injuries - Preventing injuries to thespine-Firstaidtechniquesforinjuriestothevertebralcolumn;Injuriestothethoraxandabdomen -Riskfactorsforinjuriestothethorax/abdomen-Preventinginjuriestothethorax/abdomen-Firstaidtechniquesforinjuriesto thethorax/abdomen;

Unit-V

Rehabilitation: Meaning, Concepts, Objective and scope of Rehabilitation, Principal of care andRehabilitationTherapeuticModalities:Electrotherapeuticmodalities(ShortwaveDiathermy,Ultrasound, T.E.N.S), Heat and Cold, Soft tissue Massage, Aquatic Rehabilitation Exercise,TherapeuticExercise,TherapeuticNutrition,PsychologicalRehabilitation

Referencebooks

1. Phillips,S.(2016).FatigueinSportandExercise.United Kingdom:Routledge.
2. Denegar, C. R., Saliba, S. F., Saliba, E. (2016). Therapeutic Modalities for Musculoskeletal Injuries.UnitedKingdom:HumanKinetics.
3. Prentice, W. E. (2006). Essentials of Athletic Injury Management with eSims. United Kingdom:McGraw-HillHigherEducation.

4. Khan,K.,Brukner,P.(2002).ClinicalSportsMedicine.Austria:McGraw-Hill.
5. Sinha, A. G. (2009). Principles and Practice of Therapeutic Massage. India: Jaypee Brothers MedicalPublishersPvt.Limited.
6. Singh,J.(2017).TextbookofElectrotherapy.India:JaypeeBrothersMedicalPublishersPvt.Limited.
7. ehmann, M., Foster, C., Gastmann, U. (2007). Overload, Performance Incompetence, andRegenerationinSport.UnitedStates:SpringerUS.

CourseOutcomes(CO)

Attheendofthecourse,thestudentwillbeableto

CO1	Studentswillbeabletoanalyzeanddeterminevarioussportsinjuries.
CO2	Studentswillbeabletoanalyzeanddeterminevarioussportsinjuries.
CO3	Applicationofvariousmechanismofrehabilitation
CO4	Improvedunderstandingofvarioussportsinjuriesandmechanismofrehabilitation
CO5	Analyzeresearchonvarioustreatmentmodalitiestobringbacktheathleteto theplayingarenaassoonaspossible

MAPPINGWITHCOURSEOUTCOMES(COs)andPROGRAMMESPECIFICOUTCOMES (PSOs)inthe3–pointscale[Strong–3;Medium–2;Low–1].

	CO-POMapping(CourseArticulationMatrix										LevelofCorrelationbetweenPSO's&CO's				
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	3	2	3	3	3	2	3	3	3	3	3	3	3	3	3
CO2	3	2	2	3	3	3	3	3	3	3	3	3	3	3	3
CO3	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO4	2	3	3	3	3	3	3	3	2	3	3	3	3	3	3
CO5	3	3	3	2	3	2	3	3	3	3	3	3	3	3	3
	Weightage										**15**	**15**	**15**	**15**	**15**
	WeightedPercentageofCourseContributiontoPSO's										**3.0**	**3.0**	**3.0**	**3.0**	**3.0**

Semester	23MEPP103: Practical - I:FIELDTESTINGOFPHYSICAL AND PHYSIOLOGICALFITNESS	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
I				10	5	25	75	100

LearningObjective(LO):

LO1	Toacquirefamiliarityandbuildskillsinquantifyingkinanthropometry, physicalfitnessandfunctionalcapacity.

1. **DemonstrationofKinanthropometryDataCollection**
   - AssessmentofLength,Breadth,Depth,Girth,andSkinfoldthickness
   - QuantificationofBodyComposition,viz.PercentBodyFat-FatMass-LeanBodyMass,andBodyMassIndex
   - Classificationof SomatoTypes

2. **DemonstratingMethodsofQuantifyingDataonHealth-relatedPhysicalFitnessComponents**
   - Strength
   - Cardiorespiratoryendurance
   - Muscularendurance
   - Flexibility- includingrange ofmotionofallmajorjointsandmusclesusingGoniometer

3. **Demonstration of Assessing Data on Skill-related Physical FitnessComponents**
   - Speed
   - Power
   - Agility
   - Balance
   - Coordination
   - ReactionTime

4. **DemonstrationofTestingFunctionalAbilityandCapacity**
   - FunctionalAbility
   - FunctionalCapacity

CourseOutcomes(CO)

Attheendofthecourse,thestudentwillbeableto

CO1	Demonstratethecapabilitytoassesskinanthropometricmeasurements
CO2	Exhibitsthec competence to measure health related physical fitness omponents.
CO3	Exhibitsthecompetencetomeasureskillrelatedphysicalfitnesscomponents.
CO4	Demonstratetheabilitytoevaluatefunctionalabilityandcapacity.

MAPPINGWITHCOURSEOUTCOMES(COs)andPROGRAMMESPECIFICOUTCOMES (PSOs)inthe3–pointscale[Strong–3;Medium–2;Low–1].

	CO-POMapping(CourseArticulationMatrix										LevelofCorrelationbetweenPSO's&CO's				
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	2	3	3	3	3	3	3	3	3	3	3	3	3	3
CO2	3	2	2	3	2	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	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	3	3
	Weightage										12	12	12	12	12
	WeightedPercentageofCourseContributiontoPSO's										3.0	3.0	3.0	3.0	3.0

Semester	23MEPP203:Practical-II: LABORATORYTECHNIQUESINFITNESSTESTING	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
II				10	5	25	75	100

LearningObjective(LO):

LO1	Demonstrates the ability to utilize laboratory equipments and techniques inthe assessmentofphysicalandphysiologicalfitness

1. Demonstrating MethodofQuantifyingDataonHeartRateandHRV

- Heartratemeasurementsatrest
- AcuteHeartRateresponsetoExercise
  - Peak HeartRate
  - AverageHeartRate
  - HeartRateduringRecovery
- Teamheartratemeasures
- PosturalEffectsonHeartRate
- Pulse&HeartRate
- HeartRateVariability
  - Rwaves
  - QRScomplex
  - RRintervals
  - VeryLowFrequency-LowFrequency-HighFrequencyBands

2. DemonstrationofMeasuringBloodPressure

- SystolicBloodPressureatRest
- DiastolicBloodPressureatRest
- Mean ArterialBlood Pressure
- PulsePressure
- BloodPressure Responsesto Exercise
- PosturalEffectonBloodPressure
  - Sitting
  - Standing
  - Lying
- Hypertension

3. DemonstratingtheAnalysisof BodyCompositionusingBODPOD

- EstimationofBodyDensity-PercentBodyFat-FatMass-LeanBodyMass

4. Demonstrating the Utility of Team Heart Rate Monitor in the assessment ofrestingheartrate,peakheartrate,averageheartrate,recoveryheartrate,excesspost exerciseoxygen consumption

5. DemonstratingtheEvaluationofStrengthusingBack-Leg-ChestDynamometer,Push-Pull Dynamometer,HandDynamometer,andHydraulicPinchGauge

6. DemonstrationofFitnessAssessment usingWirelessTimingGateSystem

- Speed-Agility-AerobicPower-AnaerobicPower-Endurance

CourseOutcomes(CO)

Attheendofthecourse,thestudentwillbeableto

CO1	Demonstratethecapability toassessbloodpressure.
CO2	Demonstrate thecapabilitytoassessheartrate, andheart ratevariability.
CO3	Exhibitsthecompetencetomeasurebodycompositionandclassifybodytypes.
CO4	Displaytheabilitytomeasurestrengthusingdynamometerin labsetting
CO5	Exhibittheabilitytoquantifyskillrelatedphysicalfitnesscomponentsinlabsettingusingsophisticated researchequipments

MAPPINGWITHCOURSEOUTCOMES(COs)andPROGRAMMESPECIFICOUTCOMES (PSOs)inthe3–pointscale[Strong–3;Medium–2;Low–1].

	CO-POMapping(CourseArticulationMatrix										LevelofCorrelationbetweenPSO's&CO's				
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	3	2	3	3	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	2	3	3	3	3	3	3	3	3	3	3	3	3
CO3	3	3	3	3	3	3	3	3	2	3	3	3	3	3	3
CO4	3	3	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	3	3
	Weightage										**15**	**15**	**15**	**15**	**15**
	WeightedPercentageofCourseContributiontoPSO's										**3.0**	**3.0**	**3.0**	**3.0**	**3.0**

Semester	23MEPP304: Practical - III:ADVANCE LABORATORYTECHNIQUE SINEXERCISE PHYSIOLOGY	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
III				10	5	25	75	100

LearningObjective(LO):

LO1	Demonstrates the ability to utilize laboratory equipments and techniques intheassessmentofphysicalandphysiologicalfitness

1. **DemonstrationofUpperandLowerExtremityErgometerExerciseTestingusingMONARK 89IEand MONARK 894E**
   - Work load - Setting of load - Pendulum weight - mechanical and electronicbraking system – pedalling frequency – Procedure for work test – Saddleand handle-bar adjustments - unit of measures: kilopond metres (kpm) andwatts
   - Standardprotocols-Choiceofload
   - Energy demand and heart rate response to exercise with different load – interpretation of data.

2. **Demonstrationof MetabolicGasExchangeTestingusingCPETandK5**
   - Calibration of Flow and Volume – Concentration of Reference Gas – ConcentrationofRoomAirandGas.
   - Parameters to be measured: Metabolic, Ventilatory, Cardiovascular, andGasExchange.

3. **DemonstratingtheMeasurementofLungVolumesandCapacitiesusingSPIROMETER**
   - Tidal Volume, Inspiratory Reserve Volume, Expiratory Reserve Volume,ResidualVolume
   - VitalCapacity,TotalLungCapacity,InspiratoryCapacity,ExpiratoryCapacity,FunctionalResidualCapacity
   - DynamicLungVolumes:FVC- FEV_1-FEF_{25-75}-MMEF – PEFR- MVV

4. **DemonstratingtheMeasurementsquantifiedwithIsokineticDynamometer**
   - Strength, Endurance, Power, and Range of Motion of all major joints andmuscles

5. **QuantificationofFitnessutilizingJumpMeasuringSystem**
   - Jumpheight-Flighttime-Contacttime-ReactiveStrengthIndex

6. **DemonstratingtheusesofInertialMeasurementUnit(IMU)**
   - DynamicStabilityduringwalkingand running
   - Jumpinganalysis
   - Postureanalysis

CourseOutcomes(CO)

Attheendofthecourse,thestudentwillbeableto

CO1	Demonstratetheabilitytomonitorphysiologicalfunctionsusingscientificresearcheq uipmentsviz.IMU,Wingateergometer,isokineticmachine.
CO2	Demonstrate theabilitytocollectdataonmetabolicgasexchange
CO3	Exhibitsthe competence tocollectand report spirometrydataandbiomarkers
CO4	Demonstrate the ability to monitor strength and endurance in specific range ofmotionatparticularintensitybyusingisokineticmachine.
CO5	Demonstratetheabilitytomonitorspatiotemporalvariablesbyusingscientificresear chequipmentsviz.OPTOJump,andIMU.

MAPPINGWITHCOURSEOUTCOMES(COs)andPROGRAMMESPECIFICOUTCOMES (PSOs)inthe3–pointscale[Strong–3;Medium–2;Low–1].

	CO-POMapping(CourseArticulationMatrix										LevelofCorrelationbetweenPSO's&CO's				
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO3	3	2	3	3	3	3	3	3	2	3	3	3	3	3	3
CO4	3	3	3	2	3	3	3	3	3	3	3	3	3	3	3
CO5	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3
	Weightage										**15**	**15**	**15**	**15**	**15**
	WeightedPercentageofCourseContributiontoPSO's										**3.0**	**3.0**	**3.0**	**3.0**	**3.0**

Semester	23MEPD403:DISSERTATION	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
IV				14	7	25	75	100

LearningObjective(LO):

LO1	Investigating currentresearchproblemandfindingsolution

CourseOutcomes(CO):

Atthe endofthecourse,thestudentwillbeableto

CO1	Handlethepracticalproblemstoenhancethesportsperformance
CO2	Collectliterature relatedtotheirresearchproblem
CO3	Knowsthemethods tocollectdata
CO4	Knowsthesuitablestatisticsandableinterpretthestudy result
CO5	Identifiesthe reasonformodificationandconcludes

(SubmissionofDissertation)

Student must design, conduct, and report on an original research study of an aspect oftheir M.Sc. Exercise Physiology programme. They can perform research using equipments suchasCPET,K5,WingateErgometer,Spirometer,Teamheartratemonitor,BodPod,Kinanthropometric kit, isokinetic, Inertial Measurement Unit for metabolic gas analysis, anaerobicpower,aerobicpower,lungcapacities,lungvolumes,restingheartrate,peakheartrate,averageheart rate, recovery heart rate, body composition, somato typing, kinematic measurements orkinetic measurementsofsportspersonsandofindividualsfor clinicalexercisephysiology.

The student must carry out a research work based on topic of his/her own choice, underthe supervision of a teacher. The research work shall be by the fourth semester. The studentsmust plan and prepare a research proposal and make an initial synopsis presentation whereinhe/she introduces the problem, its relevance, the method, expected outcome etc., and internalevaluation of the presentation will be made. The supervising teacher will monitor the student'sprogressinthestudywhichwillbeevaluatedinternally.Thefinalprojectreporthastobesubmitted in the prescribed format (APA Guidelines) by the end of the fourth semester for evaluation. Thestudent should produce a synopsis of his/her research work for the external examination andmakea powerpointpresentation ofthesame.

VIVA

There will be a comprehensive viva voce examination at the end of the fourth semesterbased on the theories in the field of exercise physiology and the area of research conducted bythestudent beevaluated bythecommittee.

The split of ESE mark as follows 25 marks for Viva-Voce and 50 marks for DissertationEvaluation.

CourseOutcomes(CO):

Attheendofthecourse,thestudentwillbeableto

CO1	Handlethepracticalproblemstoenhancethesportsperformance
CO2	Collectliterature relatedtotheirresearchproblem
CO3	Knowsthemethods tocollectdata
CO4	Knowsthesuitablestatisticsandableinterpretthestudy result
CO5	Identifiesthe reasonformodificationandconcludes

MAPPINGWITHCOURSEOUTCOMES(COs)andPROGRAMMESPECIFICOUTCOMES (PSOs)inthe3–pointscale[Strong–3;Medium–2;Low–1].

	CO-POMapping(CourseArticulationMatrix										LevelofCorrelationbetweenPSO's& CO's				
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**
CO1	3	3	3	3	2	3	3	3	2	3	3	3	3	3	3
CO2	3	3	3	3	2	3	3	3	3	3	3	3	3	3	3
CO3	3	3	2	3	2	3	3	3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	2	3	3	3	3	3	3	3	3	3
CO5	3	3	3	3	2	3	3	3	2	3	3	3	3	3	3
	Weightage										**15**	**15**	**15**	**15**	**15**
	WeightedPercentageofCourseContributiontoPSO's										**3.0**	**3.0**	**3.0**	**3.0**	**3.0**

Semester	23MSBX408:ExtensionActivity	Hours/Week			C	Marks		
		L	T	P		CIA	ESE	Total
IV					1	25	75	100

ExtensionActivity: Thebasicobjectiveofextensionactivityistocreatesocialawarenessandknowledgeofsocialrealitiestohaveconcernforthewelfareofthecommunityandengageincreativeandconstructivesocietaldevelopment.

a. Itis mandatoryfor every studenttoparticipateinextensionactivity.
b. AllthestudentsshouldenrollunderNSS/NCC/CYRC/RRC/PhysicalEducationoranyotherservice organization in theuniversity.
c. Studentshouldputaminimumattendanceof40hoursinayeardulycertifiedbytheProgrammeCo-Ordinator.
d. Extensionactivity shallbeconductedoutsidetheclasshours.
e. Extensionactivity is categorizedasnon-corecourse.

PHYSICALEDUCATION

A. GUIDELINES

Regular Activities (120 Hours/Year - after working hours of the College) (in Total 240 Hours)The Physical Education curriculum will develop students' knowledge and skills in physicalactivities.Thisbaseof knowledgeandskillsinPhysicalEducationisacorecomponentofthewholesome development of an individual. It helps to create a fit citizen of our nation. RegularActivitieswillbeprescribedbythePhysicalDirector/Facultyi/cofthecolleges/Universityas perthe localneedsofthe institutions.

B. SCHEMEOFEVALUATION

Nature ofActivity	Evaluation Criteria	Level ofPerformance	Markforeachcategory		
			Scoring Scheme	Maximum	Total(Maximum)
Regular Activities	Attendance	Upto 50%	10	30	70
		51 to75%	20		
		Above 75%	30		
	FitnessProgression	Flexibility,Strengthand Endurance	From SemesterI toIV	15	
	Participation	Regular physical activities,games/sports & Intramural sports,healthawarenessactivities, conference/seminaretc.		25	
		Involvement in organising sportsactivities/tournaments/ competitions			
Special Camp	IntramuralSports			10	30
	Intercollegiate/DistrictLevel			20	
	Inter-University /StateLevel&Above			30	
				Total	**100**

****