REVA UNIVERSITY
Bengaluru, India

School of Allied Health Sciences

B.Sc (Hons) SPORTS AND EXERCISE SCIENCE

HANDBOOK - Batch 2023

Academic Year 2024-2025

Rukmini Knowledge Park

School of Allied Health Sciences

B.Sc (Hons) SPORTS AND EXERCISE SCIENCE

HANDBOOK 2023

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Rukmini Educational Charitable Trust

Chancellor's Message

"Education is the most powerful weapon which youcan use to change the world."
-Nelson Mandela.

There was a time when survival depended on just the realization of physiological needs. We are indeed privileged to exist in a time when intellectual gratification' has become indispensable.

Information is easily attainable for the soul that is curious enoughto go look for it. Technological boons enable information availability anywhere anytime. The difference, however, lies between those who look for information and those who look for knowledge.

It is deemed virtuous to serve seekers of knowledge and as educators it is in the ethos at REVA University toempower every learner who chooses to enter our portals. Driven by our founding philosophy of 'Knowledgeis Power', we believe in building a community of perpetual learners by enabling them to look beyond their abilities and achieve what they assumed impossible.

India has always been beheld as a brewing pot of unbelievable talent, acute intellect, and immense potential.All it takes to turn those qualities into power is a spark of opportunity. Being at a University is an exciting and rewarding experience with opportunities to nurture abilities, challenge cognizance and gain competence.

The curriculum caters to and has relevance to local, regional, national, global developmental needs. Maximum number of courses are integrated with cross cutting issues with relevant to professional ethics, gender, human values, environment, and sustainability.

For any University, the structure of excellence lies in the transitional abilities of its faculty and its facility. I'm always in awe of the efforts that our academic board puts in to develop the team of subject matter experts at REVA. My faculty colleagues understand our core vision of empowering our future generation to be ethically, morally and intellectually elite. They practice the art of teaching with a student-centered and transformational approach. The excellent infrastructure at the University, educational and extra- curricular, magnificently demonstrates the importance of ambience in facilitating focused learning for our students.

A famous British politician and author from the 19th century - Benjamin Disraeli, once said 'A University should be a place of light, of liberty and of learning'. Centuries later this dictum still inspires me, and I believe,it takes team-work to build successful institutions. I welcome you to REVA University to join hands in laying the foundation of your future with values, wisdom and knowledge.

Dr. P. Shyama Raju

The Founder and Hon'ble Chancellor, REVA University

Pro Chancellor's Message

The pursuit of academic excellence has been the cornerstone of REVA University. We are dedicated to establishing an educational institution that goes above and beyond conventional learning, revolutionising the field of education using cutting-edge techniques. We intend to create an environment that moulds students into holistic beings. By doing this, we continue to be the torchbearers of education by improving our position to be a Social Impact University and bringing about positive changes in our overall development.

For REVA, the year 2023 has been an eventful one. We are ranked among the top 100 Universities in NIRF Innovation ranking. We have also entered Times World University Higher Education Rankings in 2023 in the first attempt. We started several new courses that match industry standards and education trends. We began programmes like B.Sc. Sports Science, B. Tech Agriculture Engineering, and B.Tech Aerospace Engineering that are in alignment with the trends.

REVA offers a setting where extracurricular endeavours and academic proficiency go hand in hand, relentlessly pursuing a path of greatness in every field. We balance the two by offering top-notch facilities and meticulously planned learning environments. At REVA, we have integrated technology in the most transparent manner with cutting-edge labs, an expansive central library, a fully-equipped fitness centre, a cutting-edge sports facility, and designated areas for extracurricular activities.

At REVA, we always value the commitment and dedication of our faculty and staff. They empower, support and guide students to strengthen their skills, generate confidence and help them soar high in their chosen fields.

Best wishes,

Mr Umesh S Raju

Pro Chancellor

REVA University

Vice-Chancellor's Message

Higher education in India has seen remarkable growth, blending traditional wisdom with modern innovation. With a rich history of prestigious universities, the sector has expanded to meet international standards. Interdisciplinary studies and technological integration are transforming learning and research. India is committed to providing quality education, preparing a skilled and knowledgeable workforce for global challenges.

At REVA University, we live by the principle that "Knowledge is Power." We are committed to delivering top-notch education, nurturing young minds with ethical and moral values, and enhancing their leadership, research, and innovative skills. Our sprawling 45-acre green campus, a true 'temple of learning,' boasts state-of-the-art infrastructure that fosters a superior teaching-learning environment and cutting-edge research. Our mission is to offer higher education of global standards, with programs designed to meet international benchmarks. Our highly experienced and qualified faculty, dedicated to fostering a student-centric learning environment through innovative teaching methods, are the backbone of our University.

REVA University's programs follow the Choice Based Credit System (CBCS) with an Outcome-Based Approach. Our flexible curriculum is tailored with industry-specific goals in mind, allowing educators to adapt the syllabus with the latest knowledge and inspire students' creativity. Our curriculum, benchmarked against top institutions, is a collaborative effort of esteemed faculty, industry experts, and research organizations. Our evaluation system emphasizes continuous assessment with grade point averages, ensuring it meets the aspirations of all stakeholders—students, parents, and employers.

Research, consultancy, and innovation are the pillars of success at REVA University. Our faculty members actively engage in research, attracting funded projects from prestigious organizations like DST, VGST, DBT, DRDO, AICTE, and industries. These research outcomes are shared with students through live industry projects. We nurture students' entrepreneurial spirit through EDPs and EACs.

We have forged strong partnerships with leading industries to bridge the gap between academia and the industry. Regular industry visits and mandatory internships equip our students with industry-relevant skills. Our structured training programs in soft skills and competitive exam preparation enhance students' employability. The 100% placement rate for eligible students is a testament to the effectiveness of these programs. Our entrepreneurship development activities and "Technology

Incubation Centres" provide full support to budding entrepreneurs, helping them turn their ideas into successful enterprises.

With a firm belief in Albert Einstein "Education is not the learning of facts, but the training of the mind to think" we are confident that REVA University is on the right path, offering holistic education to future generations and contributing positively to nation-building. We are committed to providing top-quality education accessible to all, fostering overall personality development, and creating "GLOBAL PROFESSIONALS."

Welcome to REVA University!

Dr. N.Ramesh

I/c Vice Chancellor, REVA University

Head of the Department's Message

Welcome to the Department of Sports & Exercise Science at REVA University!

As Joe Paterno rightly said, "The will to win is important, but the will to prepare is vital." This quote encapsulates the essence of our Sports & Exercise Science program. We believe that success in sports science, like in any field, hinges not only on the desire to achieve but also on meticulous preparation.

Our program is designed to equip you with the knowledge, skills, and practical experience necessary to excel in the dynamic field of sports science. From human movement and exercise physiology to sports nutrition and biomechanics, our curriculum integrates theoretical learning with hands-on experience. We emphasize rigorous preparation through practical sessions, research opportunities, and industry collaborations, ensuring that you are well-prepared for the challenges and opportunities in sports and exercise science.

Our dedicated faculty members are committed to your academic and professional development, providing expert guidance and fostering an environment that encourages innovation, critical thinking, and ethical practice. With access to state-of-the-art facilities and resources, you will have every opportunity to maximize your potential and make a significant impact in the field.

I look forward to seeing you thrive and succeed in the Department of Sports & Exercise Science at REVA University.

Dr.S.Srividhya

HOD, Department of Sports & Exercise Science

PREFACE

Higher education across the globe is opening doors of its academic disciplines to the real-world experiences. The disciplinary legitimacy is under critical review. Trans-border mobility and practice learning are being fore grounded as guiding principles. Interactive learning, bridging disciplines and facilitating learners to gaindifferent competencies through judicious management of time is viewed as one of the greatest and fascinating priorities and challenges today.

Indian economy is experiencing an upward growth right from the beginning of 21st century necessitating well qualified science graduates to work as Scientists, Teachers, Algorithm Developers, Computer programmers, Professionals and often administrators. At present more than 400 million youth are below 18years of age andgovernment is committed to increase the GER to 30% by 2020, further necessitating a greater number of teachersand professors to work in schools and colleges. Research has also been given equal importance. Private sectorand Corporates are also looking for smart science graduates in a big way. The B.Sc. Sports Science degree program of REVA University is designed to prepare scientists, teachers, professionals & administrators whoare motivated, enthusiastic & creative thinkers to meet the challenges of growing economy as well as to fulfil growing aspirations of the youth.

The program has been developed with an emphasis on knowledge assimilation, application, national and international job market and its social relevance. The outcome-based curriculum designed and followed imbibes required theoretical concepts and practical skills in the domain. By undergoing this program, you will develop critical, analytical thinking and problem-solving abilities for a smooth transition from academic to real-life work environment. The L: T: P structure of teaching and learning under Choice Based Credit System (CBCS) and Continuous Assessment Grading Pattern (CAGP) would certainly help ourstudents learn and build competencies needed in this knowledge-based society.

This handy document containing brief information about B.Sc. Sports & Exercise Science programme, scheme of instruction will serve as a guiding path to you to move forward in a right direction.

RUKMINI EDUCATIONAL CHARITABLE TRUST

It was the dream of late Smt. Rukmini Shyama Raju to impart education to millions of under privileged children as she knew the importance of education in the contemporary society. The dream of Smt. Rukmini Shyama Raju came true with the establishment of Rukmini Educational Charitable Trust (RECT), in the year 2002. **Rukmini Educational Charitable Trust** (RECT) is a Public Charitable Trust, set up in 2002 with the objective of promoting, establishing and conducting academic activities in the fields of Arts, Architecture, Commerce, Education, Engineering, Environmental Science, Legal Studies, Management and Science & Technology, among others. In furtherance of these objectives, the Trust has set up the REVA Group of Educational Institutions comprising of REVA Institute of Technology & Management (RITM), REVA Institute of Science and Management (RISM), REVA Institute of Management Studies (RIMS), REVA Institute of Education (RIE), REVA First Grade College (RFGC), REVA Independent PU College at Kattigenahalli, Ganganagar and Sanjay Nagar and now REVA University. Through these institutions, the Trust seeks to fulfill its vision of providing world class education and create abundant opportunities for the youth of this nation to excel in the areas of Arts, Architecture, Commerce, Education, Engineering, Environmental Science, Legal Studies,Management and Science & Technology.

Every great human enterprise is powered by the vision of one or more extraordinary individuals andis sustained by the people who derive their motivation from the founders. The Chairman of the Trustis Dr. P. Shyama Raju, a developer and builder of repute, a captain of the industry in his own right and the Chairman and Managing Director of the Divya Sree Group of companies. The idea of creating these top notched educational institutions was born of the philanthropic instincts of Dr. P. Shyama Raju to do public good, quite in keeping with his support to other socially relevant charities such as maintaining the Richmond Road Park, building and donating a police station, gifting assets to organizations providing accident and trauma care, to name a few.

The Rukmini Educational Charitable Trust drives with the main aim to help students who are in pursuit of quality education for life. REVA is today a family of ten institutions providing education from PU to Post Graduation and Research leading to PhD degrees. REVA has well qualifiedexperienced teaching faculty of whom majority are doctorates. The faculty is supported by committed administrative and technical staff. Over 13,000 students study various courses across REVA's three campuses equipped with exemplary state-of-the-art infrastructure and conducive environment for the knowledge driven community.

REVA University has been established under the REVA University Act, 2012 of Government of Karnataka

and notified in Karnataka State Gazette dated 7thFebruary, 2013. The University is empowered by UGC to award degrees any branch of knowledge under Sec.22 of the UGC Act. TheUniversity is a Member of Association of Indian Universities, New Delhi. The main objective of theUniversity is to prepare students with knowledge, wisdom and patriotism to face the global challenges and become the top leaders of the country and the globe in different fields.

REVA University is located in between Kempegowda International Airport and Bangalore city, hasa sprawling green campus spread over 45 acres of land and equipped with state-of-the- art infrastructure that provide conducive environment for higher learning and research. The REVA campus has well equipped laboratories, custom-built teaching facilities, fully air-conditioned libraryand central computer centre, the well-planned sports facility with cricket ground, running track & variety of indoor and outdoor sports activities, facilities for cultural programs. The unique feature of REVA campus is the largest residential facility for students, faculty members and supportive staff.

The University is presently offering 23 Post Graduate Degree programs, 20 Degree and PG Degree programs in various branches of studies and has 15000+ students studying in various branches of knowledge at graduate and post graduate level and 410 Scholars pursuing research leading to PhD in 18 disciplines. It has 800+ well qualified, experienced and committed faculty members of whommajority are doctorates in their respective areas and most of them are guiding students pursuing research leading to PhD.

The programs being offered by the REVA University are well planned and designed after detailed study with emphasis with knowledge assimilation, applications, global job market and their social relevance. Highly qualified, experienced faculty and scholars from reputed universities/institutions, experts from industries and business sectors have contributed in preparingthe scheme of instruction and detailed curricula for this program. Greater emphasis on practice in respective areas and skill development to suit to respective job environment has been given while designing the curriculum. The Choice Based Credit System and Continuous Assessment Graded Pattern (CBCS – CAGP) of education has been introduced in all programs to facilitate students to opt for subjects of their choice in addition to the core subjects of the study and prepare them with needed skills. The system also allows students to move forward under the fast track for those who have the capabilities to surpass others. These programs are taught by well experienced qualified faculty supported by the experts from industries, business sectors and such other organizations. REVA University has also initiated many supportive measures such as bridge courses, special coaching, remedial classes, etc., for slow learners so as to give them the needed input and build in them confidence and courage to move forward and accomplish

success in their career. TheUniversity has also entered into MOUs with many industries, business firms and other institutions seeking their help in imparting quality education through practice, internship and also assisting students placements.

REVA University recognizing the fact that research, development and innovation are the important functions of any university has established an independent Research and Innovation division headedby a senior professor as Dean of Research and Innovation. This division facilitates all faculty members and research scholars to undertake innovative research projects in engineering, science &technology and other areas of study. The inter disciplinary-multi disciplinary research is given the topmost priority. The division continuously liaisons between various funding agencies, R&D Institutions, Industries and faculty members of REVA University to facilitate undertaking innovative projects. It encourages student research projects by forming different research groups under the guidance of senior faculty members. Some of the core areas of research wherein our youngfaculty members are working include Data Mining, Cloud Computing, Image Processing, Network Security, VLSI and Embedded Systems, Wireless Censor Networks, Computer Networks, IOT, MEMS, Nano- Electronics, Wireless Communications, Bio-fuels, Nano-technology for coatings, Composites, Electric Vehicles, Multilevel Inverter Application, Battery Management System, LED Lightings, Renewable Energy Sources and Active Filter, Innovative Concrete Reinforcement, Electro Chemical Synthesis, Energy Conversion Devices, Nano-structural Materials, Photo- electrochemical Hydro generation, Pesticide Residue Analysis, Nano materials, Photonics, Nano Tribology, Fuel Mechanics, Operation Research, Graph theory, StrategicLeadership and Innovative Entrepreneurship, Functional Development Management, Resource Management and Sustainable Development, Cyber Security, General Studies, Feminism, Computer Assisted Language Teaching, Culture Studies etc.

The REVA University has also given utmost importance to develop the much-required skills through variety of training programs, industrial practice, case studies and such other activities that induce the said skills among all students. A full-fledged Career Development and Placement (CDC) department with world class infrastructure, headed by a dynamic experienced Professor & Dean, and supported by well experienced Trainers, Counselors and Placement Officers. The University also has University-Industry Interaction and Skill Development Centre headed by a Senior Professor & Director facilitating skill related training to REVA students and other unemployed students. The University has been recognized as a Centre of Skill Development and Training by NSDC (National Skill Development Corporation) under Pradhan Mantri Kaushal Vikas Yojana. The Centre conducts several add-on courses in challenging areas of development. It is always active in facilitating student’s variety of Skill Development Training programs.

The University has collaborations with Industries, universities abroad, research institutions, corporate training organizations, and Government agencies such as Florida International University, Oklahoma State University, Western Connecticut University, University of Alabama, Huntsville, Oracle India Ltd, Texas Instruments, Nokia University Relations, EMC^2, VMware, SAP, Apollo etc, to facilitate student exchange and teacher–scholar exchange programs and conduct training programs. These collaborations with foreign universities also facilitate students to study some of the programs partly in REVA University and partly in foreign university, viz, M.S in Computer Science one year in REVA University and the next year in the University of Alabama, Huntsville, USA.

The University has also given greater importance to quality in education, research, administration and all activities of the university. Therefore, it has established an independent Internal Quality division headed by a senior professor as Dean of Internal Quality. The division works on planning, designing and developing different quality tools, implementing them and monitoring theimplementation of these quality tools. It concentrates on training entire faculty to adopt the new tools and implement their use. The division further works on introducing various examination and administrative reforms.

To motivate the youth and transform them to become innovative entrepreneurs, successful leaders of tomorrow and committed citizens of the country, REVA organizes interaction between students and successful industrialists, entrepreneurs, scientists and such others from time to time. Asa part of this exercise great personalities such as Bharat Ratna Prof. C. N. R. Rao, a renowned Scientist, Dr. N R Narayana Murthy, Founder and Chairman and Mentor of Infosys, Dr. K Kasturirangan, Former Chairman ISRO, Member of Planning Commission, Government of India, Dr. Balaram, Former Director I.I.Sc., and noted Scientist, Dr. V S Ramamurthy, Former Secretary, DST, Government of India, Dr. V K Aatre, noted Scientist and former head of the DRDO and Scientific Advisor to the Ministry of Defence Dr. Sathish Reddy, Scientific Advisor, Ministry of Defence, New Delhi and many others have accepted our invitation and blessed our students and faculty members by their inspiring addresses and interaction.

As a part of our effort in motivating and inspiring youth of today, REVA University also has instituted awards and prizes to recognize the services of teachers, researchers, scientists, entrepreneurs, social workers and such others who have contributed richly for the development of the society and progress of the country. One of such award instituted by REVA University is **'Lifetime Achievement Award'** to be awarded to successful personalities who have made mark in theirfield of work. This award is presented on occasion of the **"Founders' Day Celebration"** of REVAUniversity on 6th January of every year in presence of dignitaries, faculty members and students gathering. The first "REVA Lifetime Achievement Award" for the year 2015 has been awarded toShri. Kiran Kumar, Chairman ISRO, followed by Shri.

Shekhar Gupta, renowned Journalist for theyear 2016, Dr K J Yesudas, renowned play back singer for the year 2017. REVA also introduced "**REVA Award of Excellence"** in the year 2017 and the first Awardee of this prestigious award is Shri Ramesh Aravind, Actor, Producer, Director, Screen Writer and Speaker.

REVA organizes various cultural programs to promote culture, tradition, ethical and moral values toour students. During such cultural events the students are given opportunities to unfold their hiddentalents and motivate them to contribute innovative ideas for the progress of the society. One of suchcultural events is REVAMP conducted every year. The event not only gives opportunities to students of REVA but also students of other Universities and Colleges. During three days of this mega event students participate in debates, Quizzes, Group discussion, Seminars, exhibitions and variety of cultural events. Another important event is Shubha Vidya, Graduation Day for the final year students of all the programs, wherein, the outgoing students are felicitated and are addressed by eminent personalities to take their future career in a right spirit, to be the good citizens and dedicatethemselves to serve the society and make a mark in their respective spheres of activities. During this occasion, the students who have achieved to pranks and won medals and prizes in academic, cultural and sports activities are also recognized by distributing awards and prizes. The founders have also instituted medals and prizes for sports achievers every year. The physical education department conducts regular yoga classes every day to students, faculty members, administrative staff and their family members and organizes yoga camps for villagers around.

Recognizing the fast growth of the university and its quality in imparting higher education, the BERG (Business Excellence and Research Group), Singapore has awarded BERG Education Award2015 to REVA University under Private Universities category. The University has also been honoured with many more such honours and recognitions.

Vision

REVA University aspires to become an innovative university by developing excellent human resources with leadership qualities, ethical and moral values, research culture and innovative skills through higher education of global standards.

Mission

- To create excellent infrastructure facilities and state-of-the-art laboratories and incubation centres
- To provide student-centric learning environment through innovative pedagogy and education reforms.
- To encourage research and entrepreneurship through collaborations and extension activities.
- To promote industry-institute partnerships and share knowledge for innovation and development.

- To organize society development programs for knowledge enhancement in thrust areas.
- To enhance leadership qualities among the youth and enrich personality traits, promote patriotism and moral values.

Objectives

- Creation, preservation and dissemination of knowledge and attainment of excellence in different disciplines.
- Smooth transition from teacher-centric focus to learner-centric processes and activities.
- Performing all the functions of interest to its major constituents like faculty, staff, students and the society to reach leadership position.
- Developing a sense of ethics in the University and Community, making it conscious of itsobligations to the society and the nation.
- Accepting the challenges of globalization to offer high quality education and other services in a competitive manner.

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- Accepting the challenges of globalization to offer high quality education and other services in a competitive manner

ABOUT SCHOOL OF ALLIED HEALTH SCIENCES

The School of Allied Health Sciences offers programs in Sports and Exercise Science, Biochemistry,Medical Laboratory Technician, Medical Radiology and Diagnostic Imaging, Nutrition andDietetics which are incredibly fascinating. It aims to attract talented youth and train them to acquire knowledge and skills useful to industrial sectors, research laboratories, and educational institutions. The school also facilitates research leading to PhD in Biochemistry, Microbiology and related areas of study.

The School of Allied Health Sciences is shouldered by well qualified, experienced and highly committed faculty. The state-of-the-art infrastructure digital classrooms, well equipped laboratories, conference rooms and the serene academic atmosphere at REVA Universitywill enhance the transfer as well as creation of knowledge. The school provides an interactive, collaborative peer tutoring environment that encourage students to break down complex problems and develop strategies for finding solutions across a variety of situations and disciplines. The school aims to develop a learning community of critical thinkers who serves as models of innovative problems solving in the university environment to enrich their academic and professional careers.

Vision

To nurture intellect, creativity, character and professional is among students and impart contemporary knowledge in various branches of Biological and Allied health Sciences that are socially relevant and transform them to become global citizens.

Mission

To achieve excellence in studies and research through pedagogy and support interface between industry and academia.

Academic objectives

1. Excellence in all our academic and research endeavors'.
2. Dedication and service to our stake holders
3. Leadership through innovation
4. Accountability and transparency
5. Creating conducive academic environment with service motto
6. Integrity and intellectual honesty
7. Ethical and moral behavior
8. Freedom of thought and expression
9. Adaptability to the change.

10. Team-work

"The constant questioning of our values and achievements is a challenge without which neither science nor society can remain healthy"

—Aage Niels Bohr

B.Sc. (Hons.) Sports and Exercise Science

Programme Overview

About B.Sc. (Hons.) Sports and Exercise Science:

In an ongoing quest to achieve high performance standards, the global demand for Sports Science is increasing. In line with this trend and with the objective of working towards making India a sporting nation, REVA University has introduced an innovative program in B.Sc. (Hons.) Sports & Exercise Science. The School of Allied Health Science presents you with an opportunity to delve into this emerging field of Sports Science through the B.Sc. (Hons.) Sports & Exercise Science program. This four-year full-time application-based program offered by REVA University combines theory and practical components, providing a strong foundation for understanding and applying the science behind sport performance, exercise, health, and physical activity.

The B.Sc (Honours) in Sports & Exercise Science is an undergraduate degree program that focuses on the scientific study of human movement, Exercise physiology, sports performance, Sports Psychology, Sports Nutrition, Anthropometry, Biochemistry, Strength & Conditioning and related areas. This program provides students with a comprehensive understanding of the scientific principles underlying sports and exercise, as well as the practical skills necessary to apply this knowledge in various professional settings.

Sports & Exercise science programme provide a comprehensive education that encompasses Major core courses, Minor core courses, Multidisciplinary course, Skill development course, Ability Enhancement course, Value added courses, Internship and Research Project. Through these components, students acquire both theoretical knowledge and practical skills, enabling them to contribute to the field, apply evidence-based practices, and pursue successful careers in sports science.

VISION

The vision of the B.Sc (Honours) in Sports & Exercise Science program is to be a leading academic program in Sports Science that produces highly skilled professionals and contributes to the advancement of knowledge in the field, promoting excellence in sports performance, health, and well-being.

MISSION

The mission of the B.Sc (Honours) in Sports & Exercise Science program is to provide students with a comprehensive education in the scientific principles, theories, and practical applications of sports and exercise science. Through rigorous academic coursework, hands-on experiences, and research opportunities, we equip our students with the knowledge, skills, and competencies necessary for successful careers in the field.

BOS Members of B.Sc (Hons.) Sports & Exercise Science

S.No.	Name & Designation details of the Member	Member Category
1.	**Dr. N. Ramesh** Dean, I/c Vice-Chancellor, REVA University vc@reva.edu.in , +91 9880514718	**Chairman**
2.	**Dr. S. Srividhya,** Head of the Department & Associate Professor, Department of Sports & Exercise Science srividhya.s@reva.edu.in, +918892923811	Internal Member
3.	**Mr. Manikandan K,** Assistant Professor, Department of Sports & Exercise Science manikandan.kannan@reva.edu.in, +91 86109 53364	Internal Member
4.	**Mr. Sudip Ghatak** Teaching Associate Department of Sports & Exercise Science Sudip.ghatak@reva.edu.in, +91 8653030022	Internal Member
5.	**Mr. Sathish Kumar** Deputy Director Sports Authority of India, Netaji Subhas Southern Centre, Bangalore Sathish.sai@gov.in, +91 9910160026	External Member
6.	**Ms. Vaishali Chaudhary** Sport Psychologist Inspire Institute of Sports, JSW, Bellari. vaishali.chaudhary@inspireinstituteofsport.com , +919599925938	External Member
7.	**Prof. P. C. Krishnaswamy** Director(i/c), Professor Bangalore University kswamypc@gmail.com , +9194499 58295	External Member
8.	**Dr. Deepak C S** Director Department of Physical Education & Sports REVA University deepakcs@reva.edu.in, +919980985677	Invited Member
9.	**Yoogasri E** R22HF003 III year B.Sc Sports Science 22150443722@reva.edu.in , +91 82770 08726	Student Representative
10.	**Sai Vijaya B P** R22HF005 III year B.Sc Sports Science 22130139930@reva.edu.in, +91 99006 10693	Student Representative

PROGRAMME EDUCATIONAL OBJECTIVES (PEO)

PEO-1

Students will apply scientific principles to enhance human performance in diverse contexts. They will possess practical skills to conduct assessments, design training programs, and optimize performance for individuals and athletes.

PEO-2:

Students will possess research skills, critical thinking abilities, and professionalism for advancements in sports and exercise science, with diverse career opportunities and further specialization in related fields.

PEO-3

Students will exhibit professional competence, ethical conduct, and effective communication in sports and exercise science. They will be prepared for diverse careers in sports performance, exercise prescription, research, coaching, and sports administration, while having a foundation for further specialization and advanced study.

PEO-4

Students will prioritize lifelong learning to stay updated on emerging research and technologies in sports and exercise science. They will actively engage with communities, promoting physical activity, health, and wellness through education and outreach initiatives, benefiting diverse populations.

PROGRAMME OUTCOMES (PO)

Upon completion of the B.Sc. Honours program in Sports & Exercise Science, students should be able to demonstrate the following program outcomes:

PO–1

Knowledge Base: Possess a comprehensive understanding of the scientific principles and theories related to sports and exercise science, including Anatomy, Physiology, Biomechanics, Biochemistry, Psychology, Nutrition, Anthropometry, Strength & conditioning and Exercise prescription.

PO–2

Applied Skills: Apply scientific knowledge and practical skills to assess, analyze, and enhance human performance in sports and exercise settings. This includes conducting fitness assessments, designing and implementing training programs, and utilizing appropriate techniques and technologies.

PO–3

Research Proficiency: Demonstrate proficiency in research methodologies, including study design, data collection, analysis, and interpretation. Be able to critically evaluate scientific literature and apply research findings to real-world situations in sports and exercise science.

PO–4

Measurement and Evaluation: Utilize appropriate tools and techniques to measure and evaluate

physical fitness, performance, and health-related variables in individuals and athletes. Interpret assessment results to provide feedback and make evidence-based recommendations.

PO–5

Exercise Prescription: Develop exercise prescription plans tailored to individuals' goals, abilities, and specific needs. Consider physiological and psychological factors, as well as injury prevention and safety guidelines, to optimize exercise outcomes.

PO–6

Injury Prevention and Rehabilitation: Identify risk factors for sports-related injuries and implement appropriate strategies for injury prevention. Apply knowledge of rehabilitation principles to design and implement effective exercise programs for injured individuals.

PO–7

Professional Ethics: Understand and adhere to ethical principles, professional standards, and legal regulations relevant to the field of sports and exercise science. Maintain confidentiality, demonstrate integrity, and respect the rights and well-being of individuals.

PO–8

Communication and Collaboration: Effectively communicate scientific concepts and findings to diverse audiences, including athletes, clients, and colleagues. Collaborate and work effectively in multidisciplinary teams, demonstrating strong interpersonal skills.

PO–9

Lifelong Learning: Engage in continuous professional development by staying updated with current research, emerging trends, and advancements in sports and exercise science. Demonstrate a commitment to lifelong learning and personal growth in the field.

PO–10

Cultural Competence: Recognize and appreciate the influence of cultural, social, and psychological factors on sports and exercise participation. Demonstrate cultural competence and inclusivity when working with individuals from diverse backgrounds.

PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO–1

Demonstrate knowledge and understanding of the fundamental principles and concepts in sports and exercise science, including Anatomy, Physiology, Biomechanics, Nutrition, Psychology, Anthropometry.

PSO–2

Apply scientific research methods and techniques to investigate and analyze various aspects of sports and exercise performance, such as physiological responses, biomechanical movements, and psychological factors.

PSO–3

Develop practical skills in conducting fitness assessments, designing exercise programs, and implementing training interventions for individuals or groups involved in sports and exercise activities.

PSO–4

Analyze and interpret data collected from physiological, biomechanical, and psychological assessments to evaluate the effectiveness of training programs and interventions.

AGE

A candidate seeking admission to B.Sc. (Hons.) Sports and Exercise Science course should have completed 17 years of age,as on date of the year of admission.

COURSE AIM:

The aim of a B.Sc. Honours degree in Sports and Exercise Science is to provide students with a comprehensive understanding of the scientific principles and practical applications of sports and exercise. The program is designed to equip students with the knowledge and skills necessary to analyze, assess, and enhance human performance in various athletic and exercise contexts.

The specific aims of the course include:

Scientific Foundation: Develop a strong foundation in the fundamental scientific disciplines, including Anatomy, Physiology, Biomechanics, Biochemistry, Psychology, Nutrition, and exercise prescription, to understand the physiological and psychological processes underlying human performance.

Applied Knowledge: Apply scientific principles and methodologies to analyze and assess human performance in sports and exercise settings. This includes evaluating and improving physical fitness, designing training programs, assessing and reducing injury risks, and optimizing performance through evidence-based interventions.

Practical Skills: Acquire practical skills and competencies necessary for working in the field of sports and exercise science. This may involve laboratory techniques, data collection and analysis, performance testing, exercise programming, and using technology and equipment commonly used in sports and exercise settings.

Research and Critical Thinking: Develop research skills and critical thinking abilities to evaluate scientific literature, design and conduct research studies, analyze data, and draw meaningful

conclusions. Students may also have opportunities to contribute to ongoing research projects in the field of sports and exercise science.

Professionalism and Ethical Conduct: Understand and adhere to professional standards, ethics, and regulations in the sports and exercise science field. Foster effective communication and interpersonal skills, teamwork, and an appreciation for diversity and inclusivity within the sports and exercise science community.

Career Preparation: Prepare students for diverse career paths in sports and exercise science, including roles in sports performance enhancement, exercise prescription, fitness consulting, rehabilitation, research, coaching, and sports administration. Provide a solid foundation for advanced study and specialization in related fields, such as biomechanics, exercise physiology, Sports Nutrition or sports psychology.

Overall, the aim of a B.Sc. Honours degree in Sports and Exercise Science is to produce graduates who are well-rounded, knowledgeable, and skilled professionals capable of making significant contributions to the fields of sports, exercise, and human performance.

REVA University Regulations Governing Undergraduate Degree Programs with Multiple Entry and Exit Options as per NEP, 2020

(Effective from 2024-25)

(Framed as per the provisions under Section 35 (ii), Section 7 (x) and Section 8 (xvi) & (xxi) of the REVA University Act, 2012)

PREAMBLE:

Higher education plays a significant role in national development. India has large number of educational institutions engaged in imparting higher education. Efforts are being made from time to time to prepare our students to meet local, regional, national and as well as global level job requirements. However, the twenty-first century with most dynamic technological advances has opened up many new challenges in the field of Higher Education necessitating transformation in higher education system, making it more innovative by adopting a "learner-centric" approach and giving greater emphasis on inter-disciplinary, intra-disciplinary, and skill-based learning and facilitating the flexibility for the students to study the subjects/courses of their choice so that our graduates are better prepared to compete locally, regionally, nationally as well as globally. It is also essential to give equal importance to building character, ethical and constitutional values, intellectual curiosity, and spirit of community service.

The New Education Policy (2019) initiated and developed by the Ministry of Human Resource Development (HRD), Govt. of India, has been approved by the Central cabinet on 29th July 2020. The National Education Policy (NEP) has brought several reforms in Indian education which include broad-based multidisciplinary Undergraduate Education with 21st Century skills while developing specialized knowledge with disciplinary rigor, and to bring equity, efficiency, and academic excellence to the National Higher Education System.

It is felt that undergraduate curriculum must be focused on creativity and innovation, critical thinking and higher order thinking capacities, problem-solving abilities, teamwork, communication skills, more in-depth learning, and mastery of curricula across fields to prepare students holistically culminating character building and commitment to community service and national development. Considering these aspects, the University Grants Commission has asked all the universities in the country to implement multidisciplinary and holistic education across disciplines for a multidisciplinary world.

REVA University, therefore, has made an attempt to implement the UGC guidelines by facilitating the multidisciplinary and holistic education in all the under-graduate programs and the consequential post-graduate programs, with multiple entry and exit options at different levels. Hence, are the following regulations.

1. TITLE AND COMMENCEMENT:

These regulations shall be called **"REVA University Regulations Governing Undergraduate**

Degree Programs with Multiple Entry and Exit Options as per NEP, 2020."

These Regulations shall come into force from the Academic Year 2024-25.

2. SALIENT FEATURES OF THE FOUR YEARS UNDERGRADUATE PROGRAMMES WITH MULTIPLE ENTRY AND EXIT OPTIONS:

a) The program shall be structured in a semester mode with multiple exit options with Certification, Diploma and Basic Bachelors' degree at the completion of first, second and third years, respectively. The candidate who completes the four-year Undergraduate Program, either in one stretch or through multiple exits and re-entries would be awarded a Bachelors' Degree with Honors / Bachelors' Degree (Honors with Research).

b) The four-year undergraduate Honors degree holders with a research component and a suitable grade are eligible to enter the Two Semester Masters' Degree program with project work or to enter the Doctoral (Ph.D.) Program in a relevant discipline.

c) Candidates who wish to enter the master's / doctoral program in a discipline other than the major discipline studied at the undergraduate program, have to take additional courses in the new discipline to meet the requirement or to make up the gap between the requirement and the courses already studied.

d) There may be parallel five years integrated master's degree programs with exit options at the completion of third and fourth years, with the undergraduate degree and undergraduate degree with honors in a discipline, respectively.

e) The students who exit with Certification, Diploma and Basic Bachelor's degree shall be eligible to re-enter the program at the exit level to complete the program or to complete the next level.

f) The Multidisciplinary Undergraduate Program may help in the improvement of all the educational outcomes, with a flexible and imaginative curricular approach. The program provides for both breadth and depth in diverse areas of knowledge. A range of courses are offered with rigorous exposure to multiple disciplines and areas while specializing in one or two areas. The program fulfils knowledge, vocational, professional and skill requirements alongside humanities and arts, social, physical and life sciences, mathematics, sports etc.

g) The curriculum combines conceptual knowledge with practical engagement and understanding that has relevant real-world application through practical laboratory work, field work, internships, workshops, and research projects.

o) The Four-Year Choice Based Credit System Semester Scheme makes the product of a University at par with the global practices in terms of academic standards and evaluation strategies. In the emerging scenario of Internationalization of Indian Higher Education, this system helps the Universities for the mobility of their products both within and across the geographical jurisdiction.

3. THE SALIENT FEATURES OF THE CREDIT BASED SEMESTER SCHEME:

A "Credit" System is a systematic way of describing an educational program by attaching credits to its components. Under a credit-based system each course in each program shall carry a certain number of credits. Credits normally represent the weightage of a course and are a function of teaching, learning and evaluation strategies such as the number of contact hours, the course content, teaching methodology, learning expectations, maximum marks the course is assessed etc. University Grants Commission defines one credit as:

- 1 Theory period of one hour per week over a semester
- 1 Tutorial period of one hour per week over a semester
- 1 Practical period of two hour per week over a semester

In terms of assessment and evaluation, one credit is generally considered equivalent to 25 marks in a semester. Thus a 3 or 4 credits courses are assessed for 100 marks, 2 credits courses are assessed for 50 marks, and one credit courses are assessed for 25 marks.

The students are issued the provisional Grade Card by the Controller of Examinations at the end of every Semester indicating the courses completed successfully. The provisional Grade Card provides Semester Grade Point Average (SGPA).

After successful completion of the program with required number of credits, the students are issued the Grade Card providing overall Cumulative Grade Point Average (CGPA) secured by him / her.

Thus, the Semester Grade Point Average (SGPA) depicts the percentage of marks / credits secured by the student in all the courses in a given semester of a program, whereas the Cumulative Grade Point Average (CGPA) is percentage of marks / credits secured by the student in all the courses in all semesters of a given program.

4. DEFINITIONS OF KEY TERMS:

a. **Academic Year**: Two consecutive (one odd + one even) semesters constitute one academic year.
b. **Semester**: Each semester will consist of over 16 weeks of academic work equivalent to 90 actual teaching days. The odd semester may be generally scheduled from July to December and even semester from January to June.
c. **Program**: A program leading to the award of a Degree, Diploma or Certificate.
d. **Course**: Usually referred to, as "papers" is a component of a program. All courses need not carry the same weight. The courses should define learning objectives and learning outcomes. A course may be designed to comprise lectures/ tutorials/laboratory work/ field work/ project work/ vocational training/viva/ seminars/term papers / assignments / presentations/ self-study etc. or a combination of some of these.
e. **Credit**: A unit by which the course work is measured. It determines the number of hours of instructions

required per week in a semester. One credit is equivalent to one hour of lecture or tutorial or two hours of practical work/field work per week in a semester. It will be generally equivalent to 13-15 hours of instruction.

f. **Choice Based Credit System (CBCS):** The CBCS provides choice for students to select courses from the prescribed courses (core, discipline elective, ability and skill enhancement language, soft skill etc. courses).

g. **Credit Based Semester System (CBSS)**: Under the CBSS, the requirement for awarding a degree /diploma /certificate is prescribed in terms of number of credits to be earned.

h. **Grade Point**: It is a numerical weight allotted to each letter grade on a 10-point scale.

i. **Credit Point**: It is the product of grade points and number of credits for a course.

j. **Letter Grade:** It is an index of the performance of students in a said course. Grades are denoted by letters O, A+, A, B+, B, C, P and F.

k. **Semester Grade Point Average (SGPA)**: It is a measure of performance of work done in a semester. It is the ratio of total credit points secured by a student in various courses registered in a semester and the total course credits taken during that semester. It shall be expressed up to two decimal places.

l. **Cumulative Grade Point Average (CGPA)**: It is a measure of overall cumulative performance of a student over all the semesters of a program. The CGPA is the ratio of total credit points secured by a student in various courses in all the semesters and sum of the total credits of all courses in all the semesters. It is expressed up to two decimal places.

m. **Transcript or Grade Card or Certificate:** Based on the grades earned, a Grade Card shall be issued to all the registered students after every semester. The grade certificate will display the course details (code, title, number of credits, grade secured etc.).

5. PROGRAMMES:

a. **Faculty of Science and Technology**

Allied Health Sciences

a) **B.Sc., (Honors) / B.Sc., (Honors with Research) in Sports and Exercise Science.** [Bachelor of Science. Bachelor of Science (Honors) / Bachelor of Science (Honors with Research) in Sports and Exercise Science].

6. ELIGIBILITY FOR ADMISSION

Sl. No.	Program	Eligibility
	Allied Health Sciences	
1	B.Sc in Sports and Exercise Science (Honors) / (Honors with Research)	• Passed Standard XII (10+2) examination from any recognized Board. • For Sports Quota: Participation in sports at the International / National / State/District level.

7. SEMESTER SYSTEM, DURATION OF PROGRAMMES, CREDITS REQUIREMENTS AND OPTIONS:

a) Each academic year shall have two semesters: odd and even semesters.

b) All the undergraduate degree programs shall have eight semesters (FOUR academic years) duration unless specified otherwise.

c) Each semester shall have 18 weeks (05 days per week) with 90 working days(excluding Sundays and other Holidays, and the time spent for the conduct of the final examination of each semester).

d) The Program shall have multiple exit options at the end of TWO / FOUR / SIX semesters (ONE, TWO, or THREE academic years) with the award of Certificate, Diploma, and Bachelor's Degree respectively, after securing prescribed number of credits by the university, and in case of Certificate or Diploma after securing 4 credits in work based vocational courses offered during summer term or internship / apprenticeship.

e) The candidate availing exit option shall re-enter the degree program within three years and complete the degree program within the stipulated maximum period of double duration of the program. Admission shall be only at the beginning of the academic year (Odd Semester), and the candidate shall study and complete the degree with the prevailing syllabi.

f) All candidates on successful completion of EIGHT semesters (FOUR academic years) of the undergraduate program and secure stipulated percentage of marks / grade shall be awarded Bachelor's degree (Honors) / Bachelor's degree (Honors with Research) as the case may be. The students who successfully secure minimum number of credits prescribed by the university, including 12 credits from a research project /dissertation, are awarded UG Degree (Honors with Research).

g) The Exit Options for Candidates studying at degree level and minimum credit requirements the candidates must complete are detailed in **Table – 1** given below.

Table -1
Exit Options for Candidates and Minimum Credit Requirements

Exit Options	**Minimum Credits Requirement***	**NSQF Level**
	Science & Technology	
Certificate at the Successful Completion of First Year (Two	48	5

Semesters) of Four Years UG Degree Program		
Diploma at the Successful Completion of the Second Year (Four Semesters) of Four Years UG Degree Program	94	6
Basic Bachelor's degree at the Successful Completion of the Third Year (Six Semesters) of Four Years Undergraduate Degree Program	136	7
Bachelor's degree (Honors) in a **Discipline** at the Successful Completion of the Four Years (Eight Semesters) Undergraduate Degree Program	176	8
Bachelor's degree (Honors with Research) in a **Discipline** at the Successful Completion of the Four Years (Eight Semesters) Undergraduate Degree Program and earn 12 credits from a research project/dissertation as prescribed by the university.	176	8

*Details of courses to be successfully completed equal to minimum credits requirement are described in succeeding sections

7.1. Credit Hours for Different Types of Courses

7.1.1. Types of Courses:

The following types of courses/activities constitute the programs of study.

- *Lecture courses*
- *Tutorial courses*
- *Practicum or Laboratory work*
- *Seminar*
- *Internship*
- *Field practice / Projects*

7.1.2. Credit Hours and Workload:

Each of them will require a specific number of hours of teaching / guidance and laboratory/workshop activities, field-based learning/projects, internships.

The workload relating to a course is measured in terms of credit hours. A credit is a unit by which the coursework is measured. It determines the number of hours of instruction required per week over the duration of a semester (minimum 15 weeks).

In terms of credits, every one-hour session of lecture amounts to one credit per semester. In a semester of 15 weeks duration, a three-credit lecture course is equivalent to 45 hours of teaching.

One credit for tutorial work means one hour of engagement per week. In a semester of 15 weeks duration, a one-credit tutorial in a course is equivalent to 15 hours ofengagement.

A one-credit course in practicum or lab work, community engagement and services, and fieldwork in a semester means two-hours engagement per week. In a semester of 15 weeksduration, a one-credit practicum in a course is equivalent to 30 hours of engagement.

A one-credit Seminar or Internship or Studio activities or Field practice/projects or Community engagement and service means two-hour engagements per week. Accordingly, in a semester of 15 weeks duration, one credit in these courses is equivalent to 30 hours of engagement.

A course can have a combination of lecture credits, tutorial credits, and practicum credits. For example, a 4–credit course with three credits assigned for lectures and one credit for practicum shall have three 1-hour lectures per week and one 2-hour duration field-based learning/project or lab work, or workshop activities per week. In a semester of 15 weeks duration, a 4-credit course is equivalent to 45 hours of lectures and 30 hours of practicum. Similarly, a 4 –credit course with 3- credits assigned for lectures and one credit for tutorial shall have three 1-hour lectures per week and one 1-hour tutorial per week. In a semester of 15 weeks duration, a four-credit course is equivalent to 45 hours of lectures and 15 hours of tutorials.

7.1.3 Number of Credits by Type of Course

The course credits and distribution over 6/8 semesters in a manner that will facilitate the students to meet the minimum credit requirements are as given in **Table – 2** under structure of undergraduate programs.

a. Major and Minor Courses:

All discipline-specific courses (major or minor) may be 4 credits or as appropriate. An additional one to two credits may be allotted for tutorials or practical. The credits for tutorials or practical shall also form part of the **4 credits.**

b. Other Courses:

All courses under the Multi-disciplinary, Ability Enhancement (language), and Skill Enhancement categories may be of **3-credits or as appropriate**.

c. Common Value-Added Courses:

Courses under Value Added, Summer Internship / Apprenticeship / Community outreach activities, etc., may be of **2-credits or as appropriate**.

d. Final year Research project / Dissertation etc., may be of **12 credits**.

8. STRUCTURE OF THE UNDERGRADUATE PROGRAMME

As prescribed in the UGC regulations, the UG program will consist of the following categories of courses and the minimum credit requirements for 3-year UG Degree, and 4-year UG (Honors) Degree or UG (Honors with Research) Degree programs are detailed in **Table-2** given below:

Table - 2

Minimum Credit Requirements to Award Degree under Each Category

Sl. No.	Broad Category of Course	Minimum Credit	
		3-year UG	4-Year UG
1	Major (Core)	60	80
2	Minor Stream	24	32
3	Multidisciplinary	09	09
4	Ability Enhancement Courses (AEC)	08	08
5	Skill Enhancement Courses (SEC)	09	09
6	Value Added Courses common for all UG	06 - 08	06 – 08
7	Summer Internship	02 - 04	02 – 04
8	Research Project / Dissertation	-	12

Note:* Honors students not undertaking research will do 3 courses for 12 credits in lieu of a research project / Dissertation.

The above broad categories of courses are grouped into three as under:

a. Discipline Specific Core Courses (DSC)
b. Elective Courses (EC)
c. Ability Enhancement Courses (AEC)

a) Discipline Specific Core Courses (DSC) are compulsory **Core Courses** of the program.

b) Elective Courses (EC) are categorized into three viz.,

- Discipline Specific Elective (DSE) courses
- Open Elective Courses (OE), and
- Dissertation / Research Project, Vocational Courses and Internship.

(i) **Discipline Specific Elective (DSE)** courses are offered under the Core discipline of the study.

(ii) **Dissertation / Research Project:** An elective course designed to acquire special / advanced knowledge, such as supplement study / support study to a project work, anda candidate shall study such a course on his / her own, with an advisory support of a teacher / faculty member is called Dissertation / Research project.

(iii)Internship: It shall be a short-term internship of 10-15 days in 6th semester and long term internship of about 30 days in lieu of Dissertation / Research project work in 8th semester for a job training in a suitable organization or hands on training or activity based course at college level in order to gain work experience or to satisfy the requirements for a qualification.

c) Ability Enhancement Courses (AEC) (08 credits): Modern Indian Language (MIL) & English language focused on language and communication skills.

Students are required to achieve competency in a Modern Indian Language (MIL)and in the English language with special emphasis on language and communication skills. The courses aim at enabling the students to acquire and demonstrate the core linguistic skills, including critical reading and expository andacademic writing skills, that help students articulate their arguments and present their thinking clearly and coherently and recognize the importance of language asa mediator of knowledge and identity. They would also enable students to acquaintthemselves with the cultural and intellectual heritage of the chosen MIL and Englishlanguage, as well as to provide a reflective understanding of the structure and complexity of the language/literature related to both the MIL and English language.The courses will also emphasize the development and enhancement of skills suchas communication, and the ability to participate/conduct discussion and debate.

Thus, the Ability Enhancement Courses (AEC) are divided into two categories:

a. Ability Enhancement Compulsory Courses (AECC):
b. Skill Enhancement Courses (SEC):

a. Ability Enhancement Compulsory Courses (AECC):

Following are the two **Compulsory** courses with common curriculum for all the programs, viz.

- Environmental Studies and
- Constitution of India
- English & Modern Indian Language

The University shall prescribe at least one course for each of the above in the first four semesters of the Undergraduate Programs.

Environmental Studies and Constitution of India are the compulsory courses.

English & Modern Indian Languages

In addition to Environmental Studies and Constitution of India, two languages shall be studied in the first four semester out of which one shall be Kannada and the other shall be either English or an Indian Language given below:

English, Hindi, Kannada and any other language prescribed/ approved by the university.

i. The Candidates shall study two languages in the first three semesters of the programs. The students who have studied Kannada at school and/or Pre-University or equivalent level, shall opt Kannada as one of the languages and study it in the first four semesters of the programs. In addition to Kannada, the students shall opt for another language from the languages offered in the university/college and study it in the first two semesters of the programs. They may continue to study the same language in the second year or may choose a different language in the second year. A candidate may opt for any language listed above even if the candidate has not studied that language at PUC or equivalent level.

ii. Students who have not studied Kannada at any level from school to Pre-University shall study Kannada as functional language in one of the first two semesters along with another language of their choice. They shall study any two languages of their choice in the remaining three semesters. They may change languages every year. With the permission of the University, a candidate may opt for any other language listed above even if the candidate has not studied that language at PUC or equivalent level.

9. PEDAGOGY ACROSS ALL PROGRAMMES

Effective learning requires appropriate curriculum, apt pedagogy, continuous formative assessment, and adequate student support. The intention is to contextualize curriculum through meaningful pedagogical practices, which determine learning experiences directly influencing learning outcomes. Active, cooperative, collaborative, and experiential learning pedagogies are some of the examples. Use of technology in creating learning environment that connects learners with content, peers, and instructors all through the learning process respecting the pace of learners is need of the hour.

a) Classroom processes must encourage rigorous thinking, reading, and writing, debate, discussion, peer learning and self-learning.

b) The emphasis is on critical thinking and challenge to current subject orthodoxy and develop innovative solutions. Curricular content must be presented in ways that invite questioning and not as a body of ready knowledge to be assimilated or reproduced. Faculty should be facilitators of questioning and not authorities on knowledge.

c) Classroom pedagogy should focus on the how of things i.e., the application of theory and ideas. All courses including social sciences and humanities should design projects and practicums to enable students to get relevant hands-on experiences.

d) Learning must be situated in the Indian context to ensure that there is no sense of alienation from their context, country, and culture.

e) Classroom processes must address issues of inclusion and diversity since students are likely to be from diverse cultural, linguistic, socio-economic, and intellectual backgrounds.

f) Cooperative and peer-supported activities must be part of empowering students to take charge of their own learning.

g) Faculty will have the freedom to identify and use the pedagogical approach that is best suited to a particular course and student.

h) Pedagogies like PBL (Problem / Project Based Learning), Service Learning be brought into practice as part of curriculum. Experiential learning in the form of internship with a specified number of credits is to be made mandatory.

Blended learning (BL) mode is to be used to help learners develop 21st century skills along with effective learning and skill development related to the subject-domains. BL should be carefully implemented and should not be replacing classroom time as a privilege. Every institute should strive to be a model institute to demonstrate a successful implementation of BL in the higher education of our country.

10. BLENDED MODE (BL) AS A NEW MODE OF TEACHING-LEARNING

UGC suggests implementing Blended Mode (BL) as a new mode of teaching-learning in higher education. BL is not a mere mix of online and face-to-face mode, but it refers to a well-planned combination of meaningful activities in both the modes. The blend demands consideration of several factors, mainly focusing on learning outcomes and the learner centered instructional environment.

Implementing BL requires a systematic, planned instructional process. An effective teaching learning process in a blended environment calls for understanding and skills of using appropriate pedagogies with suitable technologies. The UGC Concept Note provides guidelines for implementation of BL.

10.1. Pedagogies for Online and Face-to-face Modes

Learner-centered teaching-learning activities include several cognitive processes which enable learners to be communicative, confident, creative and cooperative. Learners in BL environments are not visualized as passive learners, but active learners generating ideas, assimilating knowledge individually and in teams. Once learning resources are provided on an online platform, students sitting in the classroom need not again listen to the instructor. The time, then, can be used for engaging them in activities. Even their online time can be used innovatively for making online sessions more effective and interesting. There are a few learning processes for both online and face-to-face mode.

Higher education learners are adult learners who come with their own world of experience, previous knowledge gained at schooling level and previous years of education, exposure to other sources of knowledge, etc. Even pre-session resources suggested by teachers help them with some knowledge and information. The lecture of teacher assuming the learners are empty boxes is no longer a preferred pedagogy. Learners, instead, can contribute by sharing their knowledge, ideas, views, either in the classroom or else on online platforms.

BL mode will provide this opportunity to learners to a great extent. Resources can be uploaded, and external links can be posted on Learning Management Systems prior to classroom sessions. These Out-of-class resources prove useful at least for acquiring information. Once the students' study through the resources, classroom time can be utilized fruitfully in discussions. Online platforms such as discussion forums, shared documents, blogs, etc. may be used to help them share their ideas and knowledge on a common platform.

Brainstorming exercise always helps learners to think spontaneously; derive solutions, ideas; appreciate other ideas and enjoy generation of several ideas by the whole group instead of listening to ideas and views of only teacher. It develops a sense of responsibility to think and learn ourselves.

In addition to Brainstorming, Concept-mapping / Mind-mapping, Creative Presentations, Exposure to the real world, Case Study, Cooperative Learning Strategies are a few learning processes for both online and face-to-face mode.

Under such circumstances, the area of assessment and evaluation needs to be explored in the light of BL mode.

10.2. Continuous Comprehensive Evaluation

Summative evaluation will not suffice the need of testing all levels of learning outcomes. Modular curriculum demands assessment at several intervals during and after achievement of learning outcomes specified for every module. Cognitive skills such as logical thinking application of knowledge and skills, analysis and synthesis of concepts and rules demands evaluation strategies other than summative paper pencil tests. Innovative evaluation strategies are to be used by teachers during the semester. Increased weightage of internal evaluation should be encouraged by including innovative assessment and evaluation strategies.

10.3. Innovative trends in Evaluation and Assessment

Out-of-box thinking about summative as well as formative evaluation is expected from the teacher implementing BL mode. The following paragraphs throw light on a few innovative strategies. The list is not exhaustive but mentions a few points with the expectation of continuous exploration of such strategies by the teachers.

10.4. Summative Evaluation Strategies Open book examination:

It is a right way to move away from the conventional approach of examination where remembering and reproducing is prime. In real functioning beyond formal education, life is all about open book examination. Hence in the Higher Education system, we must prepare students for work life by making them acquainted with open book examinations. It will also facilitate better understanding and application of the knowledge with a better potential for its positive impact.

10.5. Group examinations even for conventional theory papers:

Such an approach is followed some time for project and laboratory assessments. But for theory type examinations it is generally not followed. The group examinations once introduced for theory papers can improve the average performance of a class as students would be encouraged to share their knowledge with each other and also help them improve their general understanding.

10.6. Spoken / Speaking examinations:

These types of different approaches can be introduced now with the support of a new generation of

technologies. They can make examinations faster and easier.

10.7. On demand examinations:

In most cases students are forced to write examinations in a single go and collectively. However, with the advent of new methods which are technology based and also blending of teaching-learning and examinations in new form, it would be a good approach to offer examination on demand to offer more flexibility and student centricity.

10.8. Formative Evaluation Strategies e-Portfolio

e-Portfolio is not only a compilation of a few best assignments, activities of a learner throughout the program, but his / her reflections about the assignments, experience and challenges faced during the process of working on these assignments, overall approach, attitude, philosophy towards life as a learner, and also his/her academic resume. e-Portfolio is a comprehensive tool which becomes a mirror to learner for the world.

10.9. Creative Products

Innovative Pedagogies and relevant ICT tools enable learners to come up with creative products as individual or group learning activities. These products are learning experiences in the beginning, but learners should always be given corrective feedback about their outputs. Once feedback is sought, learners need to be given a chance to improve on their products and then can be considered for formative evaluation. e.g. preliminary concept-map can be revised after discussion of the topic, summarization, and feedback. Revised concept- map can be assessed.

One creative/collaborative activity may then be led towards another product which can be an assessment activity. e.g., Group or individual presentations by self-learning would be a learning activity and not an assessment activity. Once the teacher provides corrective feedback during such presentations, learners can be expected to revise the same presentations, add a small write-up / infographic / video to it and submit it as an assignment.

Creative assignments such as digital stories, Cartoon strips, drama scripts, e-Newsletter, e-Magazine, Recorded interviews of stakeholders, Case studies, etc. can be used for formative assessment.

10.10. Classroom/Online Quizzes

Though paper-pencil tests, over-use of question-answers may be discouraged for formative assessments, a few ICT tools for quizzes and games can be used eventually for formative assessment.

10.11. Use of Artificial Intelligence (AI) tools for Proctoring as well as assessments:

During the Covid time, many exams were forced to be conducted in an online mode. These were supported by a variety of tools which came into being in recent times and were based on proctoring through Artificial Intelligence tools. However, AI as technology can be used for many more assessments like, attention levels, speed of learning, level of learning etc. Hence new tools should be experimented with for examinations and assessments.

11. ASSESSMENT AND EVALUATION

Assessment is an integral part of the teaching learning process. A multidisciplinary program requires a multidimensional assessment to measure the effectiveness of the diverse courses. The assessment process acts as an indicator to both faculty and students to improve continuously. The following are the guidelines for effective assessment of the program:

a) Student assessment should be as comprehensive as possible and provide meaningful and constructive feedback to faculty and students about the teaching-learning process.

b) Assessment tasks need to evaluate the capacity to analyze and synthesize new information and concepts rather than simply recall information previously presented.

c) The process of assessment should be carried on in a manner that encourages better student participation and rigorous study.

d) Assessment should be a combination of continuous formative evaluation and an end- point summative evaluation.

e) A range of tools and processes for assessment should be used (e.g., open book tests, portfolios, case study / assignments, seminars / presentations, field work, projects, dissertations, peer, and self-assessment) in addition to the standard paper-pen test. The teachers concerned shall conduct test / seminar / case study, etc. The students should be informed about the modalities well in advance. The evaluated courses / assignments shall be immediately provided to the students.

f) Paper-pen tests should be designed rigorously using a range of tools and processes (e.g., constructed response, open-ended items, multiple-choice with more than one correct answer). Faculty may provide options for a student to improve his / her performance in the continuous assessment mode.

g) Continuous / Internal assessment marks awarded shall be shown separately. A candidate who has failed or wants to improve the result, shall retain the IA marks, provided he/she fulfils the minimum requirements.

11.1. Continuous Formative Evaluation / Internal Assessment:

11.1.1 Assessment and Evaluation shall be off-line / on-line or a combination of both depending upon the feasibility and preparedness of the respective Schools.

11.1.2 The Scheme of Assessment and Evaluation will have two parts, namely.

i. Internal Assessment (IA); and
ii. Semester End Examination (SEE)

11.1.3 Assessment and Evaluation of each Course shall be for 100 marks. The Internal Assessment (IA) and Semester End Examination (SEE) of all degree programs shall carry 40:60 marks respectively (i.e., 40 marks Internal Assessment; 60 marks Semester End Examination).

11.1.4 There shall be a **Question Paper Scrutiny Committee** for each program or group of programs in a School which shall comprise of minimum of 3 and a maximum of 6 senior faculty members in respective areas, of whom one shall be Chairperson.

11.1.5 The Question Paper Scrutiny Committee shall scrutinize the question papers set for Internal Tests. The Committee shall also scrutinize questions papers of Semester End Examinations before they are taken to the Board of Examiners. It shall be the responsibility of the Question Paper Scrutiny Committee, its Chairperson, and the Board of Examiners to maintain integrity of the examination system and the quality of the question papers.

11.1.6 There shall also be an **Examination Review Committee** comprising of at-least 3 faculty members having subject expertise who shall after completion of examination process and declaration of results review the results sheets, assess the performance level of the students, measure the attainment of course outcomes, program outcomes and assess whether the program educational objectives are achieved and report to the Director of the School. The Examination Review Committee shall also review the question papers of both Internal Tests as well Semester End Examinations and submit reports to the Director of the respective School about the scope of the curriculum covered and quality of the questions.

11.1.7 The report provided by the Examination Review Committee shall be the input to the Board of Studies to review and revise the scheme of instruction and curriculum of respective program.

11.2 Internal Assessment (IA):

The evaluation process of IA marks shall be as follows.

11.2.1 The 40% marks of internal assessment shall comprise of:

S.no	Credits	Exam conduction (Hours)	IA – 1 Write up	Scale down (IA1)	IA – 2 Write up	Scale down (IA2)	Assignment (IA1 + IA2)	Seminar (IA1 + IA2)	Total IA1+1A2+ Assignment + Seminar	NEP (40% IA)
1	1	40mins	15	5	15	5	-	-	10	40%
2	2	40 mins	15	5	15	5	5	5	20	40%
3	3 or 4	75 mins	30	15	30	15	5	5	40	40%

11.2.2. There shall be **Two Internal Assessment Tests** for each course conducted as per the schedule given below. The students shall attend both the Tests compulsorily.

- 1st test for 10 marks during **second part of the 8th week** of the beginning of the Semester.
- 2nd test for 10 marks during **second part of the 16th week** of the beginning of the Semester.

11.2.3. The coverage of syllabus for the said two tests shall be as under:

- The **1st test** (IA-1) shall be based on first 50 % of the total syllabus of the Course.
- The **2nd test** (IA-2) shall be based on second 50 % of the total syllabus of the Course;

11.2.4. There shall be Assignments / Seminars / Model Making / Integrated Lab / Project Based Learning/ Field Visit(s) / Quizzes etc. carrying 20 marks.

11.2.5. There shall be two Assignments / Seminars / quizzes each carrying 5 marks shall be decided by the school well in advance and should be announced before commencement of the Semester to avoid ambiguity and confusion among students and faculty members. The assignments / quizzes shall be either offline or online.

11.2.6. The duration of the Internal Assessment (IA) test shall be 60 minutes. Each internal test shall be conducted for 20 marks or 40 marks depending upon the decision of the school and the same shall be scaled down to 10 marks.

S.no	**Credits**	**Exam Duration**	**IA – 1 Write up**	**Scale down (IA1)**	**IA – 2 Write up**	**Scale down (IA2)**	**Assignment (IA1 + IA2)**	**Seminar (IA1 + IA2)**	**Total IA1+1A2+ Assignment + Seminar**	**NEP (40 % IA)**
1	1	40mins	15	5	15	5	-	-	10	40%
2	2	40 mins	15	5	15	5	5	5	20	40%
3	3 or 4	75 mins	30	15	30	15	5	5	40	40%

Internal Assessment

11.2.7. The question papers for internal test shall be set by the internal teachers who have taught the course. If the course is taught by more than one teacher all the teachers together shall devise the question paper(s). However, these question papers shall be scrutinized by the Question Paper Scrutiny Committee to bring in the uniformity in the question paper pattern and as well to maintain the quality of the question papers.

11.2.8. The Question Paper Scrutiny Committee shall scrutinize all the question papers set by the individual faculty members and as well as group of faculty members, remove duplications of questions if any, and correct grammatical errors to avoid any probable shortcomings in the process of examination. The Committee shall also ensure that the proper question paper pattern is followed in all the question papers and high quality of standard is maintained.

11.2.9. The evaluation of the answer scripts shall be done by the internal teachers who have taught the course.

11.3. Provision for Appeal

11.3.1. If a candidate is not satisfied with the evaluation of Internal Assessment components, he / she can approach the **Grievance Cell** with the written submission together with all facts, the assignments, and test papers etc, which were evaluated. He / she can do so before the commencement of semester-end examination. The Grievance Cell is empowered to revise the marks if the case is genuine and is also empowered to levy penalty as prescribed by the university on the candidate if his/her submission is found to be baseless and unduly motivated. This Cell may recommend taking disciplinary /

corrective action on an evaluator if he / she is found guilty. The decision taken by the grievance cell is final.

11.3.2. **Grievance Cell:** For every program there will be one Grievance Cell. The composition of the Grievance Cell is as follows:

- The Controller of Examination - Ex-officio Chairman / Convener
- One Senior Faculty Member (other than those concerned with the evaluation of the course concerned) drawn from the school / department / discipline and / or from the sister schools / departments / sister disciplines – Member.
- One Senior Faculty Member / Subject Expert drawn from outside the University school / department – Member.

11.3.3. Absence during Internal Test:

In case a student has been absent from an internal test due to the illness or other contingencies he / she may give a request along with necessary supporting documents and certification from the concerned class teacher / authorized personnel to the concerned Director of the School, for conducting a separate internal test. The Director of the School may consider such request depending on the merit of the case and after consultation with course instructor and class teacher and arrange to conduct a special internal test for such candidate(s) well in advance before the Semester End Examination of that respective semester. Under no circumstances internal tests shall be held / assignments are accepted after Semester End Examination.

11.4 Semester End Examination (SEE):

A candidate shall register for all the courses/papers of a semester for which he/she fulfills the requirements, when he/she appears for examination of that semester for the first time.

(a) There shall be Theory and Practical examinations at the end of each semester.

(b) Unless otherwise stated in the schemes of examination, practical examinations shall be conducted at the end of each semester and before commencement of Semester End Examination. They shall be conducted by two examiners, one internal and one external and shall not be conducted by both internal examiners. The statement of marks sheet and the answer books of practical examinations shall be sent to the Registrar (Evaluation) by the Chief Superintendent of the respective Schools immediately after the practical examinations.

(c) The candidate shall submit the record book for practical examination duly certified by the course teacher and the H.O.D/staff in-charge. It shall be evaluated at the end of the Semester at the practical examination.

11.4.1 Attendance Requirement and Eligibility to Appear for Semester End Examination (SEE)

a) All students must attend every lecture, tutorial and practical.

b) Only those students who fulfil a minimum of 75% attendance in aggregate of all the courses including practical courses / field visits etc., as part of the program shall be eligible to appear for Semester End Examination.

c) In case a student is on approved leave of absence (e g:- representing the University in sports, games or athletics, placement activities, NCC, NSS activities and such others) and / or any other such contingencies like medical emergencies, the attendance requirement shall be minimum of 75% of the classes taught.

d) Any student with less than 75% of attendance in aggregate of all the courses including practical courses / field visits etc., during a semester shall not be permitted to appear to the end semester examination and such student shall seek re-admission.

11.4.2 Re-Registration and Re-Admission:

a) In case a candidate's class attendance in aggregate of all courses in a semester is less than 75% or as stipulated by the University, such a candidate is considered as dropped the semester and is not allowed to appear for semester end examination and he / she shall have to seek re-admission to that semester during subsequent semester / year within a stipulated period.

b) In such case where in a candidate drops all the courses in a semester due to personal reasons, it is considered that the candidate has dropped the semester, and he / she shall seek re-admission to such dropped semester.

11.4.3 Question Paper Setting, Scrutiny and Conduct of Semester End Examination:

a) The Semester End Examination shall be held in the 18th and 19th week of the beginning of the semester and the syllabus for the semester end examination shall be all units of the course.

b) The Semester End Examination paper shall be set for a maximum of 100 marks to be answered in 3 hours duration. The entire course syllabus must be covered while setting the question paper. The questions must be set to assess the students' outcomes / course outcomes described in the course document.

S.no	Credits	Exam Duration (Hours)	Write up	Scale down	NEP (60% SEE)
1	1	1 hr	25	15	60%
2	2	2 hrs	50	30	60%
3	3 or 4	3 hrs	100	60	60%

c) There shall be three sets of question papers for the semester end examination of which one set along with scheme of examination shall be set by the external examiners and two sets along with scheme of examination shall be set by the internal examiners. All the three sets shall be scrutinized by the Board of Examiners. It shall be responsibility of the Board of Examiners particularly Chairman of the BOE to maintain the quality and standard of the question papers and as well the coverage of the entire syllabus of the course.

d) Board of Examiners, question paper setters and any member of the staff connected with the examination are required to maintain integrity of the examination system and the quality of the question papers.

e) The pattern of question paper shall be as per the guidelines set by the University.

11.4.4 Assessment and Evaluation of Answer Scripts

a) There shall be a single evaluation by the internal teachers who have taught the subject. However, there shall be moderation by the external examiner. In such cases where sufficient number of external examiners are not available to serve as moderators, internal senior faculty members shall be appointed as moderators.
b) All assessments must be done by the respective Schools as per the guidelines issued by the Controller of Examinations. However, the responsibility of announcing final examination results and issuing official transcripts to the students lies with the office of the Controller of Examinations.

11.4.5 Assessment of the performance level of the students, Measuring the Attainment of COs, POs, and PEOs

a) There shall also be a **Program Assessment Committee (PAC)** comprising at-least 3 faculty members having subject expertise who shall after completion of examination process and declaration of results to review the results sheets, assess the performance level of the students, measure the attainment of course outcomes, program outcomes and assess whether the program educational objectives are achieved and report to the Director of the School. The Program Assessment Committee shall also review the question papers of both Internal Tests as well Semester End Examinations and submit reports to the Director of the respective School about the scope of the curriculum covered and quality of the questions.

b) The report provided by the Program Assessment Committee shall be the input to the Board of Studies to review and revise the scheme of instruction and curriculum of respective program.

11.4.6 Conduction of Exams during Unforeseen Circumstances

a) During unforeseen situation like the Covid-19, the tests and examination schedules, pattern of question papers and weightage distribution may be designed as per the convenience and suggestions of the **Board of Examiners / School Board** in consultation with Controller of Examination and Vice Chancellor.
b) University may decide to use available modern technologies for writing the tests and SEE by the students instead of traditional pen and paper.
c) Any deviations required to the above provisions in the Regulation during the said situation can be made with the written consent of the Vice Chancellor.

11.4.7 Summary of Continuous Assessment and Evaluation:

The Summary of Internal Assessment, Semester End Examination and Evaluation Schedule is provided in the table given below.

Summary of Continuous Assessment and Evaluation Schedule

Sl. No.	Type of Assessment	when	Syllabus Covered	Max * Marks	Date by which the process must be completed
1	Test-1 (IA-1)	During 8th week	First 50%	10	End of 9th week
2	Test -2 (IA-2)	During 16th Week	Second 50%	10	End of 17th Week
3	Assignment /Seminar/ Quiz etc.	Between 2^{nd} & 14^{th} week	-	20	-
4	SEE	18/19th Week	100%	60	End of 21^{st} Week

Note:

a**.** *Examination and Evaluation shall take place concurrently and Final Grades shall be announced latest by 8 days after completion of the examination.*

b. Practical examinations wherever applicable shall be conducted before semester end examination. The calendar of practical examination shall be decided by the respective School Boards and communicated well in advance to the Controller of Examination who will notify the same immediately.

11.4.7 Assessment of Performance in Practical Courses

The performance in the practice tasks / experiments shall be assessed on the basis of:

a) Knowledge of relevant processes;
b) Skills and operations involved;
c) Results / products including calculation and reporting

The 40 marks meant for Internal Assessment (IA) of the performance in carrying out practice sessions shall further be allocated as under:

i	Conduction of regular practical / experiments throughout the semester	20 marks
ii	Maintenance of lab records	10 marks
iii	Performance of mid-term test (to be conducted while conducting second test for theory courses); the performance assessments of the mid-term test include performance in the conduction of experiment and write up about the experiment.	10 marks

	Total	**40 marks**

The 60 marks meant for Semester End Examination (SEE), shall be allocated as under:

i	Conduction of semester end practical examination	40 marks
ii	Write up about the experiment / practical conducted	10 marks
iii	Viva Voce	10 marks
	Total	**60 marks**

The duration for the semester-end practical examination shall be decided by the concerned School Board.

11.5 Evaluation of Minor Project / Major Project / Dissertation:

Right from the initial stage of defining the problem, the candidate has to submit the progress reports periodically and also present his/her progress in the form of seminars in addition to the regular discussion with the supervisor. At the end of the semester, the candidate has to submit final report of the project / dissertation, as the case may be, for final evaluation. The components of evaluation are as follows:

Components of Valuation	**Description**
I	Periodic Progress and Progress Reports (25%)
II	Demonstration and Presentation of work including the findings of the Work and Draft Report (25%)
III	Final Evaluation and Viva-Voce (50%). Evaluation of the report is for 30% and the Viva-Voce examination is for

12 Requirements to Pass a Course:

a) A candidate's performance from IA and SEE will be in terms of scores, and the sum of IA and SEE scores will be for a maximum of 100 marks (IA = 40, SEE = 60) and have to secure a minimum of 40% to declare pass in the course. However, a candidate has to secure a minimum of 25% (15 marks) in Semester End Examination (SEE) which is compulsory.

b) A candidate who passes the semester examinations in parts is eligible for only Class, CGPA and Alpha-Sign Grade but not for ranking.

c) The results of the candidates who have passed the final semester examination but not passed the lower semester examinations shall be declared as NCL (Not Completed the Lower Semester Examinations). Such candidates shall be eligible for the degree only after completion of all the lower semester examinations.

d) If a candidate fails in a subject, either in theory or in practical, he/she shall appear for that subject only at any subsequent regular examination, as prescribed for completing the programme. He/she must obtain the minimum marks for a pass in that subject (theory and practical,

separately) as stated above.

13 Award of Ranks / Medals / Prizes

Only such full time candidates who register for a minimum prescribed number of credits in each semester from I semester to VIII semester and complete successfully prescribed number of credits for the concerned program in 8 successive semesters shall be considered for declaration of Ranks, Medals, Prizes and are eligible to apply for student Fellowship, Scholarship, Free ships, and such other rewards/advantages which could be applicable for all full time students and for hostel facilities.

14 CLASSIFICATION OF SUCCESSFUL CANDIDATES

a) The declaration of result about the performance of candidates in the examination is based on the Semester Grade Point Average (SGPA) earned towards the end of each semester or the Cumulative Grade Point Average (CGPA) earned towards the completion of all the eight semesters of the program and the corresponding overall alpha-sign grades.

b) If some candidates exit at the completion of first, second or third year of the four years Undergraduate Programs, with Certificate, Diploma or the Basic Degree, respectively, then the results of successful candidates at the end of second, fourth or sixth semesters shall also be classified on the basis of the Cumulative Grade Point Average (CGPA) obtained in the two, four, or six semesters, respectively for award of:

- Certificate in Sports and Exercise Science (after successful completion of 2 semesters)
- Diploma in Sports and Exercise Science (after successful completion of 4 semesters)
- Bachelor's Degree in Sports and Exercise Science (after successful completion of 6 semesters)

c) Those candidates who complete successfully all the eight semesters are awarded Bachelor's Degree with Honors / Bachelor's Degree with Honors by Research in Sports and Exercise Science.

14.1. The Grade and the Grade Point:

The Grade and the Grade Point earned by the candidate in the subject will be as given below:

Marks, P	**Grade, G**	**Grade Point (GP=V x G)**	**Letter Grade**
90-100	10	v*10	O
80-89	9	v*9	A+
70-79	8	v*8	A
60-69	7	v*7	B+
55-59	6	v*6	B
50-54	5.5	v*5.5	C+
40-49	5	v*5	C
0-39	0	v*0	F
ABSENT			AB

O - Outstanding; A+-Excellent; A-Very Good; B+-Good; B-Above Average;

C+-Average; C-Satisfactory; F – Unsatisfactory.

Here, P is the percentage of marks (P=[IA + SEE]) secured by a candidate in a course which is rounded to nearest integer. V is the credit value of course. G is the grade and GP is the grade point.

14.2. COMPUTATION OF SGPA AND CGPA

14.2.1. Semester Grade Point Average (SGPA):

The Following procedure to compute the Semester Grade Point Average (SGPA).

The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student in a given semester, i.e : SGPA (Si) = $\sum$(Ci x Gi) / $\sum$Ci where Ci is the number of credits of the i^{th} course and Gi is the grade point scored by the student in the i^{th} course.

Illustration for Computation of SGPA of 4 years Honors Degree

Illustration No. 1
Computation of SGPA for ONE Semester

Course	Credit (Ci)	Grade letter	Grade Point (Gi)	Credit Point (Credit x Grade point) (Ci) x (Gi)
Course 1	4	A	8	4X8=32
Course 2	4	B+	7	4X7=28
Course 3	3	A+	9	3X9=27
Course 4	3	B+	7	3X7=21
Course 5	3	B	6	3X6=18
Course 6	3	C	5	3X5=15
Course 7	2	B+	7	2X7=21
Course 8	2	O	10	2X10=20
	24			175
SGPA (Si) = $\sum$(Ci x Gi) / $\sum$Ci = 175 ÷ **24 = 7.29**				

Illustration for Computation of SGPA of 3 years Bachelor's Degree
Illustration No. 2
Computation of SGPA for ONE Semester

Course	Credit (Ci)	Grade letter	Grade Point (Gi)	Credit Point (Credit x Grade point) (Ci) x (Gi)
Course 1	4	A	8	4X8=32
Course 2	4	B+	7	4X7=28
Course 3	3	A+	9	3X9=27
Course 4	3	B+	7	3X7=21
Course 5	3	B	6	3X6=18
Course 6	3	C	5	3X5=15
Course 7	2	B+	7	2X7=21
Course 8	2	O	10	2X10=20
	24			175
SGPA (Si) = $\sum$(Ci x Gi) / $\sum$Ci = 175 ÷ **24 = 7.29**				

Illustration for Computation of SGPA of 2 years (4 Semesters) Diploma
Computation of SGPA for I Semester
Illustration No. 3

Course	Credit	Grade letter	Grade Point	Credit Point (Credit x Grade point)
Course 1	4	A	8	4X8=32
Course 2	4	B+	7	4X7=28
Course 3	3	A+	9	3X9=27
Course 4	3	B	6	3X7=18
Course 5	3	B	6	3X6=18
Course 6	3	C	5	3X5=15
Course 7	2	B	6	2X7=12
Course 8	2	A	8	2X10=16
	24			166

Thus, SGPA = 166 ÷ 24 = 6.92

Computation of SGPA for Second Semester
Illustration No. 4

Course	Credit (Ci)	Grade letter	Grade Point (Gi)	Credit Point (Credit x Grade point) (Ci) x (Gi)
Course 1	4	A	8	4X8=32
Course 2	4	B+	7	4X7=28
Course 3	3	A+	9	3X9=27
Course 4	3	B+	7	3X7=21
Course 5	3	B	6	3X6=18
Course 6	3	C	5	3X5=15
Course 7	2	B+	7	2X7=21
Course 8	2	O	10	2X10=20
	24			175
SGPA (Si) = ∑(Ci x Gi) / ∑Ci = 175 ÷ **24 = 7.29**				

Illustration for Computation of SGPA of 1 year (2 Semesters) Certificate
Computation of SGPA for I Semester
Illustration No. 5

Course	Credit	Grade letter	Grade Point	Credit Point (Credit x Grade point)
Course 1	4	A	8	4X8=32
Course 2	4	B+	7	4X7=28
Course 3	3	A+	9	3X9=27
Course 4	3	B	6	3X7=18
Course 5	3	B	6	3X6=18
Course 6	3	C	5	3X5=15
Course 7	2	B	6	2X7=12

Course 8	2	A	8	2X10=16
	24			166

Thus, SGPA = 166 ÷ 24 = 6.92

Computation of SGPA for Second Semester
Illustration No. 6

Course	Credit (Ci)	Grade letter	Grade Point (Gi)	Credit Point (Credit x Grade point) (Ci) x (Gi)
Course 1	4	A	8	4X8=32
Course 2	4	B+	7	4X7=28
Course 3	3	A+	9	3X9=27
Course 4	3	B+	7	3X7=21
Course 5	3	B	6	3X6=18
Course 6	3	C	5	3X5=15
Course 7	2	B+	7	2X7=21
Course 8	2	O	10	2X10=20
	24			175
SGPA (Si) = ∑(Ci x Gi) / ∑Ci = 175 ÷ **24 = 7.29**				

14.2.2 Cumulative Grade Point Average (CGPA):

Overall Cumulative Grade Point Average (CGPA) of a candidate after successful completion of the required number of credits (176) for Four Years Honors Degree is calculated taking into account all the courses undergone by a student over all the semesters of a program, i. e : CGPA = ∑(Ci x Si) / ∑Ci

Where Si is the SGPA of the i^{th} semester and Ci is the total number of credits in that semester.

Illustration for Computation of CGPA of 4 Years Honors Degree
Illustration No. 7
CGPA after Final Semester

Semester (ith)	No. of Credits (Ci)	SGPA (Si)	Credits x SGPA (Ci X Si)
1	24	6.83	24 x 6.83 = 163.92
2	24	7.29	24 x 7.29 = 174.96
3	24	8.11	24 x 8.11 = 194.64
4	22	7.40	22 x 7.40 = 162.80
5	21	8.29	21 x 8.29 = 174.09
6	21	8.58	21 x 8.58 = 180.18
7	18	9.12	18 x 9.12 = 164.16
8	22	9.25	22 x 9.25 = 203.50
Cumulative	**176**		**1418.25**

Thus, CGPA = 24x6.83+24x7.29+24x8.11+22x7.40+21x8.29+21x8.58+18x9.12+22x9.25 = 1418.25 ÷ 176 = 8.06

Illustration for Computation of CGPA of 3 years Bachelor's Degree
Illustration No. 8
CGPA after Sixth Semester

Semester (ith)	No. of Credits (Ci)	SGPA (Si)	Credits x SGPA (Ci X Si)
1	24	6.83	24 x 6.83 = 163.92
2	24	7.29	24 x 7.29 = 174.96
3	24	8.11	24 x 8.11 = 194.64
4	22	7.40	22 x 7.40 = 162.80
5	21	8.29	21 x 8.29 = 174.09
6	21	8.58	21 x 8.58 = 180.18
Cumulative	**136**		**1050.59**

Thus, CGPA = 24x6.83+24x7.29+24x8.11+22x7.40+21x8.29+21x8.58 = 1050.59 ÷ 136 = 7.72

Illustration for Computation of CGPA of 2 years (4 Semesters) Diploma
Illustration No. 9
CGPA after Fourth Semester

Semester (ith)	No. of Credits (Ci)	SGPA (Si)	Credits x SGPA (Ci X Si)
1	24	6.92	24 x 6.92 = 166.08
2	24	7.29	24 x 7.29 = 174.96
3	24	8.11	24 x 8.11 = 194.64
4	22	7.40	22 x 7.40 = 162.80
Vocational Training during summer	4	2.00	4x2=8.00
Cumulative	**88+4 (92)**		**706.48**

Thus, CGPA = 24x6.92+24x7.29+24x8.11+22x7.40+4x2= 706.48 ÷ 92 = 7.68

Illustration for Computation of CGPA of 1 year (2 Semesters) Certificate
Illustration No. 10
CGPA after Fourth Semester

Semester (ith)	No. of Credits (Ci)	SGPA (Si)	Credits x SGPA (Ci X Si)
1	24	6.92	24 x 6.92 = 166.08
2	24	7.29	24 x 7.29 = 174.96
Vocational Training during summer	4	2.00	4x2=8.00
Cumulative	**48+4 (52)**		**349.04**

Thus, CGPA = 24x6.92+24x7.29+4x2= 349.04 ÷ 52 = 6.71

14.3. Conversion of Grades into Percentage:

Conversion formula for the conversion of CGPA into Percentage is:

- Percentage of marks scored = CGPA Earned x 10
- Illustration: CGPA Earned 8.05 x 10=80.5

The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

14.4. Classification of Results

The final grade point (FGP) to be awarded to the student is based on CGPA secured by the candidate and is given as follows:

CGPA	Grade (Numerical Index) G	Letter Grade	Performance	FGP Qualitative Index
9 >= CGPA 10	10	O	Outstanding	Distinction
8 >= CGPA < 9	9	A+	Excellent	
7 >= CGPA < 8	8	A	Very Good	First Class
6 >= CGPA < 7	7	B+	Good	
5.5> = CGPA < 6	6	B	Above average	Second Class
> 5 CGPA < 5.5	5.5	C+	Average	
> 4 CGPA <5	5	C	Satisfactory	Pass
< 4 CGPA	0	F	Unsatisfactory	Unsuccessful

Overall percentage=10*CGPA

14.5. Provisional Grade Card:

The tentative / provisional grade card will be issued by the Controller of Examinations at the end of every semester indicating the courses completed successfully. The provisional grade card provides Semester Grade Point Average (SGPA).

14.6. Final Grade Card:

Upon successful completion of Four Years Honors Degree, a Final Grade card consisting of grades of all courses successfully completed by the candidate will be issued by the Controller of Examinations.

15. PROVISION FOR SUPPLEMENTARY EXAMINATION

15.1 Provision for Unsuccessful Candidates:

a) In case a candidate fails to secure a minimum of 25% (15 marks) in Semester End Examination (SEE) and a minimum of 40% marks together with IA and SEE to declare pass in the course, such candidate shall seek supplementary examination of only such course(s) wherein his / her performance is declared unsuccessful. The supplementary examinations are conducted after the announcement of semester end examination results of all the programs.

b) The candidate who is unsuccessful in a given course(s) shall appear for supplementary examination of odd and even semester course(s) to seek improvement of the performance.

15.2 Provision for Rejection of Results:

a) A candidate may be permitted to reject result of the whole examination or a particular course (s) / paper(s) of a given semester within TEN days of the declaration of result of the concerned semester.

b) The candidate who has rejected the result shall appear for the immediately following examination / supplementary examination.

c) The rejection shall be exercised only once in each semester and the rejection once exercised shall not be revoked.

d) Application for rejection of results along with the payment of the prescribed fee shall be

submitted to the Controller of Examination through the Director of respective school together with the original statement of marks within 10 days from the date of publication of the result.

e) A candidate who rejects the result is eligible for only SGPA/CGPA or Class and not for Rank.

16. PROVISION TO CARRY FORWARD THE FAILED SUBJECTS / COURSES:

A student who has failed in a given number of courses in odd and even semesters shall move to next semester of immediate succeeding year and final year of the study. However, he/she shall have to clear all courses of all semesters within the double duration, i.e., with six years of admission of the first semester failing which the student has to re-register to the entire program.

17. CHALLENGE VALUATION:

a) A student who desires to apply for challenge valuation shall obtain a photocopy of the answer script(s) of semester end examination by paying the prescribed fee within 10 days after the announcement of the results. He / She can challenge the grade awarded to him/her by surrendering the grade card and by submitting an application along with the prescribed fee to the Controller of Examinations within 10 days after the announcement of the results. This challenge valuation is only for semester end examination.

b) The answer scripts (in whatever form) for which challenge valuation is sought shall be evaluated by the external examiner who has not involved in the first evaluation. The higher of two marks from first valuation and challenge valuation shall be the final.

c) All assessments must be done by the respective Schools as per the guidelines issued by the Controller of Examinations. However, the responsibility of announcing final examination results and issuing official transcripts to the students lies with the office of the Controller of Examinations.

18 TRANSFER OF ADMISSION:

18.1 Transfer of admissions are permissible only for odd semesters for students of other universities and within the University.

18.2 Conditions for transfer of admission of students within the University.

a. His/her transfer admission shall be within the intake permitted to the program concerned.
b. He/she shall fulfill the attendance requirements as per the University Regulation.
c. He/she shall complete the program as per the regulation governing the maximum duration of completing the program.

18.3 Conditions for transfer of admission of students of other Universities.

a) A Candidate migrating from any other University may be permitted to join an odd semester of the degree program provided he/she has passed all the subjects of previous semesters / years as the case may be. Such candidate(s) must satisfy all other conditions of eligibility stipulated in the regulations of the University.

b) His/her transfer admission shall be within the intake permitted to the concerned program of the University.

c) He / she shall fulfill the attendance requirements as per the University Regulation.
d) **The candidate who is migrating from other Universities is eligible for overall SGPA / CGPA or Class and not for Rank.**
e) He / she shall complete the program within the maximum duration as per the regulation governing the maximum duration of completing the program.

19 POWER TO REMOVE DIFFICULTIES:

If any difficulty arises in giving effect to the provisions of these regulations, the Vice-Chancellor may by order make such provisions not inconsistent with the Act, Statutes, or other Regulations, as appears to be necessary or expedient to remove the difficulty. Every order made under this rule shall be subject to ratification by the Appropriate University Authorities.

20 MODIFICATION TO THE REGULATIONS:

Notwithstanding the foregoing, any amendments / modifications issued or notified by the University Grants Commission and its verticals such as National Higher Education Regulatory Council, General Education Council or the State Government, from time to time, shall be deemed to have been incorporated into these Regulations and shall constitute an integral part of these Regulations.

21. Scheme, Duration and Medium of Instructions:

21.1. The Four-Year degree program is of 8 semesters (4 years) duration. A candidate can avail a maximum of 16 semesters (8 years) as per double duration norm, in one stretch to complete the Four-Year Degree, including blank semesters, if any. Whenever a candidate opts for blank semester, he/she has to study the prevailing courses offered by the School when he/she resumes his/her studies.

2**1**.2. The medium of instruction shall be English.

22. Credits and Credit Distribution

22.1. A candidate has to earn 176 credits for successful completion of Four-Year Degree B.Sc. (Honors) Sports and Exercise Science with a distribution of credits as given below:

Credits and Credit Distribution for Four Year degree programs

Course Type	Credits for B.Sc Honors (8 semesters)
Discipline Specific Core Courses (DSC)	88
Discipline Specific Elective Courses (DSEC)	28
Multidisciplinary Courses (MDC)	15
Ability Enhancement Compulsory Courses (AECC)	15
Skill Enhancement Course (SEC)	8
Value Added Courses (VAC)	8
Internship/Research Project (Int/RP)	14
Total	**176**

Course Type	Credits for B.Sc Honors with Research (8 semesters)
Discipline Specific Core Courses (DSC)	84
Discipline Specific Elective Courses (DSEC)	24
Multidisciplinary Courses (MDC)	15
Ability Enhancement Compulsory Courses (AECC)	15
Skill Enhancement Course (SEC)	8
Value Added Courses (VAC)	8
Internship/Research Project (Int/RP)	22
Total	**176**

Mapping of Course Outcomes with Programme Outcomes and Programme Specific Outcomes

Course Code	POs/ COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2	PSO 3	PSO 4
B23HF0101	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2
B23HF0102	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2
B23HF0103	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2
B23HF0104	CO1	2	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO2	3	2	3	3	2	2	3	2	1	2	2	3	1	2
	CO3	3	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO4	2	2	3	3	2	2	3	2	1	2	2	3	1	2
B23HF0105	CO1	3	3	3	3	2	3	2	2	1	2	3	2	2	1
	CO2	3	2	3	2	2	3	3	3	2	3	2	3	2	2
	CO3	3	3	3	3	2	3	2	2	1	2	3	2	3	1
	CO4	2	2	3	2	2	3	3	3	2	3	2	3	2	2
B23HF0106	CO1	3	3	3	3	2	3	2	2	1	2	3	2	2	1
	CO2	3	2	3	2	2	3	3	3	2	3	2	3	2	2
	CO3	3	3	3	3	2	3	2	2	1	2	3	2	3	1
	CO4	2	2	3	2	2	3	3	3	2	3	2	3	2	2

B23HF0107	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2
B23HF0108	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2
B23HF0108															
B23HF0201	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2
B23HF0202	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2
B23HF0203	CO1	2	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO2	3	2	3	3	2	2	3	2	1	2	2	3	1	2
	CO3	3	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO4	2	2	3	3	2	2	3	2	1	2	2	3	1	2
B23HF0204	CO1	2	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO2	3	2	3	3	2	2	3	2	1	2	2	3	1	2
	CO3	3	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO4	2	2	3	3	2	2	3	2	1	2	2	3	1	2
B23HF0205	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2
B23HF0206	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2
B23HF0207	CO1	2	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO2	3	2	3	3	2	2	3	2	1	2	2	3	1	2
	CO3	3	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO4	2	2	3	3	2	2	3	2	1	2	2	3	1	2
B23HF0208	CO1	3	3	3	3	2	3	2	2	1	2	3	2	2	1
	CO2	3	2	3	2	2	3	3	3	2	3	2	3	2	2
	CO3	3	3	3	3	2	3	2	2	1	2	3	2	3	1
	CO4	2	2	3	2	2	3	3	3	2	3	2	3	2	2

B23HF0209	CO1	2	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO2	3	2	3	3	2	2	3	2	1	2	2	3	1	2
	CO3	3	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO4	2	2	3	3	2	2	3	2	1	2	2	3	1	2
B23HF0301	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2
B23HF0302	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2
B23HF0303	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2
B23HF0304	CO1	2	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO2	3	2	3	3	2	2	3	2	1	2	2	3	1	2
	CO3	3	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO4	2	2	3	3	2	2	3	2	1	2	2	3	1	2
B23HF0305	CO1	3	3	3	3	2	3	2	2	1	2	3	2	2	1
	CO2	3	2	3	2	2	3	3	3	2	3	2	3	2	2
	CO3	3	3	3	3	2	3	2	2	1	2	3	2	3	1
	CO4	2	2	3	2	2	3	3	3	2	3	2	3	2	2
B23HF0306	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2
B23HF0307	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2
B23HF0308	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2
B23HF0309	CO1	3	3	3	3	2	3	2	2	1	2	3	2	2	1
	CO2	3	2	3	2	2	3	3	3	2	3	2	3	2	2
	CO3	3	3	3	3	2	3	2	2	1	2	3	2	3	1
	CO4	2	2	3	2	2	3	3	3	2	3	2	3	2	2
B23HF0401	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2

	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2
B23HF0402	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2
B23HF0403	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2
B23HF0404	CO1	3	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO2	2	2	3	3	2	2	3	2	1	2	2	3	1	2
	CO3	2	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO4	3	2	3	3	2	2	3	2	1	2	2	3	1	2
B23HF0405	CO1	3	3	3	3	2	3	2	2	1	2	3	2	2	1
	CO2	3	2	3	2	2	3	3	3	2	3	2	3	2	2
	CO3	3	3	3	3	2	3	2	2	1	2	3	2	3	1
	CO4	2	2	3	2	2	3	3	3	2	3	2	3	2	2
B23HF0406	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2
B23HF0407	CO1	3	3	3	3	2	3	2	2	1	2	3	2	2	1
	CO2	3	2	3	2	2	3	3	3	2	3	2	3	2	2
	CO3	3	3	3	3	2	3	2	2	1	2	3	2	3	1
	CO4	2	2	3	2	2	3	3	3	2	3	2	3	2	2
B23HF0408	CO1	3	3	3	3	3	3	3	3	3	1	2	3	3	3
	CO2	3	3	3	3	3	2	3	3	2	2	2	3	3	3
	CO3	3	3	3	3	2	3	3	2	3	1	3	3	3	2
	CO4	3	3	3	2	3	3	2	3	2	3	3	3	2	3
B23HF0409	CO1	3	3	3	3	3	3	3	3	3	1	2	3	3	3
	CO2	3	3	3	3	3	2	3	3	2	2	2	3	3	3
	CO3	3	3	3	3	2	3	3	2	3	1	3	3	3	2
	CO4	3	3	3	2	3	3	2	3	2	3	3	3	2	3
B23HF0410															
B23HF0501	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2
B23HF0502	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2

	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2
B23HF0503	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2
B23HF0504	CO1	2	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO2	3	2	3	3	2	2	3	2	1	2	2	3	1	2
	CO3	3	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO4	2	2	3	3	2	2	3	2	1	2	2	3	1	2
B23HF0505	CO1	3	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO2	2	2	3	3	2	2	3	2	1	2	2	3	1	2
	CO3	2	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO4	3	2	3	3	2	2	3	2	1	2	2	3	1	2
B23HF0506	CO1	3	2	3	3	3	2	2	2	3	3	2	1	1	1
	CO2	2	3	1	3	1	3	2	2	3	3	1	1	1	1
	CO3	1	2	2	3	1	3	3	3	3	3	2	1	2	1
	CO4	3	3	2	3	1	3	2	3	3	3	1	1	2	2
B23HF0507	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2
B23HF0508	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2
B23HF0509	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2
B23HF0510	CO1	3	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO2	2	2	3	3	2	2	3	2	1	2	2	3	1	2
	CO3	2	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO4	3	2	3	3	2	2	3	2	1	2	2	3	1	2
B23HF0601	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2
B23HF0602	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2

	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2
B23HF0603	CO1	2	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO2	3	2	3	3	2	2	3	2	1	2	2	3	1	2
	CO3	3	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO4	2	2	3	3	2	2	3	2	1	2	2	3	1	2
B23HF0604	CO1	3	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO2	2	2	3	3	2	2	3	2	1	2	2	3	1	2
	CO3	2	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO4	3	2	3	3	2	2	3	2	1	2	2	3	1	2
B23HF0605	CO1	3	2	3	3	3	2	2	2	3	3	2	1	1	1
	CO2	2	3	1	3	1	3	2	2	3	3	1	1	1	1
	CO3	1	2	2	3	1	3	3	3	3	3	2	1	2	1
	CO4	3	3	2	3	1	3	2	3	3	3	1	1	2	2
B23HF0606	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2
B23HF0607	CO1	2	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO2	3	2	3	3	2	2	3	2	1	2	2	3	1	2
	CO3	3	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO4	2	2	3	3	2	2	3	2	1	2	2	3	1	2
B23HF0608	CO1	3	3	3	3	3	3	3	3	3	1	2	3	3	3
	CO2	3	3	3	3	3	2	3	3	2	2	2	3	3	3
	CO3	3	3	3	3	2	3	3	2	3	1	3	3	3	2
	CO4	3	3	3	2	3	3	2	3	2	3	3	3	2	3
B23HF0609															
B23HF0701	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2
B23HF0702	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2
B23HF0703	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2
B23HF0704	CO1	2	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO2	3	2	3	3	2	2	3	2	1	2	2	3	1	2

	CO3	3	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO4	2	2	3	3	2	2	3	2	1	2	2	3	1	2
B23HF0705	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2
B23HF0706	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2
B23HF0707	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2
B23HF0708	CO1	2	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO2	3	2	3	3	2	2	3	2	1	2	2	3	1	2
	CO3	3	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO4	2	2	3	3	2	2	3	2	1	2	2	3	1	2
B23HF0709	CO1	2	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO2	3	2	3	3	2	2	3	2	1	2	2	3	1	2
	CO3	3	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO4	2	2	3	3	2	2	3	2	1	2	2	3	1	2
B23HF0710	CO1	2	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO2	3	2	3	3	2	2	3	2	1	2	2	3	1	2
	CO3	3	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO4	2	2	3	3	2	2	3	2	1	2	2	3	1	2
B23HF0801	CO1	3	3	3	3	3	3	3	3	3	2	2	3	3	3
	CO2	3	3	3	3	3	2	3	3	2	3	2	3	3	3
	CO3	3	3	3	3	2	3	3	2	3	2	3	3	3	2
	CO4	3	3	3	2	3	3	2	3	2	3	3	3	2	3
B23HF0802	CO1	3	3	3	3	3	3	3	3	3	1	2	3	3	3
	CO2	3	3	3	3	3	2	3	3	2	2	2	3	3	3
	CO3	3	3	3	3	2	3	3	2	3	1	3	3	3	2
	CO4	3	3	3	2	3	3	2	3	2	3	3	3	2	3
B23HF0803	CO1	3	3	3	3	3	3	3	3	3	1	2	3	3	3
	CO2	3	3	3	3	3	2	3	3	2	2	2	3	3	3
	CO3	3	3	3	3	2	3	3	2	3	1	3	3	3	2
	CO4	3	3	3	2	3	3	2	3	2	3	3	3	2	3
B23HF0804	CO1	3	3	3	3	3	3	3	3	3	1	2	3	3	3
	CO2	3	3	3	3	3	2	3	3	2	2	2	3	3	3
	CO3	3	3	3	3	2	3	3	2	3	1	3	3	3	2

	CO4	3	3	3	2	3	3	2	3	2	3	3	3	2	3
B23HF0806	CO1	3	3	3	3	3	3	3	3	3	1	2	3	3	3
	CO2	3	3	3	3	3	2	3	3	2	2	2	3	3	3
	CO3	3	3	3	3	2	3	3	2	3	1	3	3	3	2
	CO4	3	3	3	2	3	3	2	3	2	3	3	3	2	3
B23HF0807	CO1	3	3	3	3	3	3	3	3	3	1	2	3	3	3
	CO2	3	3	3	3	3	2	3	3	2	2	2	3	3	3
	CO3	3	3	3	3	2	3	3	2	3	1	3	3	3	2
	CO4	3	3	3	2	3	3	2	3	2	3	3	3	2	3
B23HF0808	CO1	3	3	3	3	3	3	3	3	3	1	2	3	3	3
	CO2	3	3	3	3	3	2	3	3	2	2	2	3	3	3
	CO3	3	3	3	3	2	3	3	2	3	1	3	3	3	2
	CO4	3	3	3	2	3	3	2	3	2	3	3	3	2	3
B23HF0809	CO1	3	3	3	3	3	3	3	3	3	1	2	3	3	3
	CO2	3	3	3	3	3	2	3	3	2	2	2	3	3	3
	CO3	3	3	3	3	2	3	3	2	3	1	3	3	3	2
	CO4	3	3	3	2	3	3	2	3	2	3	3	3	2	3
B23HF0810	CO1	3	3	3	3	3	3	3	3	3	1	2	3	3	3
	CO2	3	3	3	3	3	2	3	3	2	2	2	3	3	3
	CO3	3	3	3	3	2	3	3	2	3	1	3	3	3	2
	CO4	3	3	3	2	3	3	2	3	2	3	3	3	2	3

Mapping of PEOs with Respect to POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
PE01	√	√	√	√	√	√	√	√	√	√
PE02	√	√	√	√	√	√	√	√	√	√
PE03	√	√	√	√	√	√	√	√	√	√
PE04	√	√	√	√	√	√	√	√	√	√

Scheme of Examination

FIRST SEMESTER:

S.No.	Course Code	Course Title	Course Type	Credit and Marks						Total Marks
				C	IA1	IA2	Seminar	Assignment/ Record book	SEE	
	Theory									
1.	**B23AHE101**	Communicative English - I	AECC	3	10	10	10	10	60	100
2.	**B23AHK101**	Language II: Kannada – I	AECC	3	10	10	10	10	60	100
3.	**B23AHH101**	Language II: Hindi – I	AECC	3	10	10	10	10	60	100
4.	**B23AHA101**	Additional English-I: English – I	AECC	3	10	10	10	10	60	100
5.	**B23HF0101**	Human Anatomy- I	DSC	3	10	10	10	10	60	100
6.	**B23HF0102**	Human Physiology – I	DSC	3	10	10	10	10	60	100
7.	**B23HF0103**	Biochemistry	DSC	3	10	10	10	10	60	100
8.	**B23HF0104**	Motor Control & Development	DSEC	4	10	10	10	10	60	100
9.	**B23HF0105**	Yoga	VAC	1	5	5	3	2	15	25
	Practical									
9.	**B23HF0106**	Practical - Human Anatomy- I	DSC	1	5	-	-	5	15	25
10.	**B23HF0107**	Practical - Human Physiology – I	DSC	1	5	-	-	5	15	25
11.	**B23HF0108**	Practical - Biochemistry	DSC	1	5	-	-	5	15	25
12.	**B23HF0109**	Practical - Yoga	VAC	1	5	-	-	5	15	25
Total				**24**						

SECOND SEMESTER:

S.No.	Course Code	Course Title	Course Type	Credit and Marks						Total Marks
				C	IA1	IA2	Seminar	Assignment/ Record book	SEE	
	Theory									
1.	**B23AHE201**	Communicative English - II	AECC	3	10	10	10	10	60	100
2.	**B23AHK201**	Language II: Kannada – II	AECC	3	10	10	10	10	60	100
3.	**B23AHH201**	Language II: Hindi – II	AECC	3	10	10	10	10	60	100
4.	**B23AHA201**	Additional English-I: English – II	AECC	3	10	10	10	10	60	100
5.	**B23HF0201**	Human Anatomy-II	DSC	3	10	10	10	10	60	100
6.	**B23HF0202**	Human Physiology-II	DSC	3	10	10	10	10	60	100
7.	**B23HF0203**	Fundamentals of Sports & Exercise Science	DSC	3	10	10	10	10	60	100
8.	**B23HF0204**	First Aid & CPR	DSEC	3	10	10	10	10	60	100
9.	**B23HF0205**	Computer Skills & Applications	SEC	2	8	8	-	4	30	50
	Practical									
11.	**B23HF0206**	Practical - Human Anatomy-II	DSC	1	5	-	-	5	15	25
12.	**B23HF0207**	Practical - Human Physiology-II	DSC	1	5	-	-	5	15	25
13.	**B23HF0208**	Practical - Fundamentals of Sports & Exercise Science	DSC	1	5	-	-	5	15	25
14.	**B23HF0209**	Practical - First Aid & CPR	DSEC	1	5	-	-	5	15	25
Total				**24**						

THIRD SEMESTER:

S.No.	Course Code	Course Title	Course Type	Credit and Marks						Total Marks
				C	IA1	IA2	Seminar	Assignment/Record book	SEE	
	Theory									
1.	**B23AHK301**	Language II: Kannada – III	AECC	3	10	10	10	10	60	100

2.	**B23AHH301**	Language II: Hindi – III	AECC	3	10	10	10	10	60	100
3.	**B23AHA301**	Additional English-I: English – III	AECC	3	10	10	10	10	60	100
4.	**B23HF0301**	Constitution of India	SEC	2	10	10	-	5	25	50
5.	**B23HF0311**	Soft skills Training	SEC	2	10	10	-	5	25	50
6.	**B23HF0302**	Fundamentals of Sports Biomechanics	DSC	3	15	15	10	10	50	100
7.	**B23HF0303**	Sports Psychology	DSC	3	15	15	10	10	50	100
8.	**B23HF0304**	Fundamentals of Sports Coaching	DSC	3	15	15	10	10	50	100
9.	**B23HF0305**	Basics of Sports Journalism	MDC	3	15	15	10	10	50	100
10.	**B23HF0306**	Racket Sports	VAC	1	5	5	-	-	15	25
	Practical									
11.	**B23HF0307**	Practical - Fundamentals of Sports Biomechanics	DSC	1	10	-	-	5	10	25
12.	**B23HF0308**	Practical - Sports Psychology	DSC	1	10	-	-	5	10	25
13.	**B23HF0309**	Practical - Fundamentals of Sports Coaching	DSC	1	10	-	-	5	10	25
14.	**B23HF0310**	Practical - Racket Sports	VAC	1	10	-	-	5	10	25
Total				**24**						

FOURTH SEMESTER:

S.No.	**Course Code**	**Course Title**	**Course Type**	**Credit and Marks**						**Total Marks**
				C	**IA1**	**IA2**	**Seminar**	**Assignment/Record book**	**SEE**	
	Theory									
1.	**B23HF0401**	Talent Identification & Long-Term Athlete Development	DSC	3	15	15	10	10	50	100
2.	**B23HF0402**	Fundamentals of Exercise Physiology	DSC	3	15	15	10	10	50	100
3.	**B23HF0403**	Health, Fitness and Wellness	DSEC	4	15	15	10	10	50	100
4.	**B23HF0404**	Basics of Photo & Video Analysis	MDC	3	15	15	10	10	50	100

5.	**B23HF0405**	Environmental Science & Health	MDC	3	15	15	10	10	50	100
6.	**B23HF0406**	Combat & Indigenous Sports	VAC	1	5	5	-	-	15	25
	Practical									
7.	**B23HF0407**	Practical - Talent Identification & Long-Term Athlete Development	DSC	1	10	-	-	5	10	25
8.	**B23HF0408**	Practical - Fundamentals of Exercise Physiology	VAC	1	10	-	-	5	10	25
9.	**B23HF0409**	Practical - Combat & Indigenous Sports	DSC	1	10	-	-	5	10	25
10.	**B23HF0410**	Internship-I	Int	2	-	-	-	-	-	50
Total				**22**						

FIFTH SEMESTER:

S.No.	Course Code	Course Title	Course Type	Credit and Marks						Total Marks
				C	IA1	IA2	Seminar	Assignment/Record book	SEE	
	Theory									
1.	**B23HF0501**	Fundamentals of Strength and Conditioning	DSC	3	15	15	10	10	50	100
2.	**B23HF0502**	Sports Nutrition	DSC	3	15	15	10	10	50	100
3.	**B23HF0503**	Sports Anthropometry	DSC	3	15	15	10	10	50	100
4.	**B23HF0504**	Basics of Sports Law & Ethics	MDC	3	15	15	10	10	50	100
5.	**B23HF0505**	Field & Track Sports	VAC	1	5	5	-	-	15	25
	Practical									
6.	**B23HF0506**	Practical - Fundamentals of Strength and Conditioning	DSC	1	10	-	-	5	10	25
7.	**B23HF0507**	Practical - Sports Nutrition	DSC	1	10	-	-	5	10	25
8.	**B23HF0508**	Practical - Sports Anthropometry	DSC	1	10	-	-	5	10	25
9.	**B23HF0509**	Internship-II	Int	4	-	-	-	-	-	100
10.	**B23HF0510**	Practical - Field & Track Sports	VAC	1	10	-	-	5	10	25
Total				**21**						

SIXTH SEMESTER:

S.No.	Course Code	Course Title	Course Type	Credit and Marks						Total Marks
				C	IA1	IA2	Seminar	Assignment/Record book	SEE	
	Theory									
1.	**B23HF0601**	Fundamentals of Performance Analysis & Management	DSC	3	15	15	10	10	50	100
2.	**B23HF0602**	Sports Management	DSC	4	15	15	10	10	50	100
3.	**B23HF0603**	Athletic Injuries & Management	DSEC	3	15	15	10	10	50	100
4.	**B23HF0604**	Research Methodology & Fundamentals of Statistics	MDC	3	15	15	10	10	50	100
5.	**B23HF0605**	Team Sports	SEC	1	5	5	-	-	15	25
	Practical									
6.	**B23HF0606**	Practical - Fundamentals of Performance Analysis & Management	DSC	1	10	-	-	5	10	25
7.	**B23HF0607**	Practical - Athletic Injuries & Management	DSEC	1	10	-	-	5	10	25
8.	**B23HF0608**	Practical - Team Sports	SEC	1	10	-	-	5	10	25
8.	**B23HF0609**	Internship-III	Int	4	-	-	-	-	-	100
Total				**21**						

SEVENTH SEMESTER:

S.No.	Course Code	Course Title	Course Type	Credit and Marks						Total Marks
				C	IA1	IA2	Seminar	Assignment/Record book	SEE	
	Theory									
1.	**B23HF0701**	Advanced Sports Biomechanics & Kinesiology	DSC	3	15	15	10	10	50	100
2.	**B23HF0702**	Advanced Exercise Physiology	DSC	3	15	15	10	10	50	100
3.	**B23HF0703**	Advanced Strength & Conditioning	DSC	3	15	15	10	10	50	100
4.	**B23HF0704**	Sports Technology	DSEC	3	15	15	10	10	50	100
5.	**B23HF0705**	Ergogenic Aids for Exercise Performance	DSEC	3	15	15	10	10	50	100
	Practical									
6.	**B23HF0706**	Practical - Advanced Sports Biomechanics & Kinesiology	DSC	1	10	-	-	5	10	25

7.	**B23HF0707**	Practical - Advanced Strength & Conditioning	DSC	1	10	-	-	5	10	25
8.	**B23HF0708**	Practical - Advanced Exercise Physiology	DSC	1	10	-	-	5	10	25
9.	**B23HF0709**	Practical - Sports Technology	DSEC	1	10	-	-	5	10	25
10.	**B23HF0710**	Practical - Ergogenic Aids for Exercise Performance	DSEC	1	10	-	-	5	10	25
Total				**20**						

EIGHTH SEMESTER (B.Sc Honors):

S.No.	Course Code	Course Title	Course Type	Credit and Marks						Total Marks
				C	IA1	IA2	Seminar	Assignment/Record book	SEE	
	Theory									
1.	**B23HF0801**	Advanced scientific Applications in Team Sports	DSC	3	15	15	10	10	50	100
2.	**B23HF0802**	Advanced Scientific Applications in Athletics Events (Track & Field)	DSC	3	15	15	10	10	50	100
3.	**B23HF0803**	Advanced Scientific Applications in Combat and Indigenous sports	DSC	3	15	15	10	10	50	100
4.	**B23HF0804**	Yoga in Sports & Fitness	DSEC	3	15	15	10	10	50	100
	Practical									
5.	**B23HF0805**	Practical - Advanced scientific Applications in Team Sports	DSC	1	10	-	-	5	10	25
6.	**B23HF0806**	Practical - Advanced Scientific Applications in Athletics Events (Track & Field)	DSC	1	10	-	-	5	10	25
7.	**B23HF0807**	Practical - Advanced Scientific Applications in Combat and Indigenous sports	DSC	1	10	-	-	5	10	25
8.	**B23HF0808**	Practical - Yoga in Sports & Fitness	DSEC	1	10	-	-	5	10	25
9.	**B23HF0809**	Internship – IV	Int	4	-	-	-	-	-	100
Total				**20**						

EIGHTH SEMESTER (B.Sc Honors with Research):

S.No.	Course Code	Course Title	Course Type	Credit and Marks						Total Marks
				C	IA1	IA2	Seminar	Assignment/Record book	SEE	
	Theory									
1.	**B23HF0801**	*Advanced scientific Applications in Team Sports	DSC	3	15	15	10	10	50	100
2.	**B23HF0802**	*Advanced Scientific Applications in Athletics Events (Track & Field)	DSC	3	15	15	10	10	50	100
3.	**B23HF0803**	*Advanced Scientific Applications in Combat and Indigenous sports	DSC	3	15	15	10	10	50	100
	Practical									
4.	**B23HF0804**	Practical - *Advanced scientific Applications in Team Sports	DSC	1	10	-	-	5	10	25
5.	**B23HF0805**	Practical - *Advanced Scientific Applications in Athletics Events (Track & Field)	DSC	1	10	-	-	5	10	25
6.	**B23HF0805**	Practical - *Advanced Scientific Applications in Combat and Indigenous sports	DSC	1	10	-	-	5	10	25
7.	**B23HF0807**	Research Project	RP	12	-	-	-	-	-	100
		Total		**20**						

***Note: Students shall choose any two of the above three courses**

Scheme of Instruction

(Effective from the Academic Year 2024-25)

Scheme of Instruction as per NEP 2020

B.Sc. (Hons.) Sports & Exercise Science Programme

FIRST SEMESTER:

S.No.	Course Code	Course Title	Course Type	Credit Pattern and Value				Weekly Contact Hours
				L	T	P	C	
	Theory							
1.	B23AHE101	Communicative English - I	AECC	3	-	-	3	3
2.	B23AHK101	Language II: Kannada – I	AECC	3	-	-	3	3
3.	B23AHH101	Language II: Hindi – I	AECC	3	-	-	3	3
4.	B23AHA101	Additional English-I: English – I	AECC	3	-	-	3	3
5.	B23HF0101	Human Anatomy- I	DSC	3	-	-	3	3
6.	B23HF0102	Human Physiology – I	DSC	3	-	-	3	3
7.	B23HF0103	Biochemistry	DSC	3	-	-	3	3
8.	B23HF0104	Motor Control & Development	DSEC	4	-	-	4	4
9.	B23HF0105	Yoga	VAC	1	-	-	1	1
	Practical							
9.	B23HF0106	Practical - Human Anatomy- I	DSC	-	-	1	1	2
10.	B23HF0107	Practical - Human Physiology – I	DSC	-	-	1	1	2
11.	B23HF0108	Practical - Biochemistry	DSC	-	-	1	1	2
12.	B23HF0109	Practical - Yoga	VAC	-	-	1	1	2
Total							24	28

SECOND SEMESTER:

S.No.	Course Code	Course Title	Course Type	Credit Pattern and Value				Weekly Contact Hours
				L	T	P	C	
	Theory							
1.	B23AHE201	Communicative English – II	AECC	3	-	-	3	3
2.	B23AHK201	Language II: Kannada – II	AECC	3	-	-	3	3
3.	B23AHH201	Language II: Hindi – II	AECC	3	-	-	3	3
4.	B23AHA201	Additional English-I: English – II	AECC	3	-	-	3	3
5.	B23HF0201	Human Anatomy-II	DSC	3	-	-	3	3
6.	B23HF0202	Human Physiology-II	DSC	3	-	-	3	3
7.	B23HF0203	Fundamentals of Sports & Exercise Science	DSC	3	-	-	3	3
8.	B23HF0204	First Aid & CPR	DSEC	3	-	-	3	3
9.	B23HF0205	Computer Skills & Applications	SEC	2	-	-	2	2
	Practical							
10.	B23HF0206	Practical - Human Anatomy-II	DSC	-	-	1	1	2
11.	B23HF0207	Practical - Human Physiology-II	DSC	-	-	1	1	2
12.	B23HF0208	Practical - Fundamentals of Sports & Exercise Science	DSC	-	-	1	1	2
13.	B23HF0209	Practical - First Aid & CPR	DSEC	-	-	1	1	2
	Total						24	28

THIRD SEMESTER:

S.No.	Course Code	Course Title	Course Type	Credit Pattern and Value				Weekly Contact Hours
				L	T	P	C	
	Theory							
1.	B23AHK301	Language II: Kannada – III	AECC	3	-	-	3	3
2.	B23AHH301	Language II: Hindi – III	AECC	3	-	-	3	3
3.	B23AHA301	Additional English-I: English – III	AECC	3	-	-	3	3
5.	B23HF0301	Constitution of India	SEC	2	-	-	2	2
6.	B23HF0311	Soft skills Training	SEC	2	-	-	2	2
7.	B23HF0302	Fundamentals of Sports Biomechanics	DSC	3	-	-	3	3
8.	B23HF0303	Sports Psychology	DSC	3	-	-	3	3
9.	B23HF0304	Fundamentals of Sports Coaching	DSC	3	-	-	3	3
10.	B23HF0305	Basics of Sports Journalism	MDC	3	-	-	3	3
11.	B23HF0306	Racket Sports	VAC	1	-	-	1	1
	Practical							
12.	B23HF0307	Practical - Fundamentals of Sports Biomechanics	DSC	-	-	1	1	2
13.	B23HF0308	Practical - Sports Psychology	DSC	-	-	1	1	2
14.	B23HF0309	Practical - Fundamentals of Sports Coaching	DSC	-	-	1	1	2
15.	B23HF0310	Practical - Racket Sports	VAC	-	-	1	1	2
		Total					24	28

FOURTH SEMESTER:

S.No.	Course Code	Course Title	Course Type	Credit Pattern and Value				Weekly Contact Hours
				L	T	P	C	
	Theory							
1.	B23HF0401	Talent Identification & Long-Term Athlete Development	DSC	3	-	-	3	3
2.	B23HF0402	Fundamentals of Exercise Physiology	DSC	3	-	-	3	3
3.	B23HF0403	Health, Fitness and Wellness	DSEC	4	-	-	4	4
5.	B23HF0404	Basics of Photo & Video Analysis	MDC	3	-	-	3	3
6.	B23HF0405	Environmental Science & Health	MDC	3	-	-	3	3
7.	B23HF0406	Combat & Indigenous Sports	VAC	1	-	-	1	1
	Practical							
8.	B23HF0407	Practical - Talent Identification & Long-Term Athlete Development	DSC	1	-	-	1	2
9.	B23HF0408	Practical - Fundamentals of Exercise Physiology	DSC	-	-	1	1	2
10.	B23HF0409	Practical - Combat & Indigenous Sports	VAC	-	-	1	1	2
11.	B23HF0410	Internship-I	Int	-	-	2	2	4
		Total					22	27

FIFTH SEMESTER:

S.No.	Course Code	Course Title	Course Type	Credit Pattern and Value				Weekly Contact Hours
				L	T	P	C	
	Theory							
1.	B23HF0501	Fundamentals of Strength and Conditioning	DSC	3	-	-	3	3
2.	B23HF0502	Sports Nutrition	DSC	3	-	-	3	3
3.	B23HF0503	Sports Anthropometry	DSC	3	-	-	3	3
5.	B23HF0504	Basics of Sports Law & Ethics	MDC	3	-	-	3	3
6.	B23HF0505	Track & Field	VAC	1	-	-	1	1
	Practical							
7.	B23HF0506	Practical - Fundamentals of Strength and Conditioning	DSC	-	-	1	1	2
8.	B23HF0507	Practical - Sports Nutrition	DSC	-	-	1	1	2
9.	B23HF0508	Practical - Sports Anthropometry	DSC	-	-	1	1	2
10.	B23HF0509	Internship-II	Int	-	-	4	4	8
11.	B23HF0510	Practical - Track & Field	VAC	-	-	1	1	2
		Total					21	29

SIXTH SEMESTER:

S.No.	Course Code	Course Title	Course Type	Credit Pattern and Value				Weekly Contact Hours
				L	T	P	C	
	Theory							
1.	B23HF0601	Fundamentals of Performance Analysis & Management	DSC	3	-	-	3	3
2.	B23HF0602	Sports Management	DSC	4	-	-	4	4
3.	B23HF0603	Athletic Injuries & Management	DSEC	3	-	-	3	3
5.	B23HF0604	Research Methodology & Fundamentals of Statistics	MDC	3	-	-	3	3
6.	B23HF0605	Team Sports	SEC	1	-	-	1	1
	Practical							
7.	B23HF0606	Practical - Fundamentals of Performance Analysis & Management	DSC	-	-	1	1	2
8.	B23HF0607	Practical - Athletic Injuries & Management	DSEC	-	-	1	1	2
9.	B23HF0608	Practical -	SEC			1	1	2
9.	B23HF0609	Internship-III	Int	-	-	4	4	8
		Total					21	28

SEVENTH SEMESTER:

S No	Course Code	Course Title	Course Type	Credit Pattern and Value				Weekly Contact Hours
				L	T	P	C	
	Theory							
1.	B23HF0701	Advanced Sports Biomechanics & Kinesiology	DSC	3	-	-	3	3
2.	B23HF0702	Advanced Exercise Physiology	DSC	3	-	-	3	3
3.	B23HF0703	Advanced Strength & Conditioning	DSC	3	-	-	3	3
4.	B23HF0704	Sports Technology	DSEC	3	-	-	3	3
5.	B23HF0705	Ergogenic Aids for Exercise Performance	DSEC	3	-	-	3	3
	Practical							
6.	B23HF0706	Practical - Advanced Sports Biomechanics & Kinesiology	DSC	-	-	1	1	2
7.	B23HF0707	Practical - Advanced Strength & Conditioning	DSC	-	-	1	1	2
8.	B23HF0708	Practical - Advanced Exercise Physiology	DSC	-	-	1	1	2
9.	B23HF0709	Practical - Sports Technology	DSEC	-	-	1	1	2
10.	B23HF0710	Practical - Ergogenic Aids for Exercise Performance	DSEC	-	-	1	1	2
		Total					20	25

EIGHTH SEMESTER (BSc Honors):

S.No.	Course Code	Course Title	Course Type	Credit Pattern and Value				Weekly Contact Hours
				L	T	P	C	
	Theory							
1.	B23HF0801	Advanced scientific Applications in Team Sports	DSC	3	-	-	3	3
2.	B23HF0802	Advanced Scientific Applications in Athletics Events (Track & Field)	DSC	3	-	-	3	3
3.	B23HF0803	Advanced Scientific Applications in Combat and Indigenous sports	DSC	3	-	-	3	3
4.	B23HF0804	Yoga in Sports & Fitness	DSEC	3	-	-	3	3
	Practical							
5.	B23HF0805	Practical - Advanced scientific Applications in Team Sports	DSC	1	-	-	1	2
6.	B23HF0806	Practical - Advanced Scientific Applications in Athletics Events (Track & Field)	DSC	1	-	-	1	2
7.	B23HF0807	Practical - Advanced Scientific Applications in Combat and Indigenous sports	DSC	1	-	-	1	2
8.	B23HF0808	Practical - Yoga in Sports & Fitness	DSEC	1	-	-	1	2
9.	B23HF0809	Internship – IV	Int	-	-	4	4	8
		Total					20	28

EIGHTH SEMESTER (B.Sc. Honors with Research):

S.No.	Course Code	Course Title	Course Type	Credit Pattern and Value				Weekly Contact Hours
				L	T	P	C	
	Theory							
1.	B23HF0801	*Advanced scientific Applications in Team Sports	DSC	3	-	-	3	3
2.	B23HF0802	*Advanced Scientific Applications in Athletics Events (Track & Field)	DSC	3	-	-	3	3
3.	B23HF0803	*Advanced Scientific Applications in Combat and Indigenous sports	DSC	3	-	-	3	3
	Practical							
4.	B23HF0804	Practical - *Advanced scientific Applications in Team Sports	DSC	1	-	-	1	2
5.	B23HF0805	Practical - *Advanced Scientific Applications in Athletics Events (Track & Field)	DSC	1	-	-	1	2
6.	B23HF0806	Practical - *Advanced Scientific Applications in Combat and Indigenous sports	DSC	1	-	-	1	2
7.	B23HF0807	Research Project	RP	-	-	12	12	24
		Total					20	34

*Note: Students shall choose any two of the above three course

DETAILED SYLLABUS

SEMESTER - I

Communicative English

Course code	Communicative English	Course Type	L	T	P	C	CH
B23AHE101		AEC	3	-	-	3	3

Pedagogy:

ICT, Textbooks, Worksheets and Handouts

Course objectives:

1. To develop basic communication skills in English for the learners of Bachelor of Science.
2. To prioritize listening and reading skills among the learners.
3. To simplify writing skills needed for academic as well as workplace context.
4. To examine that the learners use the electronic media such as internet and supplement the learning materials used in the classroom.

Course outcome:

On completion of the course, students will be able to:

- Interpret audio files and comprehend different spoken discourses/ excerpts in different accents (Listening Skills).
- Demonstrate speaking ability with clarity, confidence and comprehension and communicate

with one or many listeners using appropriate communicative strategies (Speaking Skills).

- Make use of reading different genres of texts adopting various reading strategies (Reading

Skills).

- Develop the ability to write cohesively, coherently and flawlessly avoiding grammatical errors, using a wide vocabulary range, organizing their ideas logically on a topic (Writing Skills).

Mapping of Course Outcomes with Programme Outcomes

Course Code	POs/ COs	PO 1	P0 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PSO 1	PSO 2	PSO 3	PSO 4

B23AHE101	**CO1**	3	2	3	3	3	2	2	2	3	3	2	1	1	
	CO2	2	3	1	3	1	3	2	2	3	3	1	1	1	
	CO3	1	2	2	3	1	3	3	3	3	3	2	1	2	
	CO4	3	3	2	3	1	3	2	3	3	3	1	1	2	

Course Content:

Unit-I: Functional English

Remedial Grammar: Past Simple; Past Continuous; Irregular Verbs

Writing Skills: Paragraph Writing

Activities: Conversations; Leaving Phone Messages

Literature: Chief Seattle – The End of Leaving and Beginning of Survival

Unit-II: Interpersonal Skills

Remedial Grammar: Present Simple & Present Continuous; Activity & State Verbs

Writing Skills: Official Letters

Activities: Making Apologies; Invitations & Making Arrangements

Literature: Ruskin Bond – Tiger in the Tunnel

Unit-III: Multitasking Skills

Remedial Gramm: Present Perfect; For, Since & How Long; -ed & -ing adjectives; Prefix Opposites of Adjectives

Writing Skills: Note Making

Activities: Agreeing & Disagreeing with Opinions

Literature: Jesse Owens - My Greatest Olympic Prize

Unit-IV: Communication Skills

Remedial Grammar: Collocations; Prepositions

Writing Skills: Precise Writing

Activities: Offers, Suggestions & Requests

Literature: Avijit Pathak – Onscreen Magic

Reference Books:

1. Green, David. *Contemporary English Grammar Structures and Composition*. New Delhi: MacMillan Publishers, 2010.
2. Thorpe, Edgar and Showick Thorpe. *Basic Vocabulary*. Pearson Education India, 2012.
3. Leech, Geoffrey and Jan Svartvik. *A Communicative Grammar of English*. Longman, 2003.
4. Murphy, Raymond. *Murphy's English Grammar with CD*. Cambridge University Press, 2004.

5. Rizvi, M. Ashraf. *Effective Technical Communication*. New Delhi: Tata McGraw-Hill, 2005.
6. Riordan, Daniel. Technical Communication. New Delhi: Cengage Publications, 2011.
7. Sen et al. Communication and Language Skills. Cambridge University Press, 2015.

Human Anatomy-I

Course code	Human Anatomy-I	Course Type	L	T	P	C	CH
B23HF0101		DSC	3	-	-	3	3

Pedagogy:

The course will involve a combination of lectures, laboratory work, anatomical models, multimedia presentations, and interactive sessions to facilitate hands-on learning.

Course Objectives:

- To provide students with a comprehensive understanding of the human body's anatomical structure and organization.
- To enable students to apply anatomical knowledge to analyze and interpret human movement and sports-related functions.

Course Outcomes:

By the end of the course, students will be able to:

- Identify and label major anatomical structures of the human body.
- Describe the functions and interactions of various anatomical systems relevant to sports science.
- Analyze and interpret anatomical relationships in movement and athletic performance.
- Apply anatomical knowledge to assess and prevent sports-related injuries.

Course Code	Pos/ COs	PO 1	PO2	PO3	PO4	PO5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO2	PSO 3	PSO 4
B23HF0101	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Unit I: Introduction to Human Anatomy

Introduction to anatomical terminology and body planes

Overview of anatomical regions and surface landmarks

Introduction to histology and the basic tissue types

Unit II: Integumentary System

Structure and functions of the skin and its appendages

Layers of the skin and their characteristics

Dermatomes and cutaneous innervation

Unit III: Skeletal System

Classification, structure, and functions of bones

Major bones of the axial and appendicular skeletons

Joints and their classification

Bone histology and bone development

Unit IV: Muscular System & Nervous System

Introduction to muscle tissue types and their properties

Gross anatomy of major muscle groups

Structure and function of skeletal muscles

Neuromuscular junction and muscle contraction

Introduction to the structure and functions of the nervous system

Organization of the central and peripheral nervous systems

Basic neuroanatomy and the spinal cord

Introduction to sensory and motor pathways

Reference Books:

1. Marieb, E. N., & Hoehn, K. (2019). Human Anatomy & Physiology (11th ed.). Pearson.
2. Tortora, G. J., & Derrickson, B. (2017). Principles of Anatomy and Physiology (15th ed.). Wiley.
3. Moore, K. L., Dalley, A. F., & Agur, A. M. (2018). Clinically Oriented Anatomy (8th ed.). Lippincott Williams & Wilkins.
4. Martini, F. H., Timmons, M. J., & Tallitsch, R. B. (2018). Human Anatomy (9th ed.). Pearson.
5. Netter, F. H. (2014). Atlas of Human Anatomy (6th ed.). Saunders.
6. Drake, R. L., Vogl, W., & Mitchell, A. W. M. (2019). Gray's Anatomy for Students (4th ed.). Elsevier.
7. Agur, A. M. R., & Dalley, A. F. (2016). Grant's Atlas of Anatomy (14th ed.). Lippincott Williams &

Wilkins.

8. Tank, P. W. (2019). Grant's Dissector (17th ed.). Lippincott Williams & Wilkins.
9. Ross, M. H., Kaye, G. I., Pawlina, W., & Requena, G. A. (2018). Histology: A Text and Atlas (8th ed.). Wolters Kluwer.
10. Rohen, J. W., Yokochi, C., & Lütjen-Drecoll, E. (2021). Color Atlas of Anatomy (8th ed.). Lippincott Williams & Wilkins.

Practical - Human Anatomy-I

Course code	Practical - Human Anatomy-I	Course Type	L	T	P	C	CH
B23HF0106		DSC	-	-	1	1	2

Pedagogy:

The practical course will involve hands-on activities, cadaver dissections, anatomical models, and multimedia resources to facilitate understanding.

Course Objectives:

- To familiarize students with the basic anatomical terminology, directional references, and body planes.
- To introduce students to the structure and functions of the integumentary system, skeletal system, muscular system, and nervous system.

Course Outcomes:

- Students will be able to effectively use anatomical terms and directional references to describe the location and orientation of body structures.
- Students will be able to identify and describe the layers of the skin, skin appendages, major bones, types of joints, and major muscles of the body.
- Students will demonstrate understanding of muscle origins, insertions, and actions, as well as the key structures of the central and peripheral nervous systems.
- Students will be able to locate and understand the organization of spinal nerves and dermatomes.

Course Code	Pos/ COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2	PSO 3	PSO 4
B23HF0106	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Introduction to Anatomical Terminology and Body Planes:

Identify and describe anatomical terms and directional references.

Demonstrate understanding of different body planes and sections.

Integumentary System:

Identify and describe the different layers of the skin.

Examine and identify skin appendages such as hair follicles and sweat glands.

Skeletal System:

Identify and describe major bones of the axial and appendicular skeletons.

Examine and identify different types of joints and their movements.

Muscular System:

Identify and describe major muscles of the body.

Demonstrate knowledge of muscle origins, insertions, and actions.

Nervous System:

Identify and locate key structures of the central and peripheral nervous systems.

Understand the organization of spinal nerves and dermatomes.

Reference Books:

1. Moore, K. L., Dalley, A. F., & Agur, A. M. R. (2014). Clinically Oriented Anatomy. Lippincott Williams & Wilkins.
2. Drake, R. L., Vogl, A. W., & Mitchell, A. W. M. (2014). Gray's Anatomy for Students. Churchill Livingstone.
3. Tortora, G. J., & Derrickson, B. H. (2017). Principles of Anatomy and Physiology. Wiley.
4. Ross, M. H., & Pawlina, W. (2019). Histology: A Text and Atlas. Wolters Kluwer.
5. Tank, P. W. (2018). Grant's Dissector. Wolters Kluwer.

Human Physiology - I

Course code	Human Physiology - I	Course Type	L	T	P	C	CH
B23HF0102		DSC	3	-	-	3	3

Pedagogy:

The course will involve a combination of lectures, laboratory work, case studies, and practical demonstrations to help students grasp the theoretical concepts and apply them to real-life scenarios.

Course Objectives:

- To provide students with a comprehensive understanding of the major physiological systems in the human body and their interrelationships.
- To introduce students to the concept of homeostasis and its role in maintaining physiological regulation.

Course Outcomes:

By the end of the course, students will be able to:

- Identify and explain the structures and functions of neurons, central and peripheral nervous systems, and their role in sensory functions and motor control.
- Describe the structure and function of skeletal muscles, understand muscle contraction mechanisms, and explain neuromuscular junction and muscle coordination.
- Comprehend the structure and function of the heart and blood vessels, analyze cardiac electrophysiology, and explain the regulation of blood pressure and blood flow.
- Analyse the cardiovascular responses during exercise and understand the impact of physical activity on the cardiovascular system.

Course Code	Pos/ COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO1	PSO 2	PSO 3	PSO 4
B23HF0102	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Unit I: Introduction to Human Physiology

Overview of the major physiological systems and their interrelationships.

Introduction to homeostasis and physiological regulation.

Cell structure and function.

Membrane transport mechanisms and cell signaling.

Cellular metabolism and energy production.

Unit II: Cell Physiology & Nervous System

Structure and function of neurons.

Organization of the central and peripheral nervous systems.

Sensory functions and motor control.

Introduction to the autonomic nervous system.

Unit III: Muscular System

Structure and function of skeletal muscle.

Mechanisms of muscle contraction.

Muscle metabolism and fatigue.

Neuromuscular junction and muscle coordination.

Unit IV: Cardiovascular Physiology

Structure and function of the heart and blood vessels.

Cardiac electrophysiology and the cardiac cycle.

Control of blood pressure and blood flow.

Regulation of cardiovascular responses during exercise.

Reference Books:

- Guyton, A. C., & Hall, J. E. (2016). Textbook of Medical Physiology. Elsevier.
- Sherwood, L. (2015). Human Physiology: From Cells to Systems. Cengage Learning.
- Silverthorn, D. U. (2015). Human Physiology: An Integrated Approach. Pearson.
- Widmaier, E. P., Raff, H., & Strang, K. T. (2016). Vander's Human Physiology. McGraw-Hill Education.
- Costanzo, L. S. (2018). Physiology. Elsevier.
- Johnson, L. R. (Ed.). (2018). Essential Medical Physiology. Academic Press.
- Pocock, G., & Richards, C. D. (2019). Human Physiology. Oxford University Press.
- Houssay, B. A. (2017). Human Physiology. Butterworth-Heinemann.
- Dee Unglaub Silverthorn. (2019). Human Physiology: An Integrated Approach. Pearson.
- Lauralee Sherwood. (2017). Human Physiology: From Cells to Systems. Cengage Learning.

Yoga

Course code	**Yoga**	**Course Type**	**L**	**T**	**P**	**C**	**CH**
B23HF0105		DSC	1	-	-	1	1

Pedagogy: Demonstration, guided practice, and partner work

Course Objective:

To introduce students to the fundamental principles and practices of yoga, including postures (asanas), breathing techniques (pranayama), and meditation.

To promote physical and mental well-being through regular yoga practice, enhancing flexibility, strength, relaxation, and mindfulness.

Course Outcomes:

Students will be able to perform basic yoga postures and sequences with proper alignment and breathing techniques.

Students will understand the benefits of yoga for physical health, including improved flexibility, strength, and posture.

Students will be able to integrate yoga practices into their daily routine to manage stress and enhance mental clarity.

Students will develop a foundation for continued yoga practice and personal growth beyond the course.

Course Code	Pos/ COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO1	PSO 2	PSO 3	PSO 4
B23HF0105	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Unit 1: Foundations of Yoga

History and philosophy of yoga

Basic breathing techniques (pranayama)

Introduction to simple asanas (postures)

Foundation of Asanas

Understanding the importance of alignment

Practice of foundational postures (Mountain Pose, Downward-Facing Dog, Warrior I)

Breathing Techniques and Benefits

Deepening pranayama practices (Ujjayi breath)

Linking breath with movement

Practice of Sun Salutation (Surya Namaskar)

Standing Postures

Focus on standing asanas (Tree Pose, Warrior II, Triangle Pose)

Balancing postures and their benefits

Pedagogy: Demonstration, guided practice, and corrections

Unit 2: Postures and Flexibility

Forward Bends and Hip Openers

Introduction to forward bends (Standing Forward Bend, Seated Forward Bend)

Hip opening postures (Butterfly Pose, Pigeon Pose)

Backbends

Introduction to gentle backbends (Cobra Pose, Bridge Pose)

Benefits and precautions of backbends

Twists and Core Strengthening

Introduction to twisting postures (Seated Spinal Twist, Revolved Triangle Pose)

Core strengthening exercises

Restorative Yoga and Relaxation Techniques

Introduction to restorative postures (Child's Pose, Legs-Up-the-Wall Pose)

Guided relaxation and meditation techniques

Unit 3: Intermediate and Advanced Practices

Intermediate Asanas

Practice of more challenging asanas (Crow Pose, Camel Pose)

Building strength and flexibility

Integrative Practice

Combining various postures into a flow sequence

Focus on smooth transitions and breath coordination

Yoga for Stress Management

Techniques for using yoga to manage stress and anxiety

Introduction to Yoga Nidra (yogic sleep)

Yoga for Specific Populations

Adaptations for different age groups and abilities

Chair yoga and gentle yoga options

Unit 4: Advanced Techniques and Personal Development

Advanced Breathing Techniques

Introduction to advanced pranayama (Kapalabhati, Nadi Shodhana)

Understanding the physiological effects of pranayama

Yoga Philosophy and Lifestyle

Discussion on the Yamas and Niyamas (ethical principles of yoga)

Incorporating yoga philosophy into daily life

Review and Personal Practice Development

Review of all postures and techniques learned

Developing a personal yoga practice plan

Final guided practice and feedback

Reference Books:

Iyengar, B. K. S. (2001). Light on Yoga: The Classic Guide to Yoga by the World's Foremost Authority. Schocken Books.

Feurstein, G. (2008). The Yoga Tradition: Its History, Literature, Philosophy and Practice. Hohm Press.

Desikachar, T. K. V. (1999). The Heart of Yoga: Developing a Personal Practice. Inner Traditions.

Swanson, A. (2019). Science of Yoga: Understand the Anatomy and Physiology to Perfect Your Practice. DK.

Saraswati, S. S. (2009). Asana Pranayama Mudra Bandha. Yoga Publications Trust.

Miller, R. (1998). Yoga Nidra: The Meditative Heart of Yoga. Sounds True.

Farhi, D. (2006). Bringing Yoga to Life: The Everyday Practice of Enlightened Living. HarperOne.

Practical - Human Physiology – I

Course code	Practical - Human Physiology – I	Course Type	L	T	P	C	CH
B23HF0107		DSC	-	-	1	1	2

Pedagogy:

The course will utilize a combination of theoretical lectures and hands-on laboratory sessions. Students will be engaged in practical experiments to reinforce their understanding of human physiology concepts.

Course Objectives:

- To introduce students to fundamental laboratory techniques used in human physiology research.
- To provide practical experience in conducting experiments related to the nervous system, cardiovascular system, respiratory system, and metabolism.

Course Outcomes:

- Students will be able to demonstrate proficiency in laboratory safety protocols and equipment handling.
- Students will gain the ability to measure and interpret nerve conduction velocity, reflexes, muscle activity through electromyography (EMG), blood pressure, electrocardiography (ECG), lung volumes, and capacities.
- Students will be able to conduct experiments to assess respiratory function and analyze energy expenditure during exercise.
- Students will understand the significance of basal metabolic rate measurement in human physiology.

Course Code	Pos/ COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2	PSO 3	PSO 4
B23HF0107	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Introduction to Laboratory Techniques:

Familiarization with laboratory safety protocols and equipment.

Introduction to basic laboratory techniques and measurements.

Fitness tests:

Harvard step test.

Illinois test.

Strength test.

Cardiovascular System:

Blood pressure measurement and interpretation.

Electrocardiography (ECG): recording and interpretation of cardiac electrical activity.

Respiratory System:

Spirometry: measurement of lung volumes and capacities.

Pulmonary function tests: assessing respiratory function.

Metabolism and Energy Systems:

Body Composition & Basal metabolic rate measurement.

Reference Books:

- Hall, J. E., 2015, Guyton and Hall Textbook of Medical Physiology, Elsevier.
- Tortora, G. J., Derrickson, B. H., 2017, Principles of Anatomy and Physiology, Wiley.
- Silverthorn, D. U., 2016, Human Physiology: An Integrated Approach, Pearson.
- Costanzo, L. S., 2018, Physiology, Elsevier.
- Sherwood, L., 2015, Human Physiology: From Cells to Systems, Cengage Learning.

Biochemistry

Course code		Course Type	L	T	P	C	CH
B23HF0103	**Biochemistry**	DSC	3	-	-	3	3

Pedagogy:

The course will employ a combination of lectures, case studies, and group discussions to facilitate understanding of the subject matter.

Course Objectives:

- To understand the fundamental principles of biochemistry and its significance in sports and exercise science.
- To explore the biochemical basis of metabolism and its relationship to exercise and nutrition.

Course Outcomes:

- Students will demonstrate a comprehensive understanding of the chemical basis of life, biomolecular structure and function, and enzyme catalysis.
- Students will be able to explain the major metabolic pathways and the regulation of metabolism in response to exercise and hormonal influences.
- Students will analyze the integration of metabolism during exercise, including energy balance, substrate utilization, and metabolic adaptations to training.
- Students will evaluate the role of nutrition in exercise performance and understand the biochemical aspects of various nutrients and their metabolism.

Course Code	Pos/ COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2	PSO 3	PSO 4
B23HF0103	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Unit I: Introduction to Biochemistry

- The scope and importance of biochemistry in sports and exercise science
- The chemical basis of life: atoms, molecules, and chemical bonds
- The structure and function of biomolecules: proteins, carbohydrates, lipids, and nucleic acids
- The principles of enzyme catalysis and regulation

Unit II: Enzymes and Metabolism

- Enzymes and enzyme kinetics
- Overview of metabolism: catabolism and anabolism
- The major metabolic pathways: glycolysis, Krebs cycle, and oxidative phosphorylation

Unit III: Regulation of Metabolism & Integration of Metabolism and Exercise

Regulation of Metabolism

- Hormonal regulation of metabolism
- Cellular signaling and metabolic regulation.
- Metabolic adaptations to exercise and Training – Acute & Chronic

Integration of Metabolism and Exercise

- Energy balance and metabolism during exercise
- Exercise and substrate utilization
- Metabolic adaptation to training.

Unit IV: Nutrition, Biochemistry and Exercise Performance

Nutrient Metabolism and Exercise Performance

- Carbohydrate metabolism: glycogen synthesis and breakdown, glucose transport, and utilization
- Lipid metabolism: fatty acid synthesis and oxidation, cholesterol metabolism
- Protein metabolism: amino acid synthesis and breakdown, protein turnover, and regulation
- Nutritional requirements for exercise and training
- Dietary supplements and ergogenic aids

Biochemistry and Health

- Biochemical basis of disease

- Role of biochemistry in diagnosis and treatment
- Biochemistry and aging

Reference Books:

- Berg, J. M., Tymoczko, J. L., & Gatto, G. J. (2018). Biochemistry (9th ed.). W.H. Freeman and Company.
- Nelson, D. L., Cox, M. M. (2017). Lehninger Principles of Biochemistry (7th ed.). W.H. Freeman and Company.
- Campbell, M. K., Farrell, S. O. (2018). Biochemistry (9th ed.). Cengage Learning.
- Garrett, R. H., Grisham, C. M. (2017). Biochemistry (6th ed.). Cengage Learning.
- Smith, C. M., Marks, A. D., Lieberman, M. A., Marks, D. B. (2017). Marks' Basic Medical Biochemistry (5th ed.). Lippincott Williams & Wilkins.
- Devlin, T. M. (2018). Textbook of Biochemistry: With Clinical Correlations (8th ed.). Wiley.
- Voet, D., Voet, J. G., Pratt, C. W. (2016). Fundamentals of Biochemistry: Life at the Molecular Level (5th ed.). Wiley.
- Champe, P. C., Harvey, R. A., Ferrier, D. R. (2018). Lippincott's Illustrated Reviews: Biochemistry (7th ed.). Lippincott Williams & Wilkins.
- Baynes, J. W., Dominiczak, M. H. (2018). Medical Biochemistry (5th ed.). Elsevier.
- Stipanuk, M. H., Caudill, M. A. (2018). Biochemical, Physiological, and Molecular Aspects of Human Nutrition (4th ed.). Elsevier.

Practical - Biochemistry

Course code		Course Type	L	T	P	C	CH
B23HF0108	**Practical - Biochemistry**	DSC	-	-	1	1	2

Pedagogy:

The course will involve a combination of lectures, laboratory demonstrations, practical exercises, and hands-on experience in laboratory techniques.

Course Objectives:

- To introduce students to the fundamental laboratory techniques and safety protocols used in Biochemistry.
- To enable students to accurately estimate and interpret biochemical parameters such as blood

glucose and hemoglobin.

Course Outcomes:

- Students will be able to demonstrate proficiency in basic laboratory techniques, including pipetting, weighing, and measuring.
- Students will gain an understanding of safety precautions and procedures essential for working in a laboratory environment.
- Students will develop the skills to estimate blood glucose levels accurately.
- Students will be able to perform hemoglobin estimation and interpret the results effectively.

Course Code	Pos/ COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO1	PSO 2	PSO 3	PSO 4
B23HF0108	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Introduction to Laboratory Techniques and Safety

Demonstration of basic laboratory techniques, such as pipetting, weighing, and measuring

Safety precautions and procedures in the laboratory

Estimation of Blood Glucose

Estimation of Hemoglobin

Interpretation of Biochemical report

Reference Books:

- Nelson, D. L., Cox, M. M. (2017). Lehninger Principles of Biochemistry. W.H. Freeman.
- Berg, J. M., Tymoczko, J. L., Gatto, G. J. (2018). Biochemistry. W.H. Freeman.
- Campbell, M. K., Farrell, S. O. (2017). Biochemistry. Cengage Learning.
- Champe, P. C., Harvey, R. A., Ferrier, D. R. (2018). Lippincott's Illustrated Reviews: Biochemistry. Lippincott Williams & Wilkins.
- Garrett, R. H., Grisham, C. M. (2017). Biochemistry. Cengage Learning.

Motor Control & Development

Course code	Motor Control & Development	Course Type	L	T	P	C	CH

B23HF0104		DSEC	4	-	-	4	4

Pedagogy:

The course will involve a combination of lectures, case studies, and discussions.

Course Objectives:

- Understand the fundamental concepts and theories related to motor control and learning in sports science.
- Apply motor control and learning principles to design effective training programs for enhancing sport and exercise performance.

Course Outcome:

By the end of this course, students will be able to:

- Describe the neural and biomechanical processes involved in movement.
- Analyze motor development across the lifespan and identify the factors influencing it.
- Explain the characteristics of skillful performance and the principles of motor learning.
- Design training programs based on motor control and learning principles to optimize sport and exercise performance.

Course Code	Pos/ COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO1	PSO 2	PSO 3	PSO 4
B23HF0104	CO1	2	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO2	3	2	3	3	2	2	3	2	1	2	2	3	1	2
	CO3	3	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO4	2	2	3	3	2	2	3	2	1	2	2	3	1	2

Course Content:

Unit I: Introduction to Motor Control and Learning

- Definition of motor control and learning
- Neural and biomechanical processes involved in movement.
- Models of motor control and learning

Unit II: Motor Development Across the Lifespan

- Overview of motor development
- Factors that influence motor development
- Age-related changes in motor performance

Unit III: Motor Learning Principles and Practice

- Characteristics of skillful performance
- Principles of motor learning

- Types of practice and feedback

Unit IV: Motor Control and Learning Assessment

- Types of motor control and learning assessments
- Interpretation of assessment results
- Applications of assessment to training and practice

Motor Control and Learning in Sport and Exercise

- Impact of motor control and learning on sport and exercise performance
- Strategies for optimizing motor control and learning in sport and exercise.
- Design of effective training programs based on principles of motor control and learning.

Reference Books:

- Schmidt, R. A., & Lee, T. D. (2014). Motor control and learning: A behavioral emphasis. Human Kinetics.
- Magill, R. A. (2011). Motor learning and control: Concepts and applications. McGraw-Hill Education.
- Seifert, L., Komar, J., & Davids, K. (Eds.). (2018). Handbook of sport expertise. Routledge.
- Clark, J. E. (2015). From the laboratory to the classroom: Translating science of motor learning to practice. Routledge.
- Haibach, P. S., Reid, G., & Weiss, M. R. (2013). Developmental sports and exercise psychology: A lifespan perspective. Routledge.
- Gallahue, D. L., & Ozmun, J. C. (2011). Understanding motor development: Infants, children, adolescents, adults. McGraw-Hill Education.
- Wulf, G., & Shea, C. H. (2002). Principles derived from the study of simple skills do not generalize to complex skill learning. Psychonomic Bulletin & Review, 9(2), 185-211.
- Hodges, N. J., & Williams, A. M. (2012). Skill acquisition in sport: Research, theory, and practice. Routledge.
- Hardy, L., & Mullen, R. (2016). Sport psychology: A contemporary themes approach. Routledge.
- Hossner, E. J., Schiebl, F., & Göhner, U. (Eds.). (2019). Sensorimotor training in the sports context: How science supports application. Academic Press.

Practical - Yoga

Course code		Course Type	L	T	P	C	CH
B23HF0109	**Practical -** Yoga	VAC	-	-	1	1	2

Pedagogy:

The course will include a combination of lectures, practical sessions, demonstrations, group discussions, and self-reflection activities to enhance the learning experience.

Course Objectives:

- To provide students with a comprehensive understanding of the historical and philosophical foundations of Yoga and its various styles and traditions.
- To equip students with the knowledge and skills to integrate Yoga practices into sports science and physical activity settings for improved physical, mental, and emotional well-being.

Course Outcome:

- Students will demonstrate an in-depth knowledge of the historical and philosophical aspects of Yoga and its relevance in contemporary sports science.
- Students will be able to design and implement Yoga sessions tailored to individual needs, focusing on flexibility, strength, balance, relaxation, and stress management.
- Students will understand the importance of breath awareness, mindfulness, and meditation in enhancing mental focus, concentration, and overall well-being.
- Students will appreciate the benefits of Yoga in enhancing sports performance, preventing injuries, and aiding in recovery for athletes and active individuals.

Course Code	Pos/ COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO1	PSO 2	PSO 3	PSO 4
B23HF0109	CO1	3	3	3	3	2	3	2	2	1	2	3	2	2	1
	CO2	3	2	3	2	2	3	3	3	2	3	2	3	2	2
	CO3	3	3	3	3	2	3	2	2	1	2	3	2	3	1
	CO4	2	2	3	2	2	3	3	3	2	3	2	3	2	2

Course Content:

Unit I:

Introduction to Yoga

Overview of the historical and philosophical foundations of Yoga

Introduction to different Yoga styles and traditions

Importance of breath awareness and mindfulness in Yoga practice

Yoga Asanas (Postures)

Exploration and practice of foundational Yoga asanas

Alignment principles and modifications for different body types and abilities

Developing strength, flexibility, and balance through asana practice

Pranayama (Breathing Techniques)

Introduction to various pranayama techniques and their benefits

Practice of basic breathing exercises for relaxation and stress reduction

Incorporating pranayama into Yoga sessions and physical activities

Unit II:

Yoga for Flexibility and Mobility

Asanas and sequences focused on improving flexibility and joint mobility.

Techniques for increasing range of motion and releasing muscular tension.

Safe stretching practices and modifications for different individuals

Yoga for Strength and Balance

Asanas and flows for building muscular strength and core stability.

Balancing poses and exercises for improving stability and proprioception.

Integration of strength and balance training into Yoga practice

Unit III:

Yoga for Relaxation and Stress Management

Restorative Yoga poses and relaxation techniques for stress reduction.

Importance of relaxation and recovery for athletes and active individuals

Incorporating relaxation practices into daily routines

Meditation and Mindfulness

Introduction to different meditation techniques and mindfulness practices

Cultivating present-moment awareness and mental clarity through meditation

Applications of mindfulness in sports performance and daily life

Unit IV:

Yoga for Athletes

Yoga practices to enhance performance, injury prevention, and recovery in athletes.

Yoga sequences targeting specific sports-related movements and muscle groups.

Benefits of Yoga for endurance, strength, and agility training

Yoga for Mental Well-being

Exploring the psychological benefits of Yoga, such as stress reduction and mood enhancement

Yoga practices for improving mental focus, concentration, and self-awareness.

Mind-body connections and the role of Yoga in holistic well-being

Integration and Personal Practice

Review and integration of various Yoga techniques covered in the course.

Developing personal Yoga routines for self-care and continued practice

Reflecting on the impact of Yoga on physical, mental, and emotional well-being

Reference Books:

- Feuerstein, G. (2012). The Yoga Tradition: Its History, Literature, Philosophy, and Practice. Hohm Press.
- Iyengar, B. K. S. (2014). Light on Yoga. HarperCollins.
- Saraswati, S. S. (2011). Asana Pranayama Mudra Bandha. Yoga Publications Trust.
- Swami Satyananda Saraswati. (2008). Bihar School of Yoga. Asana, Pranayama, Mudra, Bandha. Nesma Books India.
- Sivananda Yoga Vedanta Centre. (2012). The Complete Illustrated Book of Yoga. Harmony.
- Coulter, H. D. (2009). Anatomy of Hatha Yoga: A Manual for Students, Teachers, and Practitioners. Body and Breath.
- Stiles, M. J. (2010). The Key Muscles of Yoga: Scientific Keys, Volume I. Independent Publishers Group.
- Lasater, J. H. (2016). Relax and Renew: Restful Yoga for Stressful Times. Rodmell Press.
- Farhi, D. (2004). The Breathing Book: Good Health and Vitality Through Essential Breath Work. Holt Paperbacks.
- Khalsa, S. B. S., & McCall, T. (2015). The Principles and Practice of Yoga in Health Care. Handspring Publishing.

SEMESTER TWO

Human Anatomy-II

Course code	Human Anatomy-II	Course Type	L	T	P	C	CH
B23HF0201		DSC	3	-	-	3	3

Pedagogy:

The course will include lectures, visual aids, anatomical models, and classroom discussions.

Course Objectives:

- To understand the structure and functions of the cardiovascular, respiratory, digestive, urinary, reproductive, endocrine systems, and special senses.

- To analyze the adaptations of these systems to exercise and sports performance.

Course Outcomes:

- Students will be able to describe the anatomy and functions of the cardiovascular and respiratory systems, including blood circulation, cardiac conduction, gas exchange, and respiratory regulation during exercise.
- Students will gain knowledge of the digestive system's structure, physiology, and processes of nutrient absorption.
- Understanding the anatomy and functions of the urinary system, including kidney structure, nephron function, and fluid balance regulation.
- Students will be able to explain the anatomy of the reproductive system, the menstrual cycle, fertilization, and the embryological stages. Additionally, they will understand the major endocrine glands and their hormonal functions, as well as the anatomy and physiology of special senses (vision, hearing, equilibrium).

Course Code	Pos/ COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO1	PSO 2	PSO 3	PSO 4
B23HF0201	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Unit I: Cardiovascular System & Respiratory System

Structure and functions of the heart and blood vessels

Circulation of blood and cardiac conduction system

Blood composition and blood pressure regulation

Anatomy of the respiratory system and its components

Mechanics of breathing and gas exchange

Regulation of respiration and respiratory adaptations to exercise

Unit II: Digestive System

Structure and functions of the digestive system

Anatomy and physiology of the gastrointestinal tract

Digestive processes and nutrient absorption

Unit III: Urinary System

Anatomy and functions of the urinary system

Structure and functions of the kidneys and nephrons

Urine formation and regulation of fluid balance

Unit IV: Reproductive System & Endocrine System and Special Senses

Anatomy of the male and female reproductive systems

Reproductive hormones and the menstrual cycle

Fertilization, embryology, and pregnancy

Structure and functions of the endocrine system

Major endocrine glands and their hormones

Anatomy and physiology of the special senses (vision, hearing, equilibrium)

Reference Books:

- Marieb, E. N., & Hoehn, K. (2016). Human Anatomy & Physiology (11th ed.). Pearson.
- Tortora, G. J., & Derrickson, B. H. (2017). Principles of Anatomy & Physiology (15th ed.). Wiley.
- Saladin, K. S. (2017). Anatomy & Physiology: The Unity of Form and Function (8th ed.). McGraw-Hill Education.
- Martini, F., Nath, J. L., & Bartholomew, E. F. (2017). Fundamentals of Anatomy & Physiology (11th ed.). Pearson.
- McKinley, M. P., O'Loughlin, V. D., & Bidle, T. S. (2018). Anatomy & Physiology: An Integrative Approach (3rd ed.). McGraw-Hill Education.
- Patton, K. T., & Thibodeau, G. A. (2016). Anatomy & Physiology (10th ed.). Elsevier.
- Silverthorn, D. U. (2018). Human Physiology: An Integrated Approach (8th ed.). Pearson.
- Vander, A. J., Sherman, J. H., & Luciano, D. S. (2014). Human Physiology: The Mechanisms of Body Function (14th ed.). McGraw-Hill Education.
- Sarikas, A. (2018). Essential Clinical Anatomy (5th ed.). Lippincott Williams & Wilkins.
- Moore, K. L., & Dalley, A. F. (2018). Clinically Oriented Anatomy (8th ed.). Wolters Kluwer.

Practical - Human Anatomy-II

Course code	Practical - Human Anatomy-II	Course Type	L	T	P	C	CH
B23HF0206		DSC	-	-	1	1	2

Pedagogy:

The practical sessions will involve hands-on dissections, microscopic examinations, and interactive learning methods.

Course Objectives:

- To provide students with a comprehensive understanding of the cardiovascular, respiratory, digestive, urinary, and reproductive systems in the context of sports science.
- To develop students' practical skills in identifying and locating the major anatomical structures related to the mentioned systems.

Course Outcome:

- Students will be able to accurately identify and locate major blood vessels and heart chambers, as well as understand their roles in the cardiovascular system.
- Students will be proficient in examining and identifying different blood components under a microscope.
- Students will gain a clear understanding of the key respiratory structures, their functions, and the process of gas exchange, identify and locate major digestive organs, such as the stomach and small intestine, and understand their roles in the digestive process.
- Students will be familiar with the urinary system's key structures, such as the kidneys and bladder, and comprehend the process of urine formation and fluid balance regulation.

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
B23HF0206	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Cardiovascular System:

Identify and locate major blood vessels and chambers of the heart.

Examine and identify the different components of blood under a microscope.

Respiratory System:

Identify and locate key respiratory structures such as the trachea and lungs.

Understand the mechanics of breathing and the process of gas exchange.

Digestive System:

Identify and locate major digestive organs such as the stomach and small intestine.

Urinary System:

Identify and locate key structures of the urinary system, including the kidneys and bladder.

Understand the process of urine formation and the regulation of fluid balance.

Reference Books:

- Marieb, E. N., & Hoehn, K. (2019). Human Anatomy & Physiology. Pearson.
- Tortora, G. J., & Derrickson, B. (2017). Principles of Anatomy and Physiology. Wiley.
- Patton, K. T., Thibodeau, G. A., & Wise, C. (2017). Anatomy & Physiology. Mosby.
- Ross, M. H., Pawlina, W., & Gambon-Deza, F. (2018). Histology: A Text and Atlas. Wolters Kluwer.
- Netter, F. H. (2018). Atlas of Human Anatomy. Saunders.

Human Physiology-II

Course code	Human Physiology - II	**Course Type**	**L**	**T**	**P**	**C**	**CH**
B23HF0202		DSC	3	-	-	3	3

Pedagogy:

The course will involve lectures, laboratory work, case studies, and discussions to provide students with a comprehensive understanding of human physiology in the context of sports science.

Course Objectives:

- To develop an in-depth understanding of the physiological mechanisms involved in respiratory and renal systems.
- To explore the endocrine system's role in regulating metabolism, growth, and development.

Course Outcomes:

- Explain the structure and function of the respiratory system, including gas exchange and pulmonary ventilation.Analyze the mechanisms of renal function, including glomerular filtration, tubular reabsorption, and secretion.
- Evaluate the endocrine system's influence on metabolism, energy balance, and growth during exercise and rest.
- Demonstrate an understanding of the integration of physiological systems during exercise, including cardio-respiratory responses, metabolic adaptations, and neuroendocrine regulation.
- Assess and interpret physiological adaptations to different environmental conditions like altitude, heat, and cold in relation to exercise.

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
B23HF0202	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Unit I: Respiratory Physiology, Renal Physiology

Structure and function of the respiratory system.

Pulmonary ventilation and gas exchange.

Regulation of respiration.

Structure and function of the kidneys.

Glomerular filtration and renal blood flow.

Tubular reabsorption and secretion.

Regulation of water and electrolyte balance.

Unit II: Endocrine System and Metabolism

Introduction to the endocrine system and hormone functions.

Regulation of metabolism and energy balance.

Endocrine control of growth and development.

Unit III: Integration of Physiological Systems during Exercise

Cardio-respiratory responses to exercise.

Metabolic adaptations during exercise.

Neuroendocrine responses and thermoregulation during exercise.

Unit IV: Environmental Physiology and Exercise Assessment

Physiological adaptations to altitude, heat, and cold.

Exercise-related physiological assessments and measurements.

Reference Books:

- Guyton, A. C., & Hall, J. E. (2016). Textbook of Medical Physiology. Elsevier.
- Costanzo, L. S. (2018). Physiology. Elsevier.
- Silverthorn, D. U. (2018). Human Physiology: An Integrated Approach. Pearson.
- Sherwood, L. (2015). Human Physiology: From Cells to Systems. Cengage Learning.

- Widmaier, E. P., Raff, H., & Strang, K. T. (2019). Vander's Human Physiology. McGraw-Hill Education.
- McArdle, W. D., Katch, F. I., & Katch, V. L. (2015). Exercise Physiology: Nutrition, Energy, and Human Performance. Wolters Kluwer.
- Brooks, G. A., Fahey, T. D., & Baldwin, K. M. (2018). Exercise Physiology: Human Bioenergetics and Its Applications. McGraw-Hill Education.
- Wilmore, J. H., & Costill, D. L. (2018). Physiology of Sport and Exercise. Human Kinetics.
- Powers, S. K., & Howley, E. T. (2018). Exercise Physiology: Theory and Application to Fitness and Performance. McGraw-Hill Education.
- Kenney, W. L., Wilmore, J. H., & Costill, D. L. (2019). Physiology of Sport and Exercise with Web Study Guide. Human Kinetics.

Practical - Human Physiology-II

Course code	**Practical** - Human Physiology – II	**Course Type**	**L**	**T**	**P**	**C**	**CH**
B23HF0207		DSC	-	-	1	1	2

Pedagogy:

The course will involve hands-on practical sessions, laboratory work, data analysis, and interpretation of results related to respiratory physiology, renal physiology, exercise physiology, and environmental physiology.

Course Objectives:

- To provide students with a comprehensive understanding of advanced concepts and practical applications in human physiology related to respiration, renal function, exercise, and responses to environmental challenges.
- To develop students' skills in conducting physiological experiments, analyzing data, and drawing conclusions based on experimental results.

Course Outcome:

By the end of the course, students will be able to:

- Perform pulmonary function tests, including spirometry and lung diffusion capacity measurements.
- Analyze respiratory gas exchange data to assess pulmonary efficiency.

- Conduct urine analysis, measuring urine volume and composition, to evaluate renal function.
- Use laboratory techniques to assess renal function and interpret the results.
- Assess cardiorespiratory fitness through maximal oxygen uptake (VO2max) measurement.
- Evaluate anaerobic power and capacity using appropriate exercise physiology tests.
- Perform heat stress testing and analyze physiological responses to elevated temperatures.
- Understand physiological adaptations to high altitude through altitude simulation experiments.

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
B23HF0207	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Respiratory Physiology:

Pulmonary function tests: spirometry, lung diffusion capacity.

Analysis of respiratory gas exchange.

Renal Physiology:

Urine analysis: measurement of urine volume and composition.

Assessment of renal function using laboratory techniques.

Exercise Physiology:

Cardiorespiratory fitness assessment: maximal oxygen uptake (VO2max) measurement.

Assessment of anaerobic power and capacity.

Environmental Physiology:

Heat stress testing: assessment of physiological responses to elevated temperatures.

Altitude simulation: understanding physiological adaptations to high altitude.

Reference Books:

- Guyton, A. C., & Hall, J. E. (2016). Textbook of Medical Physiology. Saunders.
- Costanzo, L. S. (2018). Physiology. Elsevier.
- McArdle, W. D., Katch, F. I., & Katch, V. L. (2015). Exercise Physiology: Nutrition, Energy, and Human Performance. Wolters Kluwer Health.
- Berne, R. M., Levy, M. N., Koeppen, B. M., & Stanton, B. A. (2017). Physiology. Elsevier.
- Widmaier, E. P., Raff, H., & Strang, K. T. (2019). Vander's Human Physiology. McGraw-Hill

Education.

First Aid & CPR

Course code	First Aid & CPR	Course Type	L	T	P	C	CH
B23HF0204		DSEC	3	-	-	3	3

Course Description:

This theory course in the B.Sc. Sports Science curriculum provides students with an in-depth understanding of athletic injuries, their prevention, initial assessment, and management. Students will learn about anatomy, biomechanics, immediate care, documentation, and rehabilitation principles to effectively handle sports-related injuries.

Pedagogy:

The course will include lectures, case studies, group discussions, multimedia presentations, and guest lectures from sports medicine professionals.

Course Objectives:

- Understand the anatomy and biomechanics of major joints and body regions to identify vulnerable areas prone to athletic injuries.
- Develop proficiency in the initial assessment and first aid for various sports-related injuries, and learn injury prevention strategies.

Course Outcome:

Upon successful completion of the course, students will be able to:

- Evaluate and assess common signs and symptoms of athletic injuries, and implement appropriate initial care.
- Effectively communicate with athletes, coaches, and medical professionals about injury documentation and reporting.
- Apply rehabilitation principles and techniques to promote healing, restore function, and prevent reinjury in athletes.
- Demonstrate knowledge of protective equipment and safety measures to minimize the risk of injuries in sports.

Course Code	POs/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO2	PSO 3	PSO 4
B23HF0204	CO1	2	3	2	3	3	3	2	1	1	2	3	2	2	1

	CO2	3	2	3	3	2	2	3	2	1	2	2	3	1	2
	CO3	3	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO4	2	2	3	3	2	2	3	2	1	2	2	3	1	2

Course Content:

Unit I: Introduction to Athletic Injuries

Overview of athletic injuries and their impact on sports performance

Anatomy and biomechanics of major joints and body regions

Common causes and risk factors for athletic injuries

Injury Prevention and Safety Measures

Principles of injury prevention in sports

Strategies for promoting athlete safety and reducing the risk of injuries

Protective equipment and its role in injury prevention

Unit II:

Initial Assessment of Athletic Injuries

Primary survey and secondary survey techniques

Recognition and evaluation of common signs and symptoms of athletic injuries

Principles of triage and referral for further medical evaluation

Immediate Care and First Aid

Importance of first aid and CPR in sports and exercise science.

Legal and ethical considerations in providing first aid.

Good Samaritan laws and their implications.

Chain of survival in emergency situations.

The physiology of cardiac arrest and respiratory failure.

Steps of basic life support (BLS).

Hands-only CPR technique.

Use of automated external defibrillators (AEDs) in sports environments.

Principles of immediate care for athletic injuries

Techniques for controlling bleeding, managing fractures, and immobilizing injured body parts

Management of common sports-related injuries, such as sprains, strains, dislocations, and concussions

Unit III:

Documentation and Communication in Injury Management

Importance of accurate documentation of athletic injuries

Effective communication with athletes, coaches, and medical professionals

Legal and ethical considerations in injury reporting and documentation

Unit IV:

Rehabilitation Principles and Techniques

Overview of the rehabilitation process for athletic injuries

Techniques for promoting healing, restoring function, and preventing reinjury

Introduction to therapeutic modalities, exercise protocols, and injury-specific rehabilitation plans

Reference Books:

- Prentice, W. E. (2019). Arnheim's Principles of Athletic Training. McGraw-Hill Education.
- Brukner, P., & Khan, K. (2017). Clinical Sports Medicine. McGraw-Hill Education.
- Kaminski, T. W., & Wikstrom, E. A. (Eds.). (2021). Anterior Cruciate Ligament Injuries in the Female Athlete: Causes, Impacts, and Conditioning Programs. Springer.
- Anderson, M. K., & Hall, S. J. (2020). Foundations of Athletic Training: Prevention, Assessment, and Management. Wolters Kluwer.
- Clarkson, P. M., & Pezullo, J. (Eds.). (2018). Clinical Exercise Physiology (4th ed.). Human Kinetics.
- Herring, S. A., & Kibler, W. B. (Eds.). (2016). The Team Physician's Handbook. Lippincott Williams & Wilkins.
- Reider, B., & Batten, S. (2019). The Sports Medicine Resource Manual. Saunders.
- Brukner, P., & Clarsen, B. (2017). Clinical Sports Medicine Injuries. McGraw-Hill Education Australia.
- Miller, M. D., & Thompson, S. R. (2017). DeLee & Drez's Orthopaedic Sports Medicine. Elsevier.
- Starkey, C. (2018). Therapeutic Modalities (4th ed.). F.A. Davis Company.

Practical - First Aid & CPR

Course code	Practical -_First Aid & CPR	Course Type	L	T	P	C	CH
B23HF0209		DSEC	-	-	1	1	2

Course Description:

This practical course in First Aid & CPR is designed for B.Sc. Sports Science students to develop essential first aid skills, including vital signs assessment, bandaging, CPR, and AED training. Students will also learn initial assessment techniques, immobilization and splinting methods, emergency management of concussions, and sports taping and bracing techniques.

Pedagogy:

The course will involve hands-on training, practical demonstrations, simulations, and real-life case scenarios. Students will practice techniques on mannequins and fellow students to enhance their skills and confidence in managing athletic injuries effectively.

Course Objectives:

- Acquire foundational first aid skills and demonstrate competency in vital signs assessment, bandaging, and CPR.
- Develop proficiency in recognizing and evaluating common signs and symptoms of athletic injuries, along with proper triage and referral techniques.

Course Outcome:

Upon successful completion of the course, students will be able to:

- Apply appropriate immobilization techniques for fractures and dislocations, and demonstrate the application of splints and braces for joint injuries.
- Demonstrate knowledge of concussion recognition and assessment, and handle suspected concussions safely during sports events.
- Perform sports taping for common joints and apply various types of braces to provide joint stability for athletes.

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO2	PSO 3	PSO 4
B23HF0209	CO1	2	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO2	3	2	3	3	2	2	3	2	1	2	2	3	1	2
	CO3	3	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO4	2	2	3	3	2	2	3	2	1	2	2	3	1	2

Course Content:

Basic First Aid Skills:

Assessment of vital signs (pulse rate, blood pressure, respiration rate)

Bandaging techniques for different types of injuries

CPR and AED training

Initial Assessment Techniques:

Primary survey and secondary survey practice

Recognition and evaluation of common signs and symptoms of athletic injuries

Triage and referral simulations

Immobilization and Splinting:

Immobilization techniques for fractures and dislocations

Application of splints and braces for various joint injuries

Practice on mannequins and fellow students

Emergency Management of Concussions:

Recognition and assessment of concussions

Steps for immediate care and safe transportation

Simulation exercises for proper handling of suspected concussions

Sports Taping and Bracing:

Techniques for taping common joints (e.g., ankle, wrist, knee)

Application of various types of braces for joint stability

Reference Books:

- Goodman, C. C., & Fuller, K. S. (2015). Pathology: Implications for the Physical Therapist (4th ed.). Elsevier.
- Miller, M. D., Thompson, S. R., & DeLee, J. C. (Eds.). (2014). DeLee & Drez's Orthopaedic Sports Medicine: Principles and Practice (4th ed.). Elsevier.
- Prentice, W. E. (2017). Arnheim's Principles of Athletic Training: A Competency-Based Approach (17th ed.). McGraw-Hill Education.
- Anderson, M. K., & Hall, S. J. (2019). Foundations of Athletic Training: Prevention, Assessment, and Management (6th ed.). Wolters Kluwer.

  Starkey, C., & Ryan, J. (2019). Evaluation of Orthopedic and Athletic Injuries (4th ed.). F.A. Davis Company.

Fundamentals of Sports & Exercise Science

Course code	Fundamentals of Sports & Exercise Science	Course Type	L	T	P	C	CH
B23HF0203		DSC	3	-	-	3	3

Pedagogy:

The course will employ a combination of lectures, discussions, practical demonstrations, case studies, and hands-on exercises to impart theoretical knowledge and practical understanding of sports and exercise science.

Course Objectives:

- To provide students with a comprehensive understanding of the fundamental principles,

concepts, and scope of sports and exercise science.

- To introduce students to various fields within sports and exercise science and their applications in sports management, coaching, psychology, and nutrition.

Course Outcome:

- Students will demonstrate a thorough understanding of the historical perspectives, scope, and significance of sports and exercise science in modern society.
- Students will be able to identify and analyze the major concerns and developments in different fields of sports and exercise science.
- Students will gain knowledge of biomechanics, psychology, sociology, and nutrition and their applications in improving sports performance and preventing injuries.
- Students will be equipped to apply ethical considerations and emerging technologies in sports and exercise science to various settings.

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
B23HF0203	CO1	2	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO2	3	2	3	3	2	2	3	2	1	2	2	3	1	2
	CO3	3	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO4	2	2	3	3	2	2	3	2	1	2	2	3	1	2

Course Content:

Unit I: Introduction to Sports and Exercise Science

- Definition and scope of sports and exercise science
- Historical perspectives on sports and exercise science
- Current trends and developments in sports and exercise science
- Basic Concepts of Leisure , play , game ,Sport And Physical Activity Scope and Dimensions Sport & Sport Science . Significance and place of sport in modern Society.
- Emergence of Sport. Sport as an “Art” & “Science”. Brief introduction to ancient & modern Olympics.

Unit II: Different Fields in Sports & Exercise Science – An overview

Exercise Physiology, Kinesiology and Biomechanics Motor Learning, Control and Development;

Sport Sociology; Sport Psychology and pedagogy.

Development of each field of study and their major concerns.

Non-Participant Sport involvement: Sport Management and Administration; Sport Technology; Sport Journalism.

Brief Study of concepts in Sports Medicine, Coaching & Training, Leadership in Sports, Sports aesthetic and Ethics in Sports and Problems and issues in sport.

Brief introduction to the study nutrition and sports pedagogy.

Unit III: Biomechanics

- Introduction to biomechanics
- Mechanical principles of human movement
- Kinematics and kinetics of human movement
- Biomechanics of sport-specific movements

Psychology and Sociology of Sports and Exercise

- Introduction to sport psychology
- Psychological factors affecting performance.
- Psychological interventions to improve performance.
- Social and cultural aspects of sports

Nutrition for Exercise and Sports

- Introduction to nutrition
- Macronutrients and micronutrients
- Energy balance and weight management
- Nutritional supplements and ergogenic aids

Unit IV: Sports Performance

- Factors influencing sports performance.
- Training principles and methods
- Periodization and planning
- Monitoring and evaluation of sports performance

Injury Prevention and Rehabilitation

- Common sports injuries and their prevention
- Principles of injury rehabilitation
- Rehabilitation exercises and programs
- Return to play criteria.

Current Issues and Applications

- Emerging trends and technologies in sports and exercise science
- Ethical considerations in sports and exercise science
- Applications of sports and exercise science in various settings, such as rehabilitation and community health

Reference Books:

- Enoka, R. M. (2015). Neuromechanics of Human Movement. Human Kinetics.
- Hatfield, F. C. (2018). Fitness: The Complete Guide. International Sports Sciences Association.
- Heyward, V. H. (2014). Advanced Fitness Assessment and Exercise Prescription. Human Kinetics.
- Martini, F. H., Nath, J. L., & Bartholomew, E. F. (2018). Fundamentals of Anatomy & Physiology. Pearson.
- Singer, R. N., & Hausenblas, H. A. (Eds.). (2018). Handbook of Sport Psychology. Wiley.
- Kreider, R. B., Wilborn, C. D., & Greenwood, M. (Eds.). (2020). Essentials of Sport and Exercise Nutrition. Routledge.
- Wuest, D. A., & Bucher, C. A. (2019). Foundations of Physical Education, Exercise Science, and Sport. McGraw-Hill.
- Coakley, J. J., & Dunning, E. (2019). Handbook of Sports Studies. Sage Publications.
- Arnheim, D. D. (2019). Biomechanics of Musculoskeletal Injury (3rd ed.). Human Kinetics.
- Baechle, T. R., & Earle, R. W. (Eds.). (2016). Essentials of Strength Training and Conditioning. Human Kinetics.

Practical - Fundamentals of Sports & Exercise Science

Course code	Practical - Fundamentals of Sports & Exercise Science	Course Type	L	T	P	C	CH
B23HF0208		DSC	-	-	1	1	2

Pedagogy:

The course will emphasize hands-on practical exercises, laboratory work, data analysis, and real-world applications to enhance students' understanding of sports and exercise science concepts.

Course Objectives:

- Develop practical skills in exercise physiology, biomechanics, sport psychology, exercise programming, sports performance analysis, nutrition, and supplementation.
- Apply theoretical knowledge to analyze sports performance, design exercise programs, and develop nutrition plans for athletes and clients.

Course Outcomes:

- Students will be able to demonstrate proficiency in exercise physiology techniques, including analyzing VO2 max, anaerobic threshold, and blood lactate levels.
- Students will exhibit competence in biomechanics principles, using electromyography to analyze human movement and muscle activation, as well as evaluating gait and running mechanics.
- Students will develop practical skills in sport psychology, including designing mental skills training programs for both team and individual sports.
- Students will be capable of creating and implementing exercise programs for athletes and clients, considering their specific needs and goals.
- Students will gain proficiency in sports performance analysis and design effective performance improvement programs.

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
B23HF0208	CO1	2	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO2	3	2	3	3	2	2	3	2	1	2	2	3	1	2
	CO3	3	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO4	2	2	3	3	2	2	3	2	1	2	2	3	1	2

Course content:

Exercise Physiology Practical's

- Demonstration of practical skills related to exercise physiology.
- Demonstration of analyzing VO2 max and anaerobic threshold
- Demonstration of analyzing blood lactate levels

Biomechanics Practical's

- Demonstration of practical skills related to biomechanics.
- Applying biomechanics principles to analyze sports performance.
- Demonstration of human movement and muscle activation using electromyography
- Developing skills in analyzing gait and running mechanics

Sport Psychology Practical's

- Demonstration of practical skills related to sport psychology.
- Developing mental skills training programs
- Applying sports psychology principles to team and individual sports

Exercise Programming Practical's

- Demonstration of practical skills related to exercise programming.
- Developing and implementing exercise programs for athletes and clients

Sports Performance Analysis Practical's

- Demonstration of practical skills related to sports performance analysis.
- Developing and implementing performance improvement programs

Nutrition and Supplementation Practical's

- Demonstration of practical skills related to nutrition and supplementation.
- Developing and implementing nutrition and supplementation plans for athletes and clients.

Reference Books:

- McArdle, W. D., Katch, F. I., & Katch, V. L. (2021). Exercise Physiology: Nutrition, Energy, and Human Performance. Lippincott Williams & Wilkins.
- Knudson, D. V. (2019). Fundamentals of Biomechanics. Springer.
- Weinberg, R. S., & Gould, D. (2020). Foundations of Sport and Exercise Psychology. Human Kinetics.
- Bompa, T. O., & Haff, G. G. (2018). Periodization: Theory and Methodology of Training. Human Kinetics.
- Dunford, M., & Doyle, J. A. (2021). Nutrition for Sport and Exercise. Cengage Learning.

Computer Skills and Applications

Course code	Computer Skills and Applications	**Course Type**	**L**	**T**	**P**	**C**	**CH**
B23HF0205		SEC	2	-	-	2	2

Pedagogy:

The course will employ a combination of lectures, computer lab sessions, and assignments to reinforce learning.

Course Objectives:

- To introduce students to the fundamental concepts and applications of computers in the context of Exercise and Sports Science.
- To equip students with essential data management, analysis, and visualization skills relevant to their field of study.

Course Outcomes:

- Students will demonstrate a basic understanding of computer applications in Exercise and Sports Science.
- Students will be able to utilize statistical software for data analysis and interpretation.
- Students will gain proficiency in data acquisition, storage, and cleaning procedures.
- Students will be able to design and create effective visual presentations of data for scientific and practical purposes.

Course Code	Pos/ COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO1	PSO 2	PSO 3	PSO 4
B23HF0205	CO1	3	3	3	3	2	3	2	2	1	2	3	2	2	1
	CO2	3	2	3	2	2	3	3	3	2	3	2	3	2	2
	CO3	3	3	3	3	2	3	2	2	1	2	3	2	3	1
	CO4	2	2	3	2	2	3	3	3	2	3	2	3	2	2

Course Content:

Unit 1: Introduction to Computer Applications for Exercise and Sports Science

- Overview of computer applications in Exercise and Sports Science
- Overview of data management and analysis

Unit 2: Computer Education

- Introduction, meaning, need for computer education.
- History of computer.
- Characteristics of computer, Computer Programmes, Hardware & Software, mini and Microcomputers, symbols, Analog computer, visual display unit, Floppy, Disc, Data Processing.
- Mouse, Keyboard, Monitor, Types of Printer, Operation Internet, E-mail.

Unit 3: Data Management

- Principles of data management
- Data acquisition and storage
- Data cleaning and documentation

Statistical Analysis

- Overview of statistical software
- Basic statistical concepts
- Hypothesis testing and confidence intervals.
- Regression analysis

Unit 4: Data Visualization and Presentation

- Principles of data visualization
- Types of visualization techniques

- Designing effective presentations

Reference Books:

- Schneiderman, B. (2016). Designing the user interface: Strategies for effective human-computer interaction (6th ed.). Pearson.
- Johnson, R. A., & Wichern, D. W. (2013). Applied multivariate statistical analysis (6th ed.). Pearson.
- Tan, P. N., Steinbach, M., & Kumar, V. (2019). Introduction to data mining (2nd ed.). Pearson.
- Grolemund, G., & Wickham, H. (2016). R for data science: Import, tidy, transform, visualize, and model data. O'Reilly Media.
- Freedman, D., Pisani, R., & Purves, R. (2018). Statistics (5th ed.). Norton & Company.
- Anderson, D. R., Sweeney, D. J., Williams, T. A., Camm, J. D., & Cochran, J. J. (2018). Statistics for business & economics (14th ed.). Cengage Learning.
- Few, S. (2013). Information dashboard design: Displaying data for at-a-glance monitoring (2nd ed.). O'Reilly Media.
- Kosslyn, S. M. (2006). Graph design for the eye and mind. Oxford University Press.
- Tufte, E. R. (2001). The visual display of quantitative information (2nd ed.). Graphics Press.

SEMESTER THREE

FUNDAMENTALS OF SPORTS BIOMECHANICS

Course code	Fundamentals of Sports Biomechanics	**Course Type**	**L**	**T**	**P**	**C**	**CH**
B23HF0302		DSC	3	-	-	3	3

Course Description:

This course provides a comprehensive understanding of the principles of biomechanics as applied to sports science. Topics covered include kinematics, forces, mechanical properties of biological materials, biomechanics of joints, biomechanical adaptations to training and injury, gait analysis, and biomechanical analysis of various sports skills.

Pedagogy:

The course will include a mix of lectures, laboratory work, practical demonstrations, and case studies. Students will engage in hands-on experiments, biomechanical analysis of sports skills, and critical evaluation of research reviews related to sports biomechanics.

Course Objectives:

- To understand the fundamental principles of biomechanics and their application in sports science.
- To analyze and evaluate various sports skills from a biomechanical perspective.

Course Outcome:

Upon successful completion of the course, students will be able to:

- Apply biomechanical principles to analyze sports movements and understand their mechanics.
- Demonstrate an understanding of the mechanical properties of biological materials in sports.
- Analyze and evaluate the biomechanics of joints and their role in sports performance.
- Conduct biomechanical analysis of various sports skills, including running, jumping, throwing, and specific sports activities like basketball, volleyball, badminton, hockey, football, cricket, boxing, gymnastics, cycling, and swimming.

Course Code		Pos/ COs	PO1	PO 2	PO 3	PO4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PSO 1	PSO 2	PSO 3	PSO 4
B23HF0302	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2	1
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2	1
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3	1
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2	1

Course Content:

UNIT-I

Basic mathematics for Biomechanics – Trignometry, Vector Analysis, Co-ordinate Geometry, measurements, Statics, Dynamics, forces and moments. Meaning of Kinesiology, Aims and Objectives of Kinesiology, Role of Kinesiology in Sports, Anatomical Position, Principles of Plane and Axis, Various types of movements.

Role of Bio–Mechanics in the field of Sports Science, Principles of Biomechanics; Biomechanical Concepts: Motion, Newton's law of Angular Motion and Linear Motion and its relationships, Force, Centripetal and Centrifugal forces, Equilibrium, Centre of Gravity and Stability, Freely falling bodies and Projectile, Momentum, Impulse, Lever and its Classification, Work, power, Energy: Relationship of Work, Power and Energy, Friction, Spin, Impact, Elasticity, Rebound, Fluid mechanics, Air resistance and Water Resistance.

Basic Biological Principles: Diffusion, surface tension and viscosity, characteristics, influencing factors, biological applications. Introduction to mechanics: Review of principles of mechanics -vector mechanics- Resultant forces of Coplanar and Non-coplanar- Concurrent and non-concurrent forces - parallel force in space - Equilibrium of coplanar forces. Fluid mechanics: Introduction - laminar flow & turbulent flow.

UNIT-II

Mechanics of Biological Materials: Stress, Strain, Mechanical Properties of Materials, Stress-Strain relationship. Bone structure - composition and mechanical properties of bone, viscoelastic properties - Maxwell and Voight models – anisotropy -electrical properties of bone. mechanical properties of collagen rich tissues.

Soft tissues: Structure and functions of cartilages, tendons – ligaments - stress-strain relationship - soft tissue mechanics - mechanical testing of soft tissues standard sample preparation - cross-section measurement - clamping of the specimen - strain measurement - environmental control, time dependent properties of testing.

Biomechanics of joints: Skeletal joints - basic considerations - basic assumption and limitations - forces and stresses - mechanics of the elbow, shoulder, spinal column, hip, knee and ankle.

Biomechanical adaptations to training: Muscular Adaptations, Neuromuscular adaptations and Biomechanical adaptations to injury.

UNIT III

Normal Gait - Walking and gait, History, Terminology used in gait analysis, Outline of the gait cycle, The gait cycle in detail, Ground reaction forces, Support moment, Energy consumption, Optimization of energy usage, Starting and stopping, Other varieties of gait, Changes in Gait with Age, Pathological and other abnormal gaits - Specific gait abnormalities, Walking aids and Treadmill gait.

Determine the simultaneous-sequential nature of a variety of movement skills, Classify motor skills using the classification system presented, Bio-Mechanical analysis of fundamental skills: Walking, Running, Jumping, Pulling, Pushing, Lifting, Lowering, Throwing.

Types of Crouch Start – Bunch start-Medium start-Elongated start - Running – Stride length - Take-off distance - Flight distance - Landing Distance - Stride Frequency - Action of leg - Supporting phase-Driving phase - Recovery phase - Action of arms -Action of trunk - Finish - Types of Finish - Start - Running – Finish-Spikes – Types of spikes – Starting block.

Middle and Long Distance and Relays (800m, 1500m, 5000m, 10000m , and 4x100m and 4x400m) Track events (Sprint - 100m, 200m and 400m) Hurdles (100m, 110m and 400m hurdles) Hurdles – High hurdles-Approach-take-off-Flight-Landing- Running between hurdles-Intermediate hurdles-Low hurdles.

UNIT-IV

Throws (Shot-put, hammer, discus and javelin) technique, application of biomechanical principles, analysis of related research reviews. Shot-put - Shot-put - O'Brien style-Initial stance-Glide-Delivery-Reverse - Rotation style- distance prior to release-Physique-Position-Distance after release-Height of release-Speed

of release-Forces exerted -Angle of release –Air resistance - Advantages and Disadvantages of O'Brien and Rotation techniques. Hammer - Hammer Throw – Preliminary swing-The first turn-The second turn-The third turn-The delivery-Air resistance Speed of release-Angle of release-Height of release. Discus - Discus Throw – Initial stance –Preliminary swings-Transition-Turn-Delivery-reverse-Aerodynamic factors. Javelin-Javelin Throw – Types of Grip –Carry- Run – Transition, Throw, and Recovery-Speed, Angle, Height of release-Aerodynamic factors influencing flight- Advantages and Disadvantages of different Grips-Aerodynamic Javelin.

Jumps (Long jump, Triple jump, High jump and Pole vault) technique, application of biomechanical principles, analysis of related research reviews, and analysis of current world and Olympic record holder's performance. Long Jump-Hang style - Hitch Kick style - Approach run – Take-off -Flight in the Air - Landing – Take-off distance-Flight distance-Speed, angle, height of take off-air resistance-Advantages and Disadvantages of different styles. Triple Jump - Hop - Step and Jump- Approach Run – Take-off - Flight in the Air – Landing

Basketball, Volleyball, Badminton, hockey, football, cricket, boxing, gymnastics, cycling and swimming - application of biomechanical principles, analysis of skills related each game and sports using 2d analysis.

Reference Books:

- Winter, D. A. (2009). Biomechanics and Motor Control of Human Movement. John Wiley & Sons.
- Knudson, D. V. (2019). Fundamentals of Biomechanics. Springer.
- Zatsiorsky, V. M., & Seluyanov, V. N. (2002). The Mass and Inertia Characteristics of the Main Segments of the Human Body. In Biomechanics IX-B (pp. 115-122). Springer.
- Hay, J. G. (1993). The Biomechanics of Sports Techniques. Prentice Hall.
- Nigg, B. M., & Herzog, W. (2007). Biomechanics of the Musculo-Skeletal System. John Wiley & Sons.
- McGinnis, P. M. (2013). Biomechanics of Sport and Exercise. Human Kinetics.
- Enoka, R. M. (2008). Neuromechanics of Human Movement. Human Kinetics.
- Robertson, G. E., Caldwell, G. E., Hamill, J., Kamen, G., & Whittlesey, S. N. (2013). Research Methods in Biomechanics. Human Kinetics.
- Bartlett, R. (1997). Introduction to Sports Biomechanics: Analysing Human Movement Patterns. E & FN Spon.
- Cross, R., & Bahamonde, R. (2016). Biomechanics of Sport and Exercise with Web Resource and MaxTRAQ 2D Software Access-3rd Edition. Human Kinetics.

Practical - FUNDAMENTALS OF SPORTS BIOMECHANICS

Course code	Practical - Fundamentals of Sports Biomechanics	Course Type	L	T	P	C	CH
B23HF0307		DSC	-	-	1	1	2

Course Description:

This practical course provides students with hands-on experience in analyzing the biomechanics of human movement in sports. It covers the study of various body planes, joint structures, muscle attachments, and the biomechanical analysis of fundamental movements, gait, and posture.

Pedagogy:

The course will employ a combination of practical demonstrations, hands-on exercises, laboratory work, and data analysis. Students will be guided by instructors and will use relevant tools and equipment for biomechanical measurements.

Course Objectives:

- To understand the anatomical aspects of the human body and its relation to biomechanics in sports performance.
- To develop skills in conducting biomechanical analyses to assess movement patterns and provide insights into sports performance and injury prevention.

Course Outcome:

- Students will demonstrate the ability to analyze various body planes and axes and apply this knowledge to assess sports movements.
- Students will be able to identify and explain the joint structures and corresponding muscles involved in specific upper and lower extremity movements.
- Students will be proficient in measuring joint range of motion and understanding its significance in sports performance.
- Students will be able to conduct biomechanical analyses of fundamental movements, gait patterns, and posture to evaluate and enhance sports performance.

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO2	PSO 3	PSO 4
B23HF0307	CO1	3	3	2	2	1	2		1	1	3	1	3	2	1
	CO2	2	2	3	3	2	1		2	1	2	2	2	3	1
	CO3	3	3	3	2	1	1		1	2	2	1	3	2	1
	CO4	2	2	2	3	1	3		2	1	3	1	2	3	1

PRACTICALS

UNIT I

· To analyze various planes and axes of the body.

· To demonstrate the surface anatomy and muscle attachments of following bones: Clavicle, Scapula, Humerus, Radius, Ulna, Metacarpals, Phalanges, Femur, Tibia , Fibula, Patella, Tarsals and metatarsals.

UNIT II

· To demonstrate the following joints including corresponding muscles and movements of Upper Extremity: Acromioclavicular joint, Sternoclavicular joint, Shoulder joint, Elbow joint, Proximal Radioulnar joint, Distal Radioulnar joint, Wrist joint Thumb joint.

· To demonstrate the following joints including corresponding muscles and movements of Lower Extremity: Hip Joint, Knee complex, Ankle joint.

UNIT III

· Demonstration of Centre of Gravity of Human Body.

· Demonstration & Determination of Human Gait pattern.

· Measuring Joint Range of Motion of all major joints of the body

UNIT IV

· Biomechanical Analysis of fundamental movements

· Biomechanical Analysis of Gait

· Biomechanical Analysis of Posture.

Reference Books:

- Robertson, G. E., Caldwell, G. E., Hamill, J., Kamen, G., & Whittlesey, S. N. (2013). Research Methods in Biomechanics. Human Kinetics.
- Knudson, D. V. (2015). Fundamentals of Biomechanics (3rd ed.). Springer.
- Hall, S. J. (2017). Basic Biomechanics (8th ed.). McGraw-Hill Education.
- Zatsiorsky, V. M. (2007). Kinetics of Human Motion. Human Kinetics.
- Enoka, R. M. (2008). Neuromechanics of Human Movement (4th ed.). Human Kinetics.

SPORTS PSYCHOLOGY

Course code	Sports Psychology	**Course Type**	**L**	**T**	**P**	**C**	**CH**
B23HF0303		DSC	3	-	-	3	3

Course Description:

This course provides an in-depth understanding of sports psychology as a discipline, covering historical perspectives, key theories, and ethical considerations. It explores the impact of personality traits on sports performance and delves into motivational theories and goal-setting principles. Additionally, it addresses arousal, anxiety, and stress management techniques, along with the use of imagery and mental skills training to enhance athletes' confidence and self-efficacy. The course also focuses on team dynamics, leadership styles, and psychological interventions for injury rehabilitation, culminating in strategies for performance enhancement and mental toughness.

Pedagogy:

The course will utilize a combination of lectures, group discussions, practical sessions, case studies, and hands-on exercises. Students will engage in personality assessments, goal setting techniques, relaxation practices, mental skills training exercises, team-building activities, and psychological support for injured athletes to foster a comprehensive understanding of sports psychology theory.

Course Objectives:

- Develop a foundational understanding of sports psychology, including its historical context and ethical considerations, to apply in real-life scenarios.
- Acquire practical skills in motivational techniques, goal setting, stress management, mental skills training, and team dynamics to enhance athletes' performance and overall mental well-being.

Course Outcome:

- Students will be able to analyze the psychological factors influencing individual differences in sports performance.
- Students will demonstrate the ability to design and implement effective goal-setting and motivation enhancement strategies for athletes.
- Students will employ various relaxation and stress coping techniques to manage arousal, anxiety, and stress in sports.
- Students will apply mental skills training exercises and cognitive strategies to boost athletes' confidence and self-efficacy.

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO2	PSO 3	PSO 4
B23HF0303	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2

	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Unit I: Introduction to Sports Psychology and Professional practice in Sports Psychology.

Overview of sports psychology as a discipline.
Historical perspectives and key theories in sports psychology.
Ethical considerations in sports psychology practice.

Unit II: Psychology aspects of Sports & Performance

The role of personality traits in sports performance.
Psychological factors related to individual differences among athletes.
Motivation
Anxiety & stress management.

Unit:3 Professional practice in sports psychology

Imagery & visualisation.

Self-talk.

Psychological/Mental skill training.

Basic counselling skill.

Unit: 4 Team Dynamics and Leadership

Psychological aspects of team dynamics and group cohesion.

Leadership styles and their impact on team performance.

Psychological skills in Injury & Rehabilitation

Psychological factors in Injury prevention & rehabilitation

Psychological intervention for enhancing athlete's recovery

Reference Books:

- Weinberg, R. S., & Gould, D. (2019). Foundations of Sport and Exercise Psychology. Human Kinetics.
- Cox, R. H. (2016). Sport Psychology: Concepts and Applications. McGraw-Hill Education.
- Dosil, J. (2017). The Psychology of Sports Coaching: Research and Practice. Routledge.

- Van Raalte, J. L., & Brewer, B. W. (Eds.). (2018). Exploring Sport and Exercise Psychology (4th ed.). American Psychological Association.
- Murphy, S. M., & White, A. (2019). The Psychology of Exercise: Integrating Theory and Practice (4th ed.). Routledge.
- Andersen, M. B., & Morris, T. (2016). Sport Psychology in Practice. Human Kinetics.
- Williams, J. M. (Ed.). (2018). Applied Sport Psychology: Personal Growth to Peak Performance (7th ed.). McGraw-Hill Education.
- Cox, R. H., & Yoo, J. (2018). Sport Psychology: Concepts and Applications (8th ed.). McGraw-Hill Education.
- Taylor, J., & Wilson, G. (2019). Applying Sport Psychology: Four Perspectives. Human Kinetics.
- Hanton, S., Mellalieu, S. D., & Hall, R. (2017). Professional Practice in Sport Psychology: A Review. Routledge.

Practical - SPORTS PSYCHOLOGY

Course code	Practical - Sports Psychology	Course Type	L	T	P	C	CH
B23HF0308		DSC	-	-	1	1	2

Course Description:

This course provides hands-on practical training in various sports psychology techniques to enhance athlete performance and well-being. Students will learn to administer and interpret psychological assessments, apply motivation enhancement techniques, practice arousal regulation and stress management, conduct mental skills training, improve team dynamics and communication, provide psychological support during injury rehabilitation, and promote self-reflection and personal development as sports psychology practitioners.

Pedagogy:

The course will involve a combination of lectures, practical exercises, case studies, role-playing, group discussions, and reflective journaling to facilitate active learning and skill development.

Course Objective:

- Develop competency in applying sports psychology techniques for enhancing athlete performance and mental well-being.
- Cultivate self-awareness and reflective skills as aspiring sports psychology practitioners.

Course Outcome:

- Students will be able to administer and interpret psychological assessments for athletes effectively.
- Students will design and implement motivational programs to enhance athletes' motivation and goal-setting skills.
- Students will demonstrate proficiency in teaching relaxation techniques, stress management, and mental skills training to athletes.
- Students will possess the ability to foster positive team dynamics, effective communication, and leadership skills within sports teams.

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO2	PSO 3	PSO 4
B23HF0308	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Psychological Assessment Tools:

Introduction to various psychological assessment tools used in sports psychology.

Practical training in administering and interpreting psychological assessments.

Role – playing an intake session.

Case studies and discussions based on assessment results.

Designing and implementing motivational programs for athletes based on assessment and intake session.

Arousal Regulation and Stress Management:

Teaching athletes' relaxation techniques, such as progressive muscle relaxation and deep breathing.

Guided imagery sessions for stress reduction and enhancing focus.

Mental Skills Training:

Assessment

Basic counselling & intake sessions

Case studies & role plays

Developing psychological skills training program

Training in relaxation techniques & visualization strategies

Team – building activities

Reflective journaling

Reference Books:

- Gould, D., & Weinberg, R. (2019). Foundations of sport and exercise psychology. Human Kinetics.
- Weinberg, R. S., & Williams, J. M. (2019). Applied sport psychology: Personal growth to peak performance. McGraw-Hill Education.
- Andersen, M. B., & Williams, J. M. (2018). A series in applied sport psychology: Mental skills training for sports. Routledge.
- Murphy, S. M. (2017). The sport psych handbook. Human Kinetics.
- Cox, R. H. (2019). Sport psychology: Concepts and applications. McGraw-Hill Education.

Fundamentals of Sports Coaching

Course code	Fundamentals of Sports Coaching	**Course Type**	**L**	**T**	**P**	**C**	**CH**
B23HF0304		DSC	3	-	-	3	3

Course Description:

This course introduces students to the fundamental principles and methodologies of sports coaching. It covers topics such as coaching roles, ethics, communication skills, coaching styles, athlete assessment, training program design, and practical coaching sessions.

Pedagogy:

The course will employ a combination of lectures, interactive discussions, practical coaching exercises, case studies, and guest lectures from experienced coaches to enhance the students' understanding of sports coaching theory.

Course Objectives:

- Understand the roles, responsibilities, and ethical considerations in sports coaching.
- Acquire knowledge of coaching principles, methodologies, and effective communication skills for effective coaching.

Course Outcome:

Upon completing the course, students will be able to:

- Demonstrate an understanding of coaching philosophies, ethics, and professionalism.
- Apply coaching principles and methodologies to design and evaluate effective training programs for athletes.
- Analyze and adapt coaching styles for different athlete development stages and individual needs.

- Conduct practical coaching sessions and utilize effective teaching methods for skill acquisition.

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO2	PSO 3	PSO 4
B23HF0304	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Unit I: Introduction to Sports Coaching

Introduction to sports coaching: roles, responsibilities, and coaching philosophies.

Coaching ethics, professionalism, and legal considerations.

Effective communication and interpersonal skills for coaches.

Unit II: Coaching Principles and Methodologies

Understanding the coaching process: planning, organizing, and evaluating.

Coaching styles and their impact on athlete development.

Athlete assessment and individualized coaching strategies.

Unit III: Athlete Development and Training

Principles of athlete development across different age groups.

Long-term athlete development models and stages.

Designing training programs and periodization for athletes.

Unit IV: Coaching Skills and Practice

Effective teaching methods and skill acquisition principles.

Practice planning and session organization.

Coaching practical sessions with athletes in selected sports disciplines.

Reference Books:

- Lyle, J. (2018). Foundations of Sports Coaching. Human Kinetics.
- Gilbert, W., & Trudel, P. (2016). The Coaching Process: Principles and Practice for Sport. Routledge.
- Jones, R. L. (2017). Sports Coaching: A Reference Guide for Students, Coaches, and Competitors. Routledge.
- Cushion, C., & Jones, R. L. (2019). Sports Coaching: Professionalization and Practice. Routledge.
- Martens, R. (2015). Successful Coaching. Human Kinetics.

- Mageau, G. A., & Vallerand, R. J. (2020). The Coach-Athlete Relationship in Sport: A Motivational Model. Routledge.
- Côté, J., & Gilbert, W. (2018). Coaching Better Every Season: A Year-Round System for Athlete Development and Program Success. Human Kinetics.
- Mitchell, S. A., & Oslin, J. L. (2019). Teaching Sport Concepts and Skills: A Tactical Games Approach. Human Kinetics.
- Sergiovanni, T. J., & Starratt, R. J. (2017). Supervision: A Redefinition. McGraw-Hill Education.
- Gilbert, W., & Côté, J. (Eds.). (2016). Transformational Coaching in Sport: Applying Theory to Practice. Routledge.

Practical - Fundamentals of Sports Coaching

Course code	Practical - Fundamentals of Sports Coaching	Course Type	L	T	P	C	CH
B23HF0309		DSC	-	-	1	1	2

Course Description:

This practical course introduces students to the essential aspects of sports coaching, including the role and responsibilities of coaches, coaching principles, effective communication and motivation techniques, coaching styles, skill development, team building, game strategy, and match preparation. The course emphasizes hands-on learning and application of coaching techniques in various sports settings.

Pedagogy:

The course will employ a combination of practical sessions, interactive workshops, case studies, role-plays, and video analysis to enhance students' coaching skills. Students will also have the opportunity to observe and assist experienced coaches during real coaching sessions.

Course Objectives:

- Develop a comprehensive understanding of sports coaching principles and ethics.
- Acquire the necessary skills to plan, conduct, and assess skill development sessions for athletes.

Course Outcome:

By the end of the course, students will be able to:

- Demonstrate effective coaching techniques and communication skills.
- Analyze individual player skills and design appropriate skill development programs.
- Build and manage cohesive and motivated sports teams.
- Strategize game plans and prepare teams for matches effectively.

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO2	PSO 3	PSO 4

B23HF0309	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Introduction to Sports Coaching

- Understanding the role and responsibilities of a sports coach
- Basic coaching principles and ethics
- Effective communication and motivation techniques for coaches
- Introduction to coaching styles and methodologies
- Introduction to various sports and their coaching requirements

Skill Development and Techniques

- Identifying and analyzing individual player skills
- Planning and conducting skill development sessions
- Teaching fundamental techniques and drills for specific sports
- Assessing player progress and providing constructive feedback
- Integrating skill development into team strategies

Team Building and Management

- The importance of team dynamics in sports
- Strategies for fostering team cohesion and positive team culture
- Effective team communication and leadership
- Managing conflicts and challenges within the team
- Building strong coach-player relationships

Game Strategy and Match Preparation

- Understanding game analysis and opponent scouting
- Developing game strategies based on team strengths and weaknesses
- Preparing players mentally and physically for matches
- In-game decision making and adjustments
- Post-match evaluation and continuous improvement

Reference Books:

- Smith, J. (2020). Coaching: The Art and Science of Leadership. ABC Publishers.
- Johnson, R. (2019). Skill Development in Sports: A Practical Guide. XYZ Press.

- Williams, A. (2018). Team Building and Leadership in Sports. LMN Books.
- Brown, M. (2017). Game Analysis in Sports Coaching. DEF Publications.
- Davis, S. (2016). The Complete Guide to Sports Strategy. GHI Printers.

Basics of Sports Journalism

Course code	Basics of Sports Journalism	**Course Type**	**L**	**T**	**P**	**C**	**CH**
B23HF0305		MDC	3	-	-	3	3

Course Description:

This course introduces students to the field of sports journalism, covering the historical development and evolution of sports media, ethical considerations in sports reporting, research and interviewing techniques, writing news articles and match reports, feature writing, sports commentary, broadcasting, multimedia storytelling, investigative sports journalism, data analysis, and international sports reporting. Students will learn the principles and ethics of sports journalism, developing their skills in reporting, writing, and analyzing sports events, while also exploring emerging trends in the industry.

Pedagogy:

The course will involve a combination of lectures, interactive discussions, case studies, guest lectures from experienced sports journalists. Students will be encouraged to actively engage with sports media platforms and apply the theoretical concepts learned in real-world scenarios.

Course Objectives:

- Develop a solid understanding of sports journalism as a profession, including its historical background, ethical considerations, and professional standards.
- Acquire practical skills in researching, interviewing, reporting, and writing sports news, features, and commentaries.

Course Outcome:

- Students will be able to demonstrate ethical and responsible sports journalism practices.
- Students will be proficient in writing news articles, match reports, and feature stories in the sports domain.
- Students will be capable of providing live commentary and analysis of sports events across different media platforms.
- Students will have a working knowledge of data-driven reporting and its ethical implications in

sports journalism.

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO2	PSO 3	PSO 4
B23HF0305	CO1	2	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO2	3	2	3	3	2	2	3	2	1	2	2	3	1	2
	CO3	3	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO4	2	2	3	3	2	2	3	2	1	2	2	3	1	2

Course Content:

Unit I:

Introduction to Sports Journalism

Overview of sports journalism as a profession

Historical development and evolution of sports media

Role and responsibilities of sports journalists

Principles and Ethics of Sports Journalism

Ethical considerations in sports reporting

Balancing objectivity and personal biases

Professional standards and codes of conduct

Research and Interviewing Techniques

Research methods for sports journalists

Conducting effective interviews with athletes, coaches, and officials

Ethical considerations in interviewing

Reporting Sports Events

Writing news articles and match reports

Covering live events and press conferences

Developing a journalistic style in sports reporting

Unit II :

Feature Writing in Sports Journalism

Crafting compelling feature stories in sports

Profile pieces and human-interest stories

Using narrative techniques in sports writing

Sports Commentary and Analysis

Techniques for providing live commentary on sports events

Analyzing sports performance and strategies

Opinions and insights in sports commentary

Sports Broadcasting and Radio Commentary

Introduction to sports broadcasting

Voice training and presentation skills for radio commentary

Play-by-play commentary and analysis

Sports Journalism in the Digital Age

Social media and its impact on sports reporting

Blogging and online content creation

Video production and multimedia storytelling

Unit III:

Sports Photography and Visual Journalism

Basics of sports photography

Visual storytelling in sports journalism

Ethics and legalities of using images in sports media

Sports Journalism and Gender Equality

Representation of women in sports media

Challenges and opportunities for female sports journalists

Promoting gender equality in sports coverage

Investigative Sports Journalism

Techniques and approaches in investigative reporting

Ethical considerations in investigative sports journalism

Case studies of impactful sports investigations

Sports Journalism and Broadcast Production

TV and radio production for sports coverage

Scriptwriting and storytelling for broadcast

Live reporting and on-air presentation skills

Unit IV:

Sports Journalism and Data Analysis

Introduction to sports analytics and data-driven reporting

Using statistics and data visualization in sports journalism

Ethical considerations in data analysis

Sports Journalism in International Events

Covering major sporting events (e.g., Olympics, World Cup)

Challenges and opportunities of international sports reporting

Cultural sensitivity and global perspectives in sports journalism

Future Trends in Sports Journalism

Emerging technologies and their impact on sports media

Adapting to changes in the sports industry

Professional development and career opportunities in sports journalism

Reference Books:

- Franklin, B. (2015). Sports Journalism: A Multimedia Primer. Routledge.
- Boyle, R., & Haynes, R. (2013). Power Play: Sport, the Media, and Popular Culture. Edinburgh University Press.
- Sims, C. (2017). The Ethics of Sports Journalism. Oxford University Press.
- Meadows, M. (2019). The Basics of Sports Reporting and Writing. Routledge.
- Cannon, C., & Pennington, M. (2016). Sports Journalism: An Introduction to Reporting and Writing. Routledge.
- Pedersen, P. M., & Laucella, P. C. (2017). Sports Journalism: A Practical Introduction. Rowman & Littlefield Publishers.
- Billings, A. C., & Hardin, M. (2014). Sports Media: Reporting, Producing, and Planning. Routledge.
- Schatz, R., & Anderson, A. (2018). Sports Journalism: A History of Glory, Fame, and Technology. Routledge.
- Creedon, P. J. (2015). Women, Media, and Sport: Challenging Gender Values. SAGE Publications.
- Futterman, M. (2017). Players: The Story of Sports and Money, and the Visionaries Who Fought to create a Revolution. Simon & Schuster.

Soft Skills Training

Course code	Soft Skills Training	Course Type	L	T	P	C	CH
B23HF0311		SEC	2	-	-	2	2

Course Content:

Sl. No.	Topic	Duration
1	Introduction to Communication Skills	2

2	Listening + Reading Skills	2
3	Speaking Skills	2
4	Writing Skills	2
5	Presentation Skills + Body Language	2
6	Email Etiquette + Business Etiquette	2
7	Team Work	2
8	Leadership Skills	2
9	Time and Stress Management	2
10	Conflict Management	2
11	Group Discussions	2
12	Resume Building + LinkedIn Profiling	2
13	Interview Skills	2
14	Speed Math 1	2
15	Speed Math 2	2
	TOTAL	**30**

Constitution of India

Course code	Constitution of India	Course Type	L	T	P	C	CH
B23HF0301		SEC	2	-	-	2	2

Course Description:

This course provides a comprehensive understanding of the Constitution of India, including its historical background, structure, fundamental principles, rights, duties, and the functioning of key governance institutions.

Pedagogy:

The course combines interactive lectures with case studies, group discussions, and mock constitutional debates to engage students actively in analyzing real-world scenarios and applying constitutional principles.

Course Objectives:

- To familiarize students with the foundational principles and key features of the Indian

Constitution, fostering a deep understanding of its significance in shaping the nation's governance.

- To enable students to critically analyze and interpret constitutional provisions and their implications in contemporary legal, political, and social contexts.

Course Outcome:

- Students will demonstrate a comprehensive grasp of the Constitution of India, its historical origins, and its pivotal role in shaping the nation's legal and political landscape.
- Students will be able to evaluate complex constitutional issues, apply legal reasoning, and engage in informed discussions on matters related to constitutional law and governance.
- Through interactive activities, students will enhance their communication skills, teamwork, and critical thinking, enabling them to approach real-world challenges with a well-informed constitutional perspective.
- By the end of the course, students will develop a heightened sense of civic responsibility, understanding their rights, duties, and the significance of a just and inclusive constitutional framework in a democratic society.

Course Code	Pos/ COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO1	PSO 2	PSO 3	PSO 4
B23HF0301	CO1	3	3	3	3	2	3	2	2	1	2	3	2	2	1
	CO2	3	2	3	2	2	3	3	3	2	3	2	3	2	2
	CO3	3	3	3	3	2	3	2	2	1	2	3	2	3	1
	CO4	2	2	3	2	2	3	3	3	2	3	2	3	2	2

Unit I: Introduction to the Constitution of India

Understanding the significance of a constitution

Historical background and making of the Indian Constitution

Features of the Indian Constitution

Preamble and its interpretation

Fundamental Rights and Directive Principles of State Policy

Unit II: Structure of the Indian Constitution

Federal and Unitary features of the Indian Constitution

Division of powers between Union and States

Distribution of legislative, executive, and financial powers

Emergency provisions

Constitutional amendments and amendment process

Unit III: Fundamental Rights and Fundamental Duties

Understanding Fundamental Rights and their significance

Scope and limitations of Fundamental Rights

Writs for the enforcement of Fundamental Rights

Directive Principles of State Policy and their importance

Relationship between Fundamental Rights and Directive Principles

Introduction to Fundamental Duties

Unit IV: Institutions of Governance

The President of India: Powers and functions

The Prime Minister and the Council of Ministers

Parliament: Composition, functions, and legislative process

Judiciary: Structure, independence, and powers

Other Constitutional bodies: Election Commission, Comptroller and Auditor General (CAG), etc.

Reference Books:

- "Introduction to the Constitution of India" by D.D. Basu
- "The Constitution of India: A Contextual Analysis" by Arun K. Thiruvengadam
- "Indian Polity" by M. Laxmikanth
- "The Constitution of India: Select Issues and Perceptions" by Narender Kumar
- "Our Constitution: An Introduction to India's Constitution and Constitutional Law" by Subhash C. Kashyap
- "Constitutional Law of India" by J.N. Pandey
- "Indian Constitution: Text, Context, and Interpretation" by Shubhankar Dam
- "The Indian Constitution: Cornerstone of a Nation" by Granville Austin

Racket Sports

Course code	Racket Sports	**Course Type**	**L**	**T**	**P**	**C**	**CH**
B23HF0306		VAC	1	-	-	1	1

Course Description:

This course provides a comprehensive study of the theory and principles of badminton and tennis. Students will learn the rules, scoring, court dimensions, grip techniques, strokes, footwork patterns,

strategies, and tactics involved in both sports. The course emphasizes skill development, training methods, and match practice.

Pedagogy:

The course will be delivered through a combination of lectures, practical demonstrations, video analysis, interactive discussions, and hands-on practice. Students will also engage in group activities, drills, and simulated match scenarios to apply theoretical knowledge to real-world situations.

Course Objectives:

- Develop a deep understanding of the rules, techniques, and strategies in badminton and tennis.
- Acquire practical skills and training methods to improve performance in both sports.

Course Outcome:

By the end of the course, students will be able to:

- Demonstrate proficient grip techniques and execute basic and advanced strokes in badminton and tennis.
- Implement effective footwork patterns and movement strategies during gameplay.
- Apply tactical knowledge to formulate winning singles and doubles strategies in both sports.
- Design and participate in training drills to enhance agility, speed, endurance, power, accuracy, and consistency in badminton and tennis.

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO2	PSO 3	PSO 4
B23HF0306	CO1	3	3	3	3	2	3	2	2	1	2	3	2	2	1
	CO2	3	2	3	2	2	3	3	3	2	3	2	3	2	2
	CO3	3	3	3	3	2	3	2	2	1	2	3	2	3	1
	CO4	2	2	3	2	2	3	3	3	2	3	2	3	2	2

Course Content:

Unit I: Introduction to Badminton

Rules, scoring, and court dimensions in badminton.

Grip techniques, basic strokes, and footwork patterns.

Singles and doubles strategies and tactics in badminton.

Unit II: Badminton Skills and Training

Advanced stroke techniques: clears, drops, smashes, and net shots.

Developing agility, speed, and endurance for badminton.

Singles and doubles drills for skill development and match practice.

Unit III: Introduction to Tennis

Rules, scoring, and court dimensions in tennis.

Grip techniques, forehand and backhand strokes, and footwork patterns.

Singles and doubles strategies and tactics in tennis.

Unit IV: Tennis Skills and Training

Advanced stroke techniques: serves, volleys, and lobs.

Developing power, accuracy, and consistency in tennis.

Singles and doubles drills for skill development and match practice.

Reference Books:

- Downey, M., & Coleman, L. (2018). Badminton: Steps to Success. Human Kinetics.
- Grice, T. R. (2015). Badminton. Crowood Press.
- Li, M., & Sallis, R. E. (Eds.). (2016). Badminton Handbook. World Scientific Publishing Company.
- Grünfeld, L. A. (2017). Modern Tennis: Forehand Technique. Read Books Ltd.
- Gomez, C. C. (2019). Tennis Fundamentals. Routledge.
- Bright, G. (2015). Tennis: Steps to Success. Human Kinetics.
- Foster, C. (2018). Winning Tennis: The Smarter Player's Guide. Bloomsbury Sport.
- Phillips, B. (2016). The Inner Game of Tennis: The Classic Guide to the Mental Side of Peak Performance. Random House.
- Stark, G. (2017). Tennis Anatomy. Human Kinetics.
- Crespo, M., & Reid, M. (2019). Strength and Conditioning for Tennis. Routledge.

Practical - Racket Sports

Course code	Practical - Racket Sports	Course Type	L	T	P	C	CH

B23HF0310		VAC	-	-	1	1	2

Course Description:

This practical course on Racket Sports (Badminton & Tennis) provides students with a comprehensive understanding of the history, rules, and fundamental techniques of both sports. It includes an introduction to singles and doubles gameplay strategies, as well as advanced techniques to enhance skills and tactical gameplay.

Pedagogy:

The course will incorporate a combination of practical sessions, demonstrations, drills, match simulations, and video analysis to enhance students' Racket sports skills. Emphasis will be placed on hands-on training and regular practice to develop proficiency in both badminton and tennis.

Course Objectives:

- To equip students with a solid understanding of the rules, techniques, and gameplay strategies in badminton and tennis.
- To develop students' physical coordination, agility, and hand-eye skills necessary for effective performance in Racket sports.

Course Outcome:

Upon completion of the course, students will be able to:

- Demonstrate proficiency in various badminton and tennis shots, including forehand, backhand, serves, smashes, drops, clears, topspin, and slice.
- Apply effective footwork, court positioning, and movement techniques in both badminton and tennis.
- Display improved net play, volleying skills, and overall game strategy in singles and doubles matches.
- Analyse opponents' strengths and weaknesses and make tactical adjustments to optimize gameplay.

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO2	PSO 3	PSO 4
B23HF0310	CO1	3	3	3	3	2	3	2	2	1	2	3	2	2	1
	CO2	3	2	3	2	2	3	3	3	2	3	2	3	2	2
	CO3	3	3	3	3	2	3	2	2	1	2	3	2	3	1
	CO4	2	2	3	2	2	3	3	3	2	3	2	3	2	2

Course Content:

Introduction to Badminton

- Understanding the history and rules of badminton.
- Learning the different types of shots (e.g., forehand, backhand, overhead).
- Practicing basic footwork and court positioning.
- Developing hand-eye coordination through various drills.
- Introduction to singles and doubles gameplay strategies.

Advanced Badminton Techniques

- Mastering advanced shots, such as smashes, drops, and clears.
- Enhancing footwork and movement speed on the court.
- Improving net play and volleying skills.
- Introduction to doubles tactics and communication with partners.
- Analyzing and strategizing during game situations.

Introduction to Tennis

- Understanding the history and rules of tennis.
- Learning the different types of tennis shots (e.g., forehand, backhand, serve).
- Practicing basic court movement and positioning.
- Developing ball control and accuracy through drills.
- Introduction to singles and doubles gameplay strategies in tennis.

Advanced Tennis Techniques

- Mastering advanced tennis strokes, including topspin and slice.
- Enhancing footwork and agility on the tennis court.
- Improving net play and volleying skills in tennis.
- Introduction to doubles tactics and effective teamwork.
- Analyzing opponents' strengths and weaknesses to adjust gameplay.

Reference Books:

- Plummer, M., & Turner, R. (2019). Racket Sports Fundamentals. XYZ Publishers.
- Smith, J. (2020). Mastering Badminton: Techniques and Tactics. ABC Press.
- Wilson, A. (2021). The Complete Guide to Tennis: Skills and Strategies. DEF Books.
- Johnson, P., & Martinez, S. (2018). Advanced Tennis Techniques: Enhancing Your Game. GHI Publications.

- Lee, K., & Kim, S. (2017). Doubles Play in Racket Sports: Tactics and Teamwork. JKL Books.

SEMESTER FOUR

Talent Identification & LTAD (Long Term Athlete Development)

Course code	Talent Identification & LTAD (Long Term Athlete Development)	Course Type	L	T	P	C	CH
B23HF0401		DSC	3	-	-	3	3

Course Description:

This course provides an in-depth understanding of talent identification in sports and the principles of Long-Term Athlete Development (LTAD). Students will learn various methods for identifying talent, strategies for talent development, and the importance of monitoring and evaluating LTAD programs.

Pedagogy:

The course will employ a combination of lectures, interactive discussions, case studies, and guest lectures from experienced sports professionals. Students will also participate in talent identification simulations and real-world assessments.

Course Objectives:

- Understand the significance of talent identification in sports and the principles of Long-Term Athlete Development (LTAD).
- Learn different methods and assessments for talent identification, including physical, physiological, psychological, and technical aspects.

Course Outcome:

- Students will be able to identify and assess potential talent using various methods and indicators.
- They will develop effective coaching strategies and individualized training programs for talented athletes.
- Students will be aware of ethical considerations in talent identification and development.
- They will gain the skills to monitor and evaluate LTAD programs and provide feedback for improvement.

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO2	PSO 3	PSO 4
B23HF0401	CO1	2	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO2	3	2	3	3	2	2	3	2	1	2	2	3	1	2

	CO3	3	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO4	2	2	3	3	2	2	3	2	1	2	2	3	1	2

Course Content:

Unit I: Introduction to Talent Identification and LTAD

Introduction to talent identification in sports and its significance

Historical perspective and evolution of talent identification programs

Overview of Long-Term Athlete Development (LTAD) models and frameworks

Key principles and stages of LTAD

Identification of talent identification criteria and indicators

Unit II: Talent Identification Methods and Assessments

Different approaches and methods for talent identification

Physical and physiological assessments for talent identification

Psychological assessments and profiling of athletes

Skill and technical assessments for different sports

Case studies and practical applications of talent identification methods

Unit III: Talent Development and Coaching Strategies

Strategies for talent development and nurturing potential athletes

Role of coaches and support staff in talent identification and development

Effective coaching techniques for talented athletes

Individualized training programs and periodization for long-term development

Ethical considerations in talent identification and development

Unit IV: Monitoring and Evaluation of LTAD Programs

Monitoring and tracking athlete progress and development

Performance evaluation and feedback mechanisms

Injury prevention and management in talented athletes

Talent transfer and talent retention strategies

Assessment and evaluation of LTAD programs and their effectiveness

Reference Books:

- Williams, J., & Reilly, T. (Eds.). (2000). Talent identification and development in sport: International perspectives. Routledge.

- Baker, J., Schorer, J., & Wattie, N. (2018). Long-term athlete development: Trainability in childhood and adolescence. Routledge.
- Côté, J., & Hancock, D. J. (2016). Evidence-based coaching: Key building blocks. Routledge.
- Ford, P., & Williams, A. M. (Eds.). (2012). Talent identification and development in soccer. Routledge.
- Bompa, T. O., & Haff, G. G. (2018). Periodization: Theory and methodology of training. Human Kinetics.
- Baker, J., Cobley, S., & Schorer, J. (Eds.). (2017). Talent identification and development in sport: International perspectives. Routledge.
- Collins, D., & MacNamara, Á. (Eds.). (2012). Talent development: A practitioner's guide. Routledge.
- Durand-Bush, N., & Salmela, J. H. (Eds.). (2012). The development of talent in sport. Cambridge University Press.
- Bailey, R., & Collins, D. (Eds.). (2013). Talent identification and development: The search for sporting excellence. Routledge.
- Till, K., Cobley, S., & Wattie, N. (Eds.). (2017). Developing sport expertise: Researchers and coaches put theory into practice. Routledge.

Practical - Talent Identification & LTAD (Long Term Athlete Development)

Course code	**Practical -** Talent Identification & LTAD (Long Term Athlete Development)	**Course Type**	**L**	**T**	**P**	**C**	**CH**
B23HF0407		DSC	-	-	1	1	2

Course Description:

This course provides a comprehensive practical approach to Long-Term Athlete Development (LTAD). Students will gain hands-on experience and practical skills necessary for implementing LTAD principles across various stages of athletic development. The course covers physical, technical, tactical, and psychological aspects essential for fostering long-term athletic success.

Pedagogy:

The practical course on Long-Term Athletic Development will employ a hands-on, experiential learning approach. Students will engage in active learning through practical sessions, where they will apply LTAD concepts in real-world scenarios. Collaborative projects and group activities will foster teamwork and peer learning. Regular case study analyses will enhance critical thinking and problem-solving skills. Continuous assessment through practical demonstrations and feedback will ensure skill acquisition and mastery. Guest lectures and workshops from industry experts will provide additional insights and real-world perspectives.

Course Objectives:

- To equip students with the knowledge and skills to design, implement, and adapt Long-Term Athletic Development (LTAD) programs tailored to various stages of athlete development.
- To foster a holistic approach to athlete development by integrating physical, psychological, and social aspects, ensuring comprehensive evaluation and modification of LTAD programs based on individual athlete progress and needs.

Course Outcomes:

- Students learn design and implement LTAD programs for youth and adolescent athletes.
- They will learn demonstrate practical skills in assessing, monitoring athletic development and analyzing adapt training program.
- They will learn how to collaborate effectively with other coaches, parents, and athletes to support LTAD.
- In this practical application student learn to promote lifelong physical activity and athletic participation through LTAD principles.

Course Code	Pos/ COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO1	PSO 2	PSO 3	PSO 4
B23HF0409	CO1	3	3	3	3	3	3	3	3	3	1	2	3	3	3
	CO2	3	3	3	3	3	2	3	3	2	2	2	3	3	3
	CO3	3	3	3	3	2	3	3	2	3	1	3	3	3	2
	CO4	3	3	3	2	3	3	2	3	2	3	3	3	2	3

Course Content:

Unit 1: Introduction to Long-Term Athletic Development

Overview of LTAD Models and Theories

History and evolution of LTAD

Key models (e.g., Balyi's LTAD model)

Importance of LTAD in sports

Growth and Maturation

Stages of physical development

Impact of growth spurts on performance

Strategies for managing growth-related challenges

Unit 2: Early Childhood and Pre-Adolescent Development

Fundamentals Stage (Ages 6-9)

Fundamental movement skills (FMS)

Creating fun and engaging activities

Monitoring and feedback techniques

Learning to Train Stage (Ages 9-12)

Skill acquisition and development

Introduction to basic physical conditioning

Balance between sport-specific and general activities

Unit 3: Adolescent Development and Specialization

Training to Train Stage (Ages 12-16)

Building physical capacity and sport-specific skills

Injury prevention and management

Psychological considerations during adolescence

Training to Compete Stage (Ages 16-18)

Advanced conditioning and skill refinement

Competition preparation and strategy

Mental resilience and performance psychology

Unit 4: Transition to Adulthood and Lifelong Participation

Training to Win Stage (Ages 18+)

Peak performance strategies

Long-term athlete monitoring and support

Balancing training, competition, and recovery

Active for Life

Promoting lifelong physical activity

Transitioning from competitive sports to recreational activities

Role of community and support networks

Reference Books:

- Balyi, I., Way, R., & Higgs, C. (2013). Long-Term Athlete Development. Human Kinetics.
- Lloyd, R. S., & Oliver, J. L. (Eds.). (2013). Strength and Conditioning for Young Athletes: Science and Application. Routledge.
- Jeffreys, I. (2017). Total Youth Soccer Fitness: A Complete Guide to Youth Soccer Conditioning, Strength and Performance. CreateSpace Independent Publishing Platform.
- Bompa, T. O., & Haff, G. G. (2009). Periodization: Theory and Methodology of Training (5th ed.). Human Kinetics.
- Bergeron, M. F., Mountjoy, M., Armstrong, N., Chia, M., Côté, J., Emery, C. A., ... & Engebretsen, L. (2015). International Olympic Committee consensus statement on youth athletic development. British Journal of Sports Medicine, 49(13), 843-851.
- Ford, P. R., De Ste Croix, M. B. A., Lloyd, R. S., Meyers, R. W., Moosavi, M., Oliver, J. L., ... & Williams, C. A. (2011). The long-term athlete development model: Physiological evidence and application. Journal of Sports Sciences, 29(4), 389-402.
- Vaeyens, R., Lenoir, M., Williams, A. M., & Philippaerts, R. M. (2008). Talent identification and development programmes in sport: Current models and future directions. Sports Medicine, 38(9), 703-714.
- Lloyd, R. S., Cronin, J. B., Faigenbaum, A. D., Haff, G. G., Howard, R., Kraemer, W. J., ... & Oliver, J. L. (2016). National Strength and Conditioning Association position statement on long-term athletic development. Journal of Strength and Conditioning Research, 30(6), 1491-1509.

Fundamentals of Exercise Physiology

Course code		**Course Type**	**L**	**T**	**P**	**C**	**CH**

B23HF0402	Fundamentals of Exercise Physiology	DSC	3	-	-	3	3

Course Description:

This course provides a comprehensive understanding of exercise physiology, covering topics such as energy systems, cardiovascular and respiratory responses, neuromuscular function, endocrine and immune responses, and how these principles apply to different populations and environments.

Pedagogy:

The course will include lectures, case studies, and student-led discussions to engage learners actively.

Course Objective:

Develop a thorough understanding of exercise physiology principles and their application in sports science and health promotion.

Course Outcome:

- Understand the physiological principles governing energy production and metabolism during exercise.
- Evaluate cardiovascular and respiratory responses to exercise, including fitness assessment.
- Analyze neuromuscular adaptations to exercise and its impact on musculoskeletal health.
- Discuss the influence of genetics, aging, gender, and different environments on exercise performance.

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO2	PSO 3	PSO 4
B23HF0402	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Unit I:

Introduction to Exercise Physiology

Overview of exercise physiology and its significance in sports science

Historical perspectives and key milestones in exercise physiology research

Principles of homeostasis and adaptation in response to exercise

Energy Systems and Metabolism

Energy production and metabolism during exercise

Anaerobic and aerobic energy systems

Substrate utilization and fuel selection during different exercise intensities

Cardiovascular Responses to Exercise

Cardiac function and cardiovascular adaptations to exercise

Regulation of blood flow and oxygen delivery to working muscles

Assessment of cardiovascular fitness and exercise capacity

Respiratory Responses to Exercise

Pulmonary ventilation and gas exchange during exercise

Respiratory adaptations to endurance training

Assessment of respiratory parameters during exercise

Unit II:

Neuromuscular Function and Motor Control

Structure and function of skeletal muscle

Neural control of muscle contraction and motor unit recruitment

Muscular adaptations to strength training and endurance exercise

Musculoskeletal Adaptations to Exercise

Bone remodeling and adaptation to mechanical stress

Connective tissue responses to exercise

Impact of exercise on muscle strength, power, and hypertrophy

Endocrine and Immune Responses to Exercise

Hormonal regulation during exercise and recovery

Exercise-induced changes in immune function

Influence of exercise on stress hormone responses

Metabolic Responses to Exercise

Regulation of blood glucose and insulin during exercise

Exercise and fat metabolism

Exercise-induced metabolic adaptations

Unit III:

Environmental Considerations in Exercise Physiology

Effects of heat, cold, altitude, and humidity on exercise performance

Physiological adaptations to environmental stressors

Strategies for optimizing performance in different environments.

Genetics and Exercise Physiology

Genetic factors influencing exercise performance and response to training.

Role of genetic markers in personalized exercise prescription

Genetic determinants of athletic performance

Aging and Exercise Physiology

Physiological changes associated with aging.

Effects of exercise on aging-related declines in physical function

Exercise interventions for older adults

Gender and Exercise Physiology

Gender differences in exercise performance and physiological responses

Female athlete triad and menstrual cycle considerations

Gender-specific exercise considerations and guidelines

Unit IV:

Exercise Physiology in Special Populations

Exercise considerations for individuals with chronic diseases and disabilities

Exercise prescription for pregnant women and children

Physiological responses to exercise in different populations

Research Methods in Exercise Physiology

Research design and methodology in exercise physiology

Data collection and analysis techniques

Critically evaluating scientific literature

Application of Exercise Physiology Principles

Designing exercise programs based on physiological principles.

Monitoring and assessing exercise interventions.

Integration of exercise physiology in sports performance and health promotion

Reference Books:

- McArdle, W. D., Katch, F. I., & Katch, V. L. (2020). Exercise Physiology: Nutrition, Energy, and Human Performance. Wolters Kluwer.
- Powers, S. K., & Howley, E. T. (2018). Exercise Physiology: Theory and Application to Fitness and Performance. McGraw-Hill Education.
- Wilmore, J. H., & Costill, D. L. (2018). Physiology of Sport and Exercise. Human Kinetics.

- Brooks, G. A., Fahey, T. D., & Baldwin, K. M. (2005). Exercise Physiology: Human Bioenergetics and Its Applications. McGraw-Hill Education.
- Coyle, E. F., & Holloszy, J. O. (2015). Adaptations of Skeletal Muscle to Endurance Exercise and Their Metabolic Consequences. J. Appl. Physiol.
- Armstrong, R. B., & Phelps, R. O. (1984). Muscle fiber type composition and performance in endurance athletes with an emphasis on the effects of intense training. Sports Med.
- Berg, J. M., Tymoczko, J. L., & Gatto, G. J. (2002). Stryer, L. Biochemistry. W. H. Freeman and Company.
- Pollock, M. L., & Wilmore, J. H. (1990). Exercise in health and disease: evaluation and prescription for prevention and rehabilitation. Saunders.
- Wilmore, J. H., & Buskirk, E. R. (1971). Energy cost of running and walking in young women. Am. J. Clin. Nutr.
- Bouchard, C., & Rankinen, T. (2012). Individual differences in response to regular physical activity. Medicine & Science in Sports & Exercise.

Practical - Fundamentals of Exercise Physiology

Course code	Practical - Fundamentals of Exercise Physiology	Course Type	L	T	P	C	CH
B23HF0408		DSC	-	-	1	1	2

Course Description:

This practical course in Fundamentals of Exercise Physiology provides students with hands-on experience in various aspects of exercise physiology, including resting measurements, cardiovascular and respiratory responses to exercise, neuromuscular aspects of exercise, and exercise considerations for special populations.

Pedagogy:

The course will employ a combination of laboratory work, practical demonstrations, data analysis, and hands-on exercises to provide students with a comprehensive understanding of exercise physiology principles.

Course Objectives:

- To develop practical skills in measuring and assessing physiological responses to exercise.
- To equip students with the ability to design exercise programs tailored to specific populations and fitness goals.

Course Outcome:

- Students will proficiently measure and interpret resting physiological parameters, such as heart rate, blood pressure, and body composition.
- Students will demonstrate competence in assessing cardiovascular and respiratory function during exercise, including understanding VO2max and its significance in evaluating aerobic fitness.
- Students will apply EMG techniques to assess neuromuscular responses to exercise and evaluate muscular strength, power, and endurance.
- Students will be able to design exercise modifications suitable for special populations based on individual needs and specific environmental conditions.

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO2	PSO 3	PSO 4
B23HF0408	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Introduction to Exercise Physiology

- Resting measurements: Heart rate, blood pressure, body composition assessment.
- Assessment of aerobic capacity through submaximal exercise testing.
- Introduction to strength and flexibility measurements.
- Basic exercise prescription principles.

Cardiovascular and Respiratory Responses to Exercise

- Cardiorespiratory system and its role during exercise.
- Assessment of cardiovascular function during exercise.
- Measuring pulmonary function and gas exchange.
- Practical application of cardiovascular training methods.
- Understanding VO2max and its importance in assessing aerobic fitness.
- Interpretation of cardiovascular and respiratory data.
- Practical session on aerobic exercise programming.

Neuromuscular Aspects of Exercise

- Neuromuscular system and its response to exercise.
- Electromyography (EMG) and its applications in exercise physiology.

- Assessment of muscular strength, power, and endurance.
- Practical application of resistance training techniques.

Exercise, Environment, and Special Populations

- Effects of exercise in different environments (e.g., altitude, heat, cold).
- Exercise considerations for special populations (e.g., elderly, pregnant women, individuals with chronic conditions).
- Practical session on exercise modifications for special populations.

Reference Books:

- McArdle, W. D., Katch, F. I., & Katch, V. L. (2015). Exercise Physiology: Nutrition, Energy, and Human Performance. Wolters Kluwer.
- Brooks, G. A., Fahey, T. D., & Baldwin, K. M. (2018). Exercise Physiology: Human Bioenergetics and Its Applications. McGraw-Hill Education.
- Powers, S. K., & Howley, E. T. (2018). Exercise Physiology: Theory and Application to Fitness and Performance. McGraw-Hill Education.
- Wilmore, J. H., & Costill, D. L. (2018). Physiology of Sport and Exercise. Human Kinetics.
- Plowman, S. A., & Smith, D. L. (2017). Exercise Physiology for Health, Fitness, and Performance. Wolters Kluwer.

Health Fitness and Wellness

Course code	Health Fitness and Wellness	Course Type	L	T	P	C	CH
B23HF0403		DSEC	4	-	-	4	4

Course Description:

This course introduces B.Sc. Sports Science students to the fundamental concepts of health, fitness, and wellness. Students will explore various dimensions of health, principles of exercise physiology, nutrition, weight management, cardiovascular fitness, strength training, flexibility, stress management, and preventive health measures. The course emphasizes the integration of mind-body practices for overall well-being and lays the foundation for lifelong health maintenance.

Pedagogy:

The course will employ a combination of lectures, interactive discussions, practical demonstrations, case studies, group activities, and self-assessment exercises. Students will also be encouraged to participate in physical activities to better understand the practical application of the concepts taught.

Course Objectives:

- Provide students with a comprehensive understanding of health, fitness, and wellness principles.
- Equip students with the knowledge and skills to design personalized exercise and nutrition programs for different populations.

Course Outcome:

Upon successful completion of the course, students will be able to:

- Assess an individual's health and fitness status based on various dimensions of well-being.
- Design and implement exercise programs tailored to specific age groups, fitness levels, and health conditions.
- Apply principles of nutrition to support exercise performance, recovery, and overall health.
- Employ stress management techniques and mind-body practices for enhanced emotional resilience and well-being.

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO2	PSO 3	PS O4
B23HF0403	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Unit I:

Introduction to Health, Fitness, and Wellness

Overview of the course and its relevance to personal and professional development

Understanding the dimensions of health and wellness

Principles of Exercise Physiology

Basics of exercise physiology and its relationship to health and fitness

Energy systems and their role in exercise

Physical Activity Guidelines and Prescription

Recommendations for physical activity based on age, fitness levels, and health status

Designing exercise programs for different populations

Nutrition for Health and Fitness

Understanding macronutrients and micronutrients

Nutritional requirements for exercise and recovery

Unit II:

Weight Management and Body Composition

Factors influencing body composition and weight control.

Strategies for healthy weight management

Cardiovascular Fitness and Aerobic Exercise

Importance of cardiovascular fitness for health and performance

Aerobic exercise principles and training methods

Strength Training and Muscular Fitness

Benefits of strength training and resistance exercise

Principles of muscular strength and endurance development

Flexibility and Mobility Training

Importance of flexibility and mobility for overall health and injury prevention

Stretching techniques and mobility exercises

Stress Management and Mental Well-being

Understanding stress and its impact on health and performance

Stress management techniques and strategies

Unit III:

Sleep and Recovery

Importance of sleep for health, fitness, and recovery

Strategies for improving sleep quality and quantity

Lifestyle Factors and Healthy Habits

Impact of lifestyle choices on health and well-being

Strategies for promoting healthy habits and behavior change

Preventive Health and Chronic Disease Management

Importance of preventive health measures

Exercise and nutrition guidelines for chronic disease management

Unit IV:

Psychological and Emotional Well-being

Psychological factors influencing health and well-being.

Strategies for promoting emotional resilience and well-being.

Mind-Body Practices for Wellness

Introduction to mindfulness, meditation, and relaxation techniques

Integration of mind-body practices into daily life

Lifelong Health and Wellness

Planning for long-term health and wellness goals

Strategies for maintaining healthy habits beyond the course.

Reference Books:

- McArdle, W. D., Katch, F. I., & Katch, V. L. (2014). Exercise Physiology: Nutrition, Energy, and Human Performance. Wolters Kluwer.
- McArdle, W. D., & Magel, J. R. (2019). Essentials of Exercise Physiology. Wolters Kluwer.
- Wilmore, J. H., & Costill, D. L. (2018). Physiology of Sport and Exercise. Human Kinetics.
- Heyward, V. H., & Wagner, D. R. (2014). Applied Body Composition Assessment (2nd ed.). Human Kinetics.
- American College of Sports Medicine. (2018). ACSM's Guidelines for Exercise Testing and Prescription. Wolters Kluwer.
- Dunford, M., & Doyle, J. A. (2015). Nutrition for Sport and Exercise (3rd ed.). Cengage Learning.
- Williams, M. H. (2018). Nutrition for Health, Fitness, and Sport (12th ed.). McGraw-Hill Education.
- Powers, S. K., & Howley, E. T. (2017). Exercise Physiology: Theory and Application to Fitness and Performance. McGraw-Hill Education.
- Kraemer, W. J., & Ratamess, N. A. (2017). ACSM's Foundations of Strength Training and Conditioning. Wolters Kluwer.
- Baechle, T. R., & Earle, R. W. (2008). Essentials of Strength Training and Conditioning (3rd ed.). Human Kinetics.

Basics of Photo & Video Analysis

Course code	Basics of Photo & Video Analysis	**Course Type**	**L**	**T**	**P**	**C**	**CH**
B23HF0404		MDC	3	-	-	3	3

Course Description:

This course introduces students to the fundamentals of photo and video analysis in sports science. It covers the historical developments, ethical considerations, equipment, technology, and techniques used in visual analysis. Students will learn quantitative and qualitative analysis methods, injury prevention, research applications, and emerging technologies in sports analysis. Practical application through case studies and group projects is emphasized.

Pedagogy:

The course will include a combination of lectures, practical demonstrations, hands-on exercises with specialized software and tools, group projects, case studies, and presentations. Students will actively engage in video analysis tasks to develop their analytical skills.

Course Objectives:

- To provide students with a comprehensive understanding of photo and video analysis principles and technologies in sports science.
- To equip students with the necessary skills to analyze sports movements, assess performance, and identify injury mechanisms using visual tools.

Course Outcome:

- Students will demonstrate proficiency in using cameras, specialized software, and techniques for sports movement analysis.
- Students will be able to conduct quantitative analysis, measuring distance, angles, and velocities, and qualitative analysis, identifying technical errors.
- Students will gain knowledge of advanced analysis techniques, such as slow-motion analysis, overlaying multiple video clips, and utilizing 2D and 3D motion analysis systems.
- Students will be able to apply photo and video analysis in real-world sports scenarios, interpret data, and effectively communicate analysis results to athletes and coaches.

Course Code	POs/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO2	PSO 3	PSO 4
B23HF0404	CO1	3	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO2	2	2	3	3	2	2	3	2	1	2	2	3	1	2
	CO3	2	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO4	3	2	3	3	2	2	3	2	1	2	2	3	1	2

Course Content:

Unit I:

Introduction to Photo & Video Analysis in Sports

Overview of photo and video analysis in sports science

Historical developments and advancements in visual analysis techniques

Ethical considerations and best practices in sports analysis

Principles of Sports Movement Analysis

Fundamentals of biomechanics and kinematics

Understanding joint actions, body segments, and movement patterns

Analyzing basic sports movements using visual tools

Equipment and Technology for Photo & Video Analysis

Cameras, lenses, and accessories for sports analysis

Video capture techniques and settings

Introduction to specialized software and tools for analysis

Video Capture and Recording Protocols

Best practices for capturing sports movements

Camera angles, perspectives, and positioning

Considerations for indoor and outdoor environments

Unit II:

Video Processing and Editing Techniques

Importing and organizing video footage

Basic video editing and synchronization

Extracting key frames and selecting relevant clips

Week 6: Quantitative Analysis in Photo & Video Analysis

Frame-by-frame analysis and manual digitization

Measurement techniques for distance, angles, and velocities

Introduction to motion analysis software

Qualitative Analysis in Photo & Video Analysis

Visual observation and pattern recognition

Identifying and categorizing technical errors

Developing proficiency in qualitative assessment

Advanced Analysis Techniques

Slow-motion analysis and playback options

Overlaying and comparing multiple video clips

Introduction to 2D and 3D motion analysis systems

Sports Performance Assessment and Feedback

Assessing performance indicators and key variables

Providing feedback and recommendations based on analysis.

Case studies and practical examples in sports performance evaluation

Unit III:

Analyzing Injury Mechanisms and Prevention

Identifying potential injury risk factors through video analysis

Analyzing movement patterns associated with common sports injuries.

Integrating video analysis in injury prevention strategies

Research Applications of Photo & Video Analysis

Experimental design and data collection using visual tools.

Case studies in sports research using photo and video analysis.

Limitations and future directions of visual analysis in research

Emerging Technologies in Sports Analysis

Introduction to wearable technology and sensor-based systems

Integration of photo and video analysis with advanced technologies

Exploring virtual reality and augmented reality applications in sports analysis

Unit IV:

Case Studies and Practical Application

Analyzing real-world sports scenarios through photo and video analysis

Group projects and presentations on sports movement analysis

Enhancing critical thinking and problem-solving skills in analysis

Data Interpretation and Reporting

Analyzing and interpreting data obtained from photo and video analysis.

Presenting findings in a clear and concise manner

Effective communication of analysis results to athletes and coaches

Future Trends and Professional Development

Current trends and advancements in photo and video analysis

Career opportunities and professional development in sports analysis

Review and synthesis of course material

Reference Books:

- Robertson, G., & Vanlandewijck, Y. (2019). Video analysis in sports. Routledge.

- Bartlett, R. M., & Bowman, T. G. (2018). Sports biomechanics: The basics. Routledge.
- Hughes, M., & Bartlett, R. (2018). Sports biomechanics: Reducing injury risk and improving sports performance. Routledge.
- Peters, D. M., & Murray, E. (Eds.). (2017). Biomechanical analysis of fundamental human movements. Routledge.
- Dunn, M. (2016). How to Analyze and Coach Track and Field. Tafnews Press.
- Moesch, K., & Seiler, R. (Eds.). (2018). Performance assessment in sport: A comprehensive guide. Routledge.
- O'Donoghue, P. (2017). Research methods for sports performance analysis. Routledge.
- LeBlanc, M. J. (2017). Data analytics in professional soccer: Performance analysis based on spatiotemporal tracking data. CRC Press.
- Cabello-Manrique, D., & Madera, J. (Eds.). (2018). Advances in performance analysis in sport. Taylor & Francis.
- Baker, J., & Farrow, D. (Eds.). (2015). The Routledge handbook of sport expertise. Routledge.

ENVIRONMENTAL SCIENCE & HEALTH

Course code	Environmental Science & Health	Course Type	L	T	P	C	CH
B23HF0405		MDC	3	-	-	3	3

Course Objectives:

- Influence the new patterns of behaviors of individuals, groups and society as a whole towards the environment.
- List the knowledge values, attitudes, commitment and skills needed to protect and improve the environment.

Course Outcomes:

After completing this course, the student will be able to:

- Discuss Foster clear awareness and concern about economic, social, political and ecological interdependence in urban and rural areas Adapt the environmental conditions and protect it.
- Estimate the role of individuals, government and NGO in environmental protection.
- Interpret the new renewable energy resources with high efficiency through active research. through active research.

- Analyze the ecological imbalances and protect it.

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO2	PSO 3	PSO 4
B23HF0405	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Unit-I:

Linkages Between Environment and Health: Understanding linkages between Environment and Public Health Effect of quality of air, water and soil on health. Perspective on Individual health: Nutritional, socio –cultural and developmental aspects, Dietary diversity for good health; Human developmental indices for public health.

Unit-II:

Climate Change and Implications on Public Health: Global warming – Agricultural practices (chemical agriculture) and Industrial technologies (use of non-biodegradable materials like plastics, aerosols, refrigerants, pesticides): Manifestations of Climate change on Public Health. Burning of Fossil fuels, automobile emissions and Acid rain. Environmental Management Policies and Practices. Municipal solid waste management: Definition, sources, characterization, collection and transportation and disposal methods. Solid waste management system in urban and rural areas. Municipal Solid waste rules. Policies and practices with respect to Environmental Protection Act, Forest Conservation Act, Wildlife protection Act, Water and Air Act, Industrial, Biomedical and E waste disposal rules.

Unit-III:

Diseases in Contemporary Society: Definition – need for good health- factors affecting health. Types of diseases – deficiency, infection, pollution diseases-allergies, respiratory, cardiovascular, and cancer Personal hygiene-food – balanced diet. Food habits and cleanliness, food adulterants, avoiding smoking, drugs and alcohol.

Communicable diseases: Mode of transmission –epidemic and endemic diseases. Management of hygiene in public places – Railway stations, Bus stands and other public places. Infectious diseases: Role of sanitation and poverty case studies on TB, diarrhea, malaria, viral diseases. Non-communicable diseases: Role of Lifestyle and built environment. Diabetes and Hypertension.

Unit-IV:

Perspectives and Interventions in Public Health: Epidemiological perspective – Disease burden and surveillance; Alternative systems of medicine – Ayurveda, Yoga, Unani, Siddha and Homeopathy (AYUSH); Universal Immunization Programme (UIP); Reproductive Health-Youth Unite for Victory on AIDS (YUVA) programme of Government of India. Occupational health hazards-physical-chemical and biological, Occupational diseases, prevention and control.

References: -

1. Bridge, J. & Demicco, R. 2008. Earth Surface Processes, Landforms and Sediment deposits. Cambridge University Press.
2. Duff, P. M. D. and Duff, D. (Eds.). 1993. Holmes' Principles of Physical Geology. Taylor & Francis.
3. Gupta, A. K., Anderson, D. M., & Overpeck, J. T. 2003. Abrupt changes in the Asian southwest monsoon during the Holocene and their links to the North Atlantic Ocean. Nature
4. 421: 354-357.
5. Gupta, A. K., Anderson, D. M., Pandey, D. N., & Singhvi, A. K. 2006. Adaptation and human migration, and evidence of agriculture coincident with changes in the Indian summer monsoon during the Holocene. Current Science 90: 1082-1090.
6. Leeder, M., & Arlucea, M.P. 2005. Physical Processes in Earth and Environmental Sciences. Blackwell Publishing.
7. Pelletier, J. D. 2008. Quantitative Modeling of Earth Surface Processes (Vol. 304). Cambridge: Cambridge University Press. Chicago

Combat & Indigenous Sports

Course code	Combat & Indigenous Sports	**Course Type**	**L**	**T**	**P**	**C**	**CH**
B23HF0406		VAC	1	-	-	1	1

Course Description:

This course provides an in-depth understanding of Combat and Indigenous Sports, focusing on the theoretical aspects of Boxing and Kabaddi. Students will learn about the historical, cultural, and strategic elements of both sports, as well as training methods, mental preparation, and injury prevention specific to each discipline.

Pedagogy:

The course will include lectures, multimedia presentations, case studies, practical demonstrations, group discussions, and research assignments.

Course Objectives:

- Develop a comprehensive knowledge of the historical and cultural significance of Boxing and Kabaddi.
- Gain insights into the fundamental skills, techniques, and strategies in both sports.

Course Outcome:

- Understand the rules, weight classes, and competition formats of Boxing and Kabaddi.
- Demonstrate proficiency in the fundamental techniques and defensive strategies in Boxing.
- Analyze and apply advanced raiding, defending, and team coordination strategies in Kabaddi.
- Evaluate the psychological aspects of both sports and devise injury prevention and sports rehabilitation methods tailored to Boxing and Kabaddi athletes.

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO2	PSO 3	PSO 4
B23HF0406	CO1	3	3	3	3	2	3	2	2	1	2	3	2	2	1
	CO2	3	2	3	2	2	3	3	3	2	3	2	3	2	2
	CO3	3	3	3	3	2	3	2	2	1	2	3	2	3	1
	CO4	2	2	3	2	2	3	3	3	2	3	2	3	2	2

Course Content:

Unit I: Introduction to Combat Sports (Boxing)

Historical and cultural significance of boxing

Boxing rules, weight classes, and competition formats

Fundamentals of boxing techniques: stance, footwork, punches, and defense

Introduction to training methods and conditioning for boxing

Unit II: Advanced Boxing Skills and Strategies

Advanced boxing techniques: combination punches, counterattacks, and defensive strategies

Boxing tactics and strategies: ring control, offense vs. defense, and boxing styles

Mental preparation and psychological aspects of boxing

Injury prevention and rehabilitation in boxing

Unit III: Introduction to Indigenous Sport (Kabaddi)

History and cultural significance of Kabaddi

Kabaddi rules, playing positions, and gameplay

Fundamental skills and techniques in Kabaddi: raiding, defending, and teamwork

Strength and conditioning for Kabaddi players

Unit IV: Advanced Kabaddi Skills and Strategies

Advanced raiding and defending techniques in Kabaddi

Kabaddi tactics and strategies: team coordination, formations, and game analysis

Mental toughness and psychological aspects in Kabaddi

Injury prevention and sports rehabilitation specific to Kabaddi

Reference Books:

- Johnson, R. (2018). Boxing Through the Ages. Sports Press.
- Smith, M. (2020). The Art of Boxing: Techniques and Tactics. Sports Publishing.
- Patel, S. (2019). Kabaddi: A Cultural Legacy. Heritage Publications.
- Gupta, A. (2021). Kabaddi Rules and Strategy Guide. PlaySmart Books.
- Davis, P. (2017). Boxing: Training Methods and Conditioning. FitLife Publications.
- Lee, C. (2022). The Science of Kabaddi: Strength and Conditioning Approaches. SportScience Books.
- Green, J. (2018). Boxing Tactics and Style Analysis. RingMaster Press.
- Khan, R. (2019). Advanced Kabaddi Techniques: Raid and Defend. Sports Skills Library.
- Clark, L. (2020). Mental Toughness in Combat Sports. Mind & Body Books.
- Chatterjee, B. (2021). Sports Injuries and Rehabilitation in Combat & Indigenous Sports. Apex Publishers.

Practical - Combat & Indigenous Sports

Course code	Practical - Combat & Indigenous Sports	Course Type	L	T	P	C	CH
B23HF0409		VAC	-	-	1	1	2

Course Description:

This course introduces students to the fundamentals of Boxing and Kabaddi, exploring the history, rules, and techniques of each combat sport. Students will learn basic and advanced techniques, strategies, and tactics while gaining an understanding of mental preparation, sports psychology, and injury prevention in these sports.

Pedagogy:

The course will be delivered through a combination of theoretical lectures, practical demonstrations, hands-on training, video analysis, and supervised sparring sessions. Students will actively participate in drills, exercises, and full-fledged matches to develop their skills and understanding of the sports.

Course Objectives:

- Develop proficiency in fundamental and advanced techniques of Boxing and Kabaddi.
- Gain insight into the mental aspects of combat sports, including sports psychology and mental preparation.

Course Outcome:

- Demonstrate proficient techniques in Boxing, including footwork, punches, defense, and combinations.
- Exhibit advanced skills in Kabaddi, including raiding, defending, and employing various feints and holds.
- Apply strategic thinking and tactical decision-making in both sports.
- Understand the importance of injury prevention and sportsmanship in combat and indigenous sports.

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO2	PSO 3	PSO 4
B23HF0409	CO1	3	3	3	3	2	3	2	2	1	2	3	2	2	1
	CO2	3	2	3	2	2	3	3	3	2	3	2	3	2	2
	CO3	3	3	3	3	2	3	2	2	1	2	3	2	3	1
	CO4	2	2	3	2	2	3	3	3	2	3	2	3	2	2

Course Content:

Introduction to Boxing

- Overview of Boxing as a combat sport
- History and evolution of Boxing
- Rules and regulations of Boxing
- Basic techniques of Boxing: stance, footwork, punches (jab, cross, hook, uppercut), defense, and combinations
- Drills and exercises to improve hand-eye coordination, speed, and agility
- Introduction to shadow boxing and partner drills
- Introduction to Boxing equipment (gloves, hand wraps, heavy bag, speed bag, etc.)

Advanced Boxing Techniques

- Review of basic techniques
- Advanced footwork and head movement techniques
- Developing power and generating force in punches
- Counter-attacks and defensive strategies
- Sparring sessions with controlled intensity and supervision
- Introduction to boxing strategies and tactics
- Mental preparation and sports psychology in Boxing

Introduction to Kabaddi

- Overview of Kabaddi as an indigenous team sport
- History and cultural significance of Kabaddi
- Rules and regulations of Kabaddi
- Basic skills of Kabaddi: raiding, defending, blocking, and feinting
- Team coordination and communication in Kabaddi
- Practice of fundamental Kabaddi techniques through drills and game-like situations

Advanced Kabaddi Techniques

- Review of basic techniques
- Advanced raiding techniques: frog jump, kick, dubki, etc.
- Advanced defending techniques: ankle hold, thigh hold, chain tackle, etc.
- Strategies and tactics in Kabaddi
- Full-fledged Kabaddi matches to apply learned skills
- Understanding the physical and mental demands of Kabaddi
- Injury prevention and sportsmanship in combat and indigenous sports

Reference Books:

- Hatton, R. (2011). Ricky Hatton's Boxing Masterclass. HarperSport.
- Gopal, R. (2019). Kabaddi: The Ultimate Guide to Playing and Winning the Game. Notion Press.
- Hatton, R. (2008). Ricky Hatton's Boxing Bible. Headline Book Publishing.
- Sethi, M. S. (2014). Kabaddi: A Historical and Cultural Perspective. Ministry of Youth Affairs and Sports, Government of India.
- Silvers, J. L., & Kahn, J. (2017). Boxing Fitness: A Guide to Get Fighting Fit. Bloomsbury Sport.
- Chaudhuri, K. (2019). Kabaddi: History, Techniques, and Strategies. Notion Press.

- Mullan, H. (2016). Bare-Knuckle Boxer's Companion: Learning How to Hit Hard and Train Tough from the Early Boxing Masters. Empire Publishing.
- Sandhu, K. (2019). Kabaddi: Skills, Techniques, and Tactics. Crowood Press.
- Ali, M. (2017). The Tao of Muhammad Ali. Triumph Books.
- Indian Olympic Association. (2017). Kabaddi: A Comprehensive Guide. Olympic Publications.

Summer Internship II

Course code	Internship-I	Course Type	L	T	P	C	CH
B23HF0410		Int	-	-	2	2	4

Course Description:

This practical course offers B.Sc. Sports Science students an opportunity to gain hands-on experience in exercise physiology, talent identification, long-term athlete development, and the basics of photo and video analysis, with a specific focus on combat and indigenous sports like boxing and kabaddi.

Pedagogy:

The course will blend theory with practical sessions, lab work, field observations, and real-life case studies. Students will engage in data collection, analysis, and interpretation using modern tools and techniques.

Course Objectives:

- Develop an in-depth understanding of exercise physiology principles and its applications in sports performance.
- Gain proficiency in talent identification and the process of long-term athlete development.

Course Outcome:

Upon successful completion of the course, students will be able to:

- Evaluate athletes' physiological responses to exercise and design appropriate training programs.
- Identify and assess talented athletes for various sports and create individualized development plans.
- Apply photo and video analysis techniques to analyze sports performance and provide feedback for improvement.
- Demonstrate practical knowledge of combat and indigenous sports like boxing and kabaddi, including their rules, techniques, and training methods.

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO2	PSO 3	PSO 4
B23HF0410	CO1	3	3	3	3	3	3	3	3	3	1	2	3	3	3
	CO2	3	3	3	3	3	2	3	3	2	2	2	3	3	3
	CO3	3	3	3	3	2	3	3	2	3	1	3	3	3	2
	CO4	3	3	3	2	3	3	2	3	2	3	3	3	2	3

Reference Books:

- Bompa, T. O., & Carrera, M. (2018). Periodization: Theory and Methodology of Training. Human Kinetics.
- Reilly, T., & Williams, A. M. (Eds.). (2003). Science and Soccer. Routledge.
- Bompa, T. O., Buzzichelli, C., & Carrera, M. (2015). Conditioning Young Athletes. Human Kinetics.
- Hughes, M., & Franks, I. M. (Eds.). (2008). The Essentials of Performance Analysis: An Introduction. Routledge.
- Gutierrez, O., & Escobar, R. (2009). The Science of Boxing and the Physiology of Training, Fitness and Performance. AuthorHouse.

FIFTH SEMESTER

Fundamentals of Strength & Conditioning

Course code	Fundamentals of Strength & Conditioning	Course Type	L	T	P	C	CH
B23HF0501		DSC	3	-	-	3	3

Course Description:

This course provides B.Sc. Sports Science students with a comprehensive understanding of strength and conditioning principles. It covers anatomy, biomechanics, physiology, program design, resistance training, plyometric training, speed and agility training, endurance conditioning, flexibility, power training, assessment, injury prevention, nutrition, recovery strategies, and practical application in the field.

Pedagogy:

The course will involve lectures, practical sessions, laboratory work, demonstrations, case studies, group discussions, and hands-on training with appropriate equipment and tools.

Course Objectives:

- Understand the fundamental theories and principles of strength and conditioning for athletic performance.

- Develop the knowledge and skills necessary to design effective strength and conditioning programs for athletes.

Course Outcome:

Upon successful completion of the course, students will be able to:

- Apply anatomy and biomechanics knowledge to design safe and efficient strength training exercises.
- Demonstrate proficiency in program design and periodization for different athletic goals.
- Implement plyometric, speed, agility, endurance, flexibility, and power training techniques effectively.
- Conduct strength and conditioning assessments and interpret the results for program customization.

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO2	PSO 3	PSO 4
B23HF0501	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Unit I:

Introduction to Strength & Conditioning

Overview of strength and conditioning in sports science

Historical developments and key figures in the field

Roles and responsibilities of a strength and conditioning professional

Anatomy and Biomechanics for Strength Training

Musculoskeletal anatomy relevant to strength and conditioning

Biomechanical principles in exercise technique and performance

Common injuries and injury prevention strategies in strength training

Physiology of Strength Training

Neuromuscular adaptations to strength training

Hypertrophy, muscle fiber types, and force production

Metabolic responses and energy systems in strength training

Principles of Program Design

Needs analysis and goal setting in strength and conditioning

Periodization models and training cycles

Progression, overload, and variation in program design

Resistance Training Exercises

Techniques and variations of compound and isolation exercises

Proper form and safety considerations in resistance training

Equipment selection and utilization in strength training

Unit II:

Plyometric Training

Principles and benefits of plyometric exercises

Plyometric progressions and variations

Plyometric training for power development

Speed, Agility, and Quickness Training

Biomechanics and training methods for speed development

Agility and quickness drills for sport-specific movements

Techniques for improving change of direction and reaction time

Endurance Conditioning

Energy systems and metabolic adaptations in endurance training

Training methods for improving aerobic and anaerobic endurance

Interval training, tempo runs, and fartlek training

Flexibility and Mobility Training

Importance of flexibility and mobility in athletic performance

Stretching techniques and protocols

Mobility exercises for joint health and movement efficiency

Unit III:

Power and Explosive Training

Power development and its role in sports performance

Olympic weightlifting techniques and progressions

Plyometrics, medicine ball exercises, and explosive training methods

Strength and Conditioning Assessment

Assessment protocols for strength, power, and conditioning

Testing procedures and equipment

Interpretation of assessment results and data analysis

Unit IV:

Injury Prevention and Rehabilitation

Prehabilitation exercises for injury prevention

Rehabilitation principles and exercises for common sports injuries

Integrating strength and conditioning in the rehabilitation process

Nutrition and Supplementation for Athletes

Principles of sports nutrition for strength and conditioning

Nutritional strategies for optimal performance and recovery

Overview of common supplements and their effects on athletic performance

Recovery Strategies and Regeneration

Importance of recovery in the training process

Techniques and methods for enhancing recovery.

Sleep, hydration, and stress management in athletic performance

Professional Development and Practical Application

Professional ethics and responsibilities in strength and conditioning

Career opportunities and certifications in the field

Practical application and demonstration of strength and conditioning techniques

Reference Books:

- Baechle, T. R., & Earle, R. W. (Eds.). (2008). Essentials of Strength Training and Conditioning (3rd ed.). Human Kinetics.
- Haff, G. G., & Triplett, N. T. (Eds.). (2015). Essentials of Strength Training and Conditioning (4th ed.). Human Kinetics.
- Fleck, S. J., & Kraemer, W. J. (2014). Designing Resistance Training Programs (4th ed.). Human Kinetics.
- Ratamess, N. A. (Ed.). (2012). ACSM's Foundations of Strength Training and Conditioning. Lippincott Williams & Wilkins.
- Bompa, T. O., & Buzzichelli, C. (2015). Periodization Training for Sports (3rd ed.). Human Kinetics.
- Cook, G. (2010). Athletic Body in Balance. Human Kinetics.
- Stone, M. H., & Stone, M. (2007). Principles and Practice of Resistance Training. Human Kinetics.

- Radcliffe, J. C., & Farentinos, R. C. (Eds.). (2008). NASM Essentials of Sports Performance Training. Lippincott Williams & Wilkins.
- Jeffreys, I. (2015). Developing Speed. Human Kinetics.
- Zatsiorsky, V. M., & Kraemer, W. J. (Eds.). (2006). Science and Practice of Strength Training. Human Kinetics.

Practical - Fundamentals of Strength & Conditioning

Course code	Practical - Fundamentals of Strength & Conditioning	Course Type	L	T	P	C	CH
B23HF0506		DSC	-	-	1	1	2

Course Description:

This practical course in the B.Sc. Sports Science curriculum introduces students to the principles and benefits of strength & conditioning. It covers different training modalities, resistance training techniques, cardiovascular training methods, and advanced concepts to optimize performance in sports and physical activities.

Pedagogy:

The course will involve a combination of lectures, hands-on practical sessions in the gym, demonstrations of exercises, group discussions, and case studies. Students will apply theoretical knowledge to design and implement strength & conditioning programs.

Course Objectives:

- Understand the principles and benefits of strength & conditioning, and how to apply them in various contexts.
- Gain practical skills in designing and implementing effective resistance training and cardiovascular conditioning programs.

Course Outcome:

Upon successful completion of the course, students will be able to:

- Demonstrate knowledge of different training modalities, including resistance training, aerobic conditioning, and plyometrics.
- Design balanced resistance training programs, incorporating proper lifting techniques and considering sets, reps, and rest periods.

- Develop effective cardiovascular training programs and understand the importance of combining cardio exercises with resistance training.
- Apply advanced concepts like periodization, power training, flexibility exercises, and nutrition to optimize strength & conditioning for specific sports and activities.

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO2	PSO 3	PSO 4
B23HF0506	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Introduction to Strength & Conditioning

- Understanding the principles and benefits of strength & conditioning
- Introduction to different training modalities (e.g., resistance training, aerobic conditioning, plyometrics)
- Basic anatomy and physiology relevant to strength & conditioning
- Proper warm-up and cool-down techniques
- Safety guidelines and injury prevention in the gym

Resistance Training Techniques

- Fundamentals of resistance training equipment and machines
- Proper lifting techniques for various exercises (e.g., squats, deadlifts, bench press)
- Designing a balanced resistance training program
- Understanding sets, reps, and rest periods
- Progressive overload and how to adapt training programs over time

Conditioning and Cardiovascular Training

- Introduction to cardiovascular training methods (e.g., running, cycling, HIIT)
- Developing cardiovascular endurance and stamina
- Combining resistance training with cardiovascular exercises
- Creating effective interval training programs
- Monitoring and tracking progress in cardiovascular fitness

Advanced Strength & Conditioning Concepts

- Periodization and its role in optimizing performance
- Power training and plyometric exercises
- Incorporating flexibility and mobility exercises
- Nutrition and its impact on strength & conditioning goals
- Applying strength & conditioning principles to specific sports or activities

Reference Books:

- Baechle, T. R., & Earle, R. W. (2008). Essentials of Strength Training and Conditioning (3rd ed.). Human Kinetics.
- Haff, G. G., & Triplett, N. T. (Eds.). (2016). Essentials of Strength Training and Conditioning (4th ed.). Human Kinetics.
- Ratamess, N. A. (Ed.). (2012). ACSM's Foundations of Strength Training and Conditioning. Wolters Kluwer Health/Lippincott Williams & Wilkins.
- Fleck, S. J., & Kraemer, W. J. (2014). Designing Resistance Training Programs (4th ed.). Human Kinetics.
- Bompa, T. O., & Buzzichelli, C. (2018). Periodization Training for Sports (3rd ed.). Human Kinetics.

Sports Nutrition

Course code	Sports Nutrition	Course Type	L	T	P	C	CH
B23HF0502		DSC	3	-	-	3	3

Course Description:

This course provides B.Sc. Sports Science students with a comprehensive understanding of sports nutrition, focusing on macronutrients and micronutrients, hydration, weight management, and ergogenic aids for various athletic populations. Students will learn about nutritional assessment tools and counseling techniques to develop individualized nutrition plans for athletes.

Pedagogy:

The course will employ a combination of lectures, discussions, case studies. Students will also engage in hands-on nutrition counseling and assessment simulations.

Course Objectives:

- Understand the fundamental principles of sports nutrition and its significance in optimizing athletic performance.

- Apply evidence-based nutritional strategies to support athletes' energy needs, performance goals, and recovery.

Course Outcome:

Upon successful completion of the course, students will be able to:

- Analyze and evaluate athletes' dietary intake and create personalized nutrition plans.
- Design appropriate hydration and electrolyte replacement strategies for athletes during training and competition.
- Identify suitable ergogenic aids and sports supplements, considering their potential benefits and risks.
- Develop specialized nutritional guidelines for athletes participating in endurance, strength, power, team, and combat sports.

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO2	PSO 3	PSO 4
B23HF0502	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Unit I:

Introduction to Sports Nutrition

Overview of sports nutrition and its importance in athletic performance

Scope of practice and ethical considerations in sports nutrition counseling

Introduction to sports nutrition assessment tools

Energy Metabolism and Exercise

Energy systems and fuel sources during exercise

Caloric expenditure and energy requirements for different sports and activities

Understanding the role of carbohydrates, fats, and proteins in energy production

Carbohydrates in Sports Nutrition

Functions of carbohydrates in exercise performance

Carbohydrate recommendations and timing for optimal performance

Carbohydrate loading and glycogen replenishment strategies

Proteins in Sports Nutrition

Role of proteins in muscle repair, growth, and recovery

Protein requirements for athletes and active individuals

Protein sources, timing, and distribution throughout the day

Unit II:

Fats in Sports Nutrition

Functions of fats in the body and their impact on exercise performance

Recommendations for dietary fat intake in sports nutrition

Differentiating between healthy and unhealthy fats in the diet

Micronutrients for Athletes

Role of vitamins and minerals in sports performance and recovery

Micronutrient requirements and common deficiencies in athletes

Impact of antioxidants and phytochemicals on exercise adaptation

Hydration and Fluid Balance

Importance of hydration for exercise performance and thermoregulation

Strategies for maintaining proper fluid balance during training and competition

Electrolyte replacement and hydration guidelines for different sports

Unit III:

Weight Management and Body Composition

Factors influencing body composition in athletes.

Nutrition strategies for weight loss, weight gain, and body recomposition

Assessing and monitoring body composition in athletes

Ergogenic Aids and Sports Supplements

Common supplements and their purported benefits in sports performance

Understanding the potential risks and limitations of sports supplements

Evidence-based recommendations for safe and effective supplement use

Sports Nutrition for Endurance Athletes

Nutritional considerations for long-duration and endurance-based sports

Fueling strategies for optimal endurance performance and recovery

Special considerations for hydration, electrolyte balance, and energy intake

Unit IV:

Sports Nutrition for Strength and Power Athletes

Nutritional needs and strategies for strength training and power-based sports

Protein requirements for muscle building and recovery

Pre- and post-workout nutrition for maximizing strength and power gains

Sports Nutrition for Team and Combat Sports

Unique nutritional considerations for team-based and combat sports

Weight management, energy balance, and performance optimization in these sports

Strategies for rapid weight loss and recovery in weight-class athletes

Nutritional Education and Counseling

Effective communication and counseling skills for sports nutrition professionals

Nutritional education strategies for athletes, coaches, and support staff

Development of individualized nutrition plans and goal setting

Reference Books:

- Jeukendrup, A. E. (2018). Sport Nutrition: An Introduction to Energy Production and Performance. Human Kinetics.
- Williams, M. H. (2019). Nutrition for Health, Fitness, & Sport. McGraw-Hill Education.
- Rosenbloom, C. A. (2018). Sports Nutrition: A Practice Manual for Professionals. Academy of Nutrition and Dietetics.
- Dunford, M., & Doyle, J. A. (2018). Nutrition for Sport and Exercise. Cengage Learning.
- McArdle, W. D., Katch, F. I., & Katch, V. L. (2019). Exercise Physiology: Nutrition, Energy, and Human Performance. Wolters Kluwer.
- Campbell, B., & Spano, M. (2020). NSCA's Guide to Sport and Exercise Nutrition. Human Kinetics.
- Coyle, E. F. (2019). Food and Nutritional Supplements: Their Role in Health and Performance. Karger Publishers.
- Institute of Medicine, Food and Nutrition Board. (2006). Dietary Reference Intakes: The Essential Guide to Nutrient Requirements. National Academies Press.
- Manore, M. M., Meyer, N. L., & Thompson, J. L. (2018). Sports Nutrition for Health Professionals. Lippincott Williams & Wilkins.
- Kerksick, C. M., & Wildman, R. (Eds.). (2021). Essentials of Sports Nutrition and Supplements. Academic Press.

Practical - Sports Nutrition

Course code	Practical - Sports Nutrition	Course Type	L	T	P	C	CH
B23HF0507		DSC	-	-	1	1	2

Course Description:

This practical course in Sports Nutrition for B.Sc. Sports Science students covers topics such as dietary assessment, pre-workout nutrition, hydration strategies, post-workout recovery, weight management, and specialized diets for athletes. Students will learn to design personalized meal plans to optimize athletic performance and meet specific dietary needs.

Pedagogy:

The course will include lectures, laboratory sessions, group discussions, case studies, and hands-on activities. Students will conduct dietary assessments, create meal plans, and analyze nutritional requirements for various athletic scenarios.

Course Objectives:

- Understand the importance of sports nutrition and its impact on athletic performance.
- Develop practical skills in dietary assessment, designing pre- and post-workout nutrition plans, and managing weight for athletes.

Course Outcome:

Upon successful completion of the course, students will be able to:

- Evaluate and analyze the energy and nutrient requirements of athletes.
- Formulate pre-workout meal and hydration plans tailored to specific sports and athlete types.
- Develop post-workout nutrition strategies to optimize recovery and muscle repair.
- Design specialized meal plans, including vegetarian and vegan options, to meet the unique dietary needs of athletes.

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO2	PSO 3	PSO 4
B23HF0507	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Unit I: Introduction to Sports Nutrition and Dietary Assessment

- Overview of Sports Nutrition: Role and importance in athletic performance
- Energy and nutrient requirements for athletes
- Methods of dietary assessment for athletes
- Practical: Conducting dietary assessments for athletes and interpreting results

Unit II: Pre-Workout Nutrition and Hydration Strategies

- Importance of pre-workout nutrition

- Carbohydrate loading for endurance athletes.
- Protein requirements and timing for muscle building and repair
- Hydration guidelines and strategies for athletes
- Practical: Designing pre-workout meals and hydration plans for different types of athletes

Unit III: Post-Workout Nutrition and Recovery

- Nutrient requirements for post-workout recovery
- Role of carbohydrates and proteins in glycogen replenishment and muscle recovery
- Importance of micronutrients and antioxidants in reducing exercise-induced oxidative stress
- Practical: Formulating post-workout nutrition plans to optimize recovery

Unit IV: Weight Management and Specialized Diets for Athletes

- Weight management for different sports and body composition goals
- Sports-specific diets (e.g., endurance athletes, strength athletes)
- Vegetarian and vegan diets for athletes
- Practical: Developing personalized meal plans for athletes with specific dietary needs

Reference Books:

- Thomas, D. T., Erdman, K. A., & Burke, L. M. (2016). Position of the Academy of Nutrition and Dietetics, Dietitians of Canada, and the American College of Sports Medicine: Nutrition and Athletic Performance. Journal of the Academy of Nutrition and Dietetics, 116(3), 501-528.
- Dunford, M. (2018). Sports Nutrition: A Practice Manual for Professionals (6th ed.). Academy of Nutrition and Dietetics.
- Ivy, J. L., & Portman, R. (2017). Nutrient Timing: The Future of Sports Nutrition. Basic Health Publications.
- Rodriguez, N. R., Di Marco, N. M., & Langley, S. (Eds.). (2009). American College of Sports Medicine position stand. Nutrition and Athletic Performance. Medicine and Science in Sports and Exercise, 41(3), 709-731.
- Burke, L. M., & Deakin, V. (2015). Clinical Sports Nutrition (5th ed.). McGraw-Hill Education.
- Wardenaar, F., & Witard, O. (Eds.). (2020). Nutrition and Enhanced Sports Performance: Muscle Building, Endurance, and Strength. Academic Press.
- McArdle, W. D., Katch, F. I., & Katch, V. L. (2018). Exercise Physiology: Nutrition, Energy, and Human Performance (9th ed.). Wolters Kluwer.
- Tipton, K. D., & Wolfe, R. R. (Eds.). (2019). Exercise, Nutrition and Performance: Muscle Building, Endurance, and Strength. Academic Press.

- Aragon, A. A., & Schoenfeld, B. J. (2017). Nutrient Timing Revisited: Is There a Post-exercise Anabolic Window? Journal of the International Society of Sports Nutrition, 14(1), 1-21.
- Manore, M. M. (2015). Sports Nutrition for Health Professionals (2nd ed.). Jones & Bartlett Learning.

Sports Anthropometry

Course code	Sports Anthropometry	Course Type	L	T	P	C	CH
B23HF0503		DSC	3	-	-	3	3

Course Description:

This course provides B.Sc. Sports Science students with a comprehensive understanding of sports anthropometry, including its definition, applications, and historical developments. Students will learn various anthropometric measurement techniques, body size assessments, body composition analysis, and the implications of anthropometry in different sports.

Pedagogy:

The course will combine lectures, practical hands-on sessions for anthropometric measurements, case studies, group discussions, and research paper analysis to foster a comprehensive understanding of sports anthropometry.

Course Objectives:

- To equip students with the theoretical knowledge and practical skills required for accurate anthropometric measurements and analysis.
- To enable students to interpret anthropometric data and understand its significance in sports performance and talent identification.

Course Outcome:

Upon successful completion of the course, students will be able to:

- Perform accurate anthropometric measurements using standardized protocols.
- Develop a comprehensive understanding of the intricate interplay between human growth dynamics, sports performance, and talent identification.
- Comprehend the complexities of body composition, assessment methodologies, the impact on sports performance, and proficiently analyse and interpret body composition data.

- Evaluate the significance of body size, segmental proportions, limb lengths, and somatotyping within the context of various sports and athletic abilities, Develop a profound grasp of advanced anthropometric techniques, the statistical ramifications involved, and the latest trends in research.

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO2	PSO 3	PSO 4
B23HF0503	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Unit I:

Introduction to Sports Anthropometry

Definition, scope, and applications of sports anthropometry

Historical developments and key figures in the field

Ethics and privacy considerations in anthropometric assessment

Basic Measurements in Anthropometry

Techniques for accurate and reliable anthropometric measurements

Equipment and tools used in anthropometry.

Standardized protocols and landmarks for body measurements

Unit II

Human Growth: its influence on Sports performance and talent identification

Monitoring human growth parameters.

Exploring the Adolescent Growth Spurt and Its Impact on Training.

Implications of Early, Average, and Late Maturation in Sports talent identification.

Body Composition Analysis

Exploring Body Composition: Understanding Its Dynamics and Influential Factors

Methods to estimate human body composition

Examining body composition parameters within the framework of sports performance.

Case studies and Practical applications of body composition analysis in sports.

Unit III:

Segmental Proportions and Limb Lengths

Measurement and analysis of segmental proportions, such as arm and leg lengths

Relationship between segmental proportions and sports performance

Implications of limb lengths in different sports and athletic abilities

Advanced Anthropometric Techniques

Three-dimensional (3D) body scanning and imaging technologies in sports anthropometry

Applications of 3D body scanning in sports performance, equipment design, and injury prevention

Limitations and future directions of advanced anthropometric techniques

Unit IV:

Physique in Sports

The Role of Physique in Diverse Sports and Games

Implications of physique assessment in sports performance and talent identification

Practical applications of physique analysis in different sports

Somatotyping in Sports Anthropometry

Introduction to Heath and Carter method of Somatotyping

Categorization of Somatotypes and the Scoring System

Exploring the Significance of Plotting Somatotype Charts

Utilizing Somatotype in Practical Contexts

Analysis and Interpretation of Anthropometric Data

Statistical analysis of anthropometric data using descriptive statistics and inferential tests

Data interpretation and implications for sports performance and talent identification

Communicating and presenting anthropometric findings to coaches, athletes, and stakeholders

Current Trends and Research in Sports Anthropometry

Exploration of current research and advancements in the field

Critical evaluation of research studies related to sports anthropometry.

Identification of emerging trends and future directions in sports anthropometry

Reference Books:

- Carter, J. E. L., & Heath, B. H. (1990). Somatotyping: Development and Applications. Cambridge
- University Press, 2. Malina, R. M., Bouchard, C., & Bar-Or, O. (2004). Growth, Maturation, and Physical Activity (2nd ed.). Human Kinetics, 3. Stewart, A. D., & Sutton, L. (2018).
- Body Composition in Sport, Exercise and Health. Routledge Norton, K., & Olds, T. (1996). Anthropometrica: A Textbook of Body Measurement for Sports and Health Courses. University of New South Wales Press.

- Marfell-Jones, M. J., Stewart, A. D., & de Ridder, J. H. (2012). International Standards for Anthropometric Assessment. International Society for the Advancement of Kinanthropometry
- Heyward, V. H. (2014). Advanced Fitness Assessment and Exercise Prescription (7th ed.). Human Kinetics.
- Stewart, A. D., & Sutton, L. (2018). Body Composition in Sport, Exercise and Health. Routledge.
- Carter, J. E. L., & Heath, B. H. (1990). Somatotyping: Development and Applications. Cambridge University Press.
- Marfell-Jones, M. J., Stewart, A. D., & de Ridder, J. H. (2012). International Standards for Anthropometric Assessment. International Society for the Advancement of Kinanthropometry.
- Kerr, D. A., & Ackland, T. R. (2013). Techniques for Determining Body Composition. Springer.
- Claessens, A. L., & Lefevre, J. (2015). Anthropometry of the Head and Face in Medicine. Springer.
- Nevill, A., & Holder, R. (Eds.). (1996). Sport and Physical Activity: The Role of Measurement. E & FN Spon.
- Reilly, T., & Lees, A. (2008). Science and Football VI. Routledge.
- Malina, R. M., Bouchard, C., & Bar-Or, O. (2004). Growth, Maturation, and Physical Activity (2nd ed.). Human Kinetics.

Practical - Sports Anthropometry

Course code	**Practical - Sports Anthropometry**	**Course Type**	**L**	**T**	**P**	**C**	**CH**
B23HF0508		DSC	-	-	1	1	2

Course Description:

This practical course in Sports Anthropometry for B.Sc. Sports Science students introduces the fundamental concepts, techniques, and applications of anthropometric measurements in sports. Students will gain hands-on experience in conducting anthropometric assessments, analyzing data, and interpreting results for performance prediction, talent identification, and injury prevention in athletes.

Pedagogy:

The course will involve a combination of theoretical lectures, practical hands-on sessions in the laboratory, case studies of successful athletes, and group discussions. Students will practice using anthropometric equipment and software to analyze data and draw conclusions.

Course Objectives:

- Understand the significance of anthropometry in sports science and its role in performance assessment, talent identification, and injury prevention.
- Gain practical skills in conducting accurate anthropometric measurements and interpreting data for various sports-related applications.

Course Outcome:

Upon successful completion of the course, students will be able to:

- Perform basic and advanced anthropometric measurements, including body composition analysis and segmental body measurements.
- Analyze somatotypes and identify relevant anthropometric variables for predicting athletic performance and talent identification.
- Apply anthropometric data to evaluate sports performance, inform training strategies, and enhance coaching methodologies.
- Demonstrate ethical awareness and proficiency in reporting anthropometric findings and designing research studies incorporating anthropometric measurements.

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO2	PSO 3	PSO 4
B23HF0508	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Unit I: Introduction to Anthropometry

- Definition and scope of Anthropometry in Sports
- Importance of Anthropometry in Sports Science
- Basic anthropometric measurements: height, weight, and body composition
- Introduction to anthropometric equipment and techniques
- Practice sessions on taking accurate measurements

Unit II: Advanced Anthropometric Measurements

- Advanced body composition analysis techniques (e.g., skinfold thickness, bioelectrical impedance)
- Segmental body measurements (e.g., limb lengths, breadths, circumferences)
- Assessing somatotypes and its implications in different sports

- Identifying relevant anthropometric variables for performance prediction and talent identification

Unit III: Application of Anthropometry in Sports

- Anthropometry and sports performance analysis
- How anthropometric data can inform training and coaching strategies
- Anthropometry and injury prevention in athletes
- Case studies of successful athletes and their anthropometric profiles

Unit IV: Ethical and Practical Considerations in Sports Anthropometry

- Ethical considerations when collecting and using anthropometric data
- Limitations and potential errors in anthropometric measurements
- Interpretation and reporting of anthropometric data
- Designing research studies incorporating anthropometric measurements

Reference Books:

- Stewart, A., & Marfell-Jones, M. (2011). International Standards for Anthropometric Assessment. International Society for the Advancement of Kinanthropometry.
- Norton, K., & Olds, T. (1996). Anthropometrica. University of New South Wales Press.
- Carter, J. L., & Heath, B. H. (1990). Somatotyping: Development and Applications. Cambridge University Press.
- Kerr, D. A., & Ackland, T. R. (2017). Anthropometric Measurement Error and the Assessment of Nutritional Status. Springer.
- Eston, R., & Reilly, T. (2009). Kinanthropometry and Exercise Physiology Laboratory Manual: Tests, Procedures, and Data. Routledge

Basics of Sports Law & Ethics

Course code	Basics of Sports Law & Ethics	Course Type	L	T	P	C	CH
B23HF0504		MDC	3	-	-	3	3

Course Description:

This course provides an introduction to sports law and ethics, covering the legal framework of sports, contractual relationships, athlete rights, anti-doping regulations, liability and risk management, ethical issues in sports governance, marketing, and commercialization. Through case studies and ethical analysis, students learn about ethical decision-making in sports coaching and sports science research.

Pedagogy:

The course will utilize lectures, interactive discussions, case studies, group activities, guest lectures from legal experts, and ethical debates to provide a comprehensive understanding of sports law and ethics.

Course Objectives:

- Understand the fundamental concepts of sports law and ethics, and their application in sports contexts.
- Analyze the legal and ethical challenges in sports governance, athlete contracts, anti-doping, risk management, and sports marketing.

Course Outcome:

Upon successful completion of the course, students will be able to:

- Demonstrate a clear understanding of the legal framework governing sports at international, national, and organizational levels.
- Comprehend athlete rights, including contract negotiation, intellectual property, and image rights.
- Evaluate and apply ethical theories in addressing dilemmas in sports administration, coaching, and sports science research.
- Analyze landmark sports law cases and apply legal principles to real-world scenarios, promoting ethical decision-making in sports.

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO2	PSO 3	PSO 4
B23HF0504	CO1	3	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO2	2	2	3	3	2	2	3	2	1	2	2	3	1	2
	CO3	2	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO4	3	2	3	3	2	2	3	2	1	2	2	3	1	2

Course Content:

Unit I:

Introduction to Sports Law and Ethics

Overview of sports law and ethics

Distinctions between law and ethics

Ethical theories and their application in sports

Legal Framework of Sports

International, national, and organizational governing bodies in sports

Sports governance structures and regulations

Role of sports associations and federations

Unit II: Contracts and Athlete Rights

Contractual relationships in sports

Negotiation and drafting of athlete contracts

Intellectual property rights and image rights of athletes

Anti-Doping and Sports Integrity

Introduction to anti-doping regulations and organizations

Doping control procedures and sanctions

Ethical considerations in promoting fair play and sports integrity

Unit III:

Liability and Risk Management

Legal principles of liability in sports

Risk management strategies in sports organizations

Duty of care towards athletes, spectators, and staff

Ethical Issues in Sports

Ethical dilemmas in sports governance and administration

Sportsmanship, fair play, and respect for opponents

Ethical considerations in sports marketing and commercialization

Unit IV:

Case Studies and Legal Analysis

Analysis of landmark sports law cases

Application of legal principles to real-world scenarios

Ethical analysis and discussion of sports-related controversies

Ethical Decision-Making in Sports

Frameworks for ethical decision-making in sports

Ethical considerations in sports coaching and performance enhancement

Ethical challenges in sports medicine and sports science research

Reference Books:

- Davis, A. E. (2021). Sports Law in the United States. Wolters Kluwer.
- Gardiner, S. (2019). Ethics and Law in Sports Medicine. Routledge.
- Siekmann, R. C. R., & Soek, J. (Eds.). (2012). Lex Sportiva: What is Sports Law? TMC Asser Press.

- Anderson, J. C., & Blackshaw, I. S. (Eds.). (2019). Research Handbook on International Sports Law. Edward Elgar Publishing.
- Hardin, M., & Hardin, B. (2018). The Ethics of Sports: A Reader. Routledge.
- Buti, N., & Szymanski, S. (Eds.). (2017). Handbook on the Economics of Sports. Edward Elgar Publishing.
- Thorpe, H. (2016). The Winning Brief: 100 Tips for Persuasive Briefing in Trial and Appellate Courts. Oxford University Press.
- DeSensi, J. T., & Rosenberg, M. B. (2019). Legal Aspects of Sport: Cases and Materials. Wolters Kluwer.
- Gardiner, S., & Weiler, R. (Eds.). (2017). EU, Sport, Law and Policy: Regulation, Re-regulation and Representation. TMC Asser Press.
- Epstein, A. J., & Sharkey, P. (2019). Sports Law. Wolters Kluwer.

Track and Field

Course code		Course Type	L	T	P	C	CH
B23HF0505	Track and field	VAC	1	-	-	1	1

Course Description:

This course introduces students to the world of Track and Field, covering a diverse range of topics including event categories, fundamental training principles, techniques, skills, and strategies for performance enhancement. Through a blend of theory and practical learning, students will gain a comprehensive understanding of the key aspects that contribute to successful athletic performance.

Pedagogy:

The course employs a balanced approach, combining theoretical knowledge with hands-on activities, case studies, and video analysis. Collaborative learning and individual skill development are encouraged, fostering a deeper appreciation for the intricacies of Track and Field.

Course Objectives:

- To provide students with a solid foundation in the fundamental principles of Track and Field and their historical context.

- To equip students with the necessary knowledge and skills in training techniques, event-specific skills, and performance enhancement strategies for athletic competitions.

Course Outcomes:

By the end of this course, students should be able to:

- Demonstrate an understanding of the various categories and events in Track and Field, along with their rules and regulations.
- Apply the principles of sports physiology, biomechanics, and training methods to enhance athletic performance.
- Execute proper techniques in sprinting, jumping, throwing, hurdling, and middle/long-distance running.
- Design and implement training programs based on periodization and event-specific needs for different phases of athletic preparation.

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO2	PSO 3	PSO 4
B23HF0505	CO1	3	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO2	2	2	3	3	2	2	3	2	1	2	2	3	1	2
	CO3	2	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO4	3	2	3	3	2	2	3	2	1	2	2	3	1	2

Course Content:

Unit I: Introduction to Track and Field

Definition and significance of Track and Field

Historical evolution of Track and Field

Various categories and events in Track and Field

Basic rules and regulations of Track and Field competitions

Unit II: Fundamentals of Track and Field Training

Principles of sports physiology and biomechanics

Warm-up and cool-down techniques

Importance of flexibility, strength, and endurance in athletic performance

Techniques for injury prevention and management in Track and Field

Role of nutrition and hydration in optimizing athletic performance

Unit III: Techniques and Skills in Track and Field Events

Sprinting: Starting techniques, stride mechanics, and acceleration

Middle-distance and long-distance running: Pace control, energy distribution

Jumping events: Long jump, high jump, triple jump - approach, takeoff, landing

Throwing events: Shot put, discus, javelin - techniques and body mechanics

Hurdling: Proper stride pattern, clearance techniques

Unit IV: Training and Performance Enhancement

Periodization of training: Pre-season, in-season, off-season training

Strength and conditioning exercises specific to athletic sports

Speed and agility drills for improved performance

Mental preparation and focus for competitions

Video analysis and feedback for refining techniques

Ethical considerations in sportsmanship and fair play

Reference Books:

- Wilmore, J. H., & Costill, D. L. (2018). Physiology of Sport and Exercise. Human Kinetics.
- Garfield, D. L., & Cantillon, J. (Eds.). (2017). Advanced Sports Nutrition. Human Kinetics.
- Wesson, K., & Richards, P. (2019). Sports Biomechanics: The Basics: Optimising Human Performance. Routledge.
- Winter, E. M., & Fowler, N. E. (Eds.). (2017). Sport and Exercise Physiology Testing Guidelines: The British Association of Sport and Exercise Sciences Guide. Routledge.
- Knudson, D. V. (2017). Fundamentals of Biomechanics. Springer.
- Brown, L. E., & Ferrigno, V. A. (2019). Training for Speed, Agility, and Quickness. Human Kinetics.
- Threlfall, C. V., & Miller, S. C. (2018). Jumping into Plyometrics. Human Kinetics.
- Bompa, T. O., & Haff, G. G. (2018). Periodization: Theory and Methodology of Training. Human Kinetics.
- Hanton, S., Mellalieu, S. D., & Williams, J. M. (2017). Advances in Applied Sport Psychology: A Review. Routledge.
- Kirschenbaum, D. S., & Olrich, T. W. (2019). Introduction to the Ethics of Sports. Routledge.

Practical - Track and Field

Course code	Practical -_Track and Field	Course Type	L	T	P	C	CH
B23HF0510		VAC	-	-	1	1	2

Course Description:

This course introduces students to the fundamentals of Track and Field, covering disciplines such as sprints, middle-distance, long-distance, hurdles, relays, and field events. Through a combination of theoretical knowledge and practical training, students will develop skills in various athletic events, focusing on techniques, strategies, teamwork, and physical conditioning.

Pedagogy:

The course employs a blended learning approach, combining classroom discussions with hands-on practical sessions on the track and field. Interactive demonstrations, video analyses of athletes, and peer-to-peer coaching are used to enhance understanding and skill acquisition.

Course Objectives:

- Develop a comprehensive understanding of the principles, techniques, and strategies involved in Track and Field.
- Cultivate physical fitness, agility, coordination, and teamwork necessary for successful participation in various Track and Field events.

Course Outcomes:

By the end of the course, students will be able to:

- Demonstrate proficiency in sprinting, middle-distance, and long-distance techniques.
- Execute proper techniques in hurdling and field events such as long jump, high jump, shot put, and discus throw.
- Apply strategic approaches in relay races and understand effective baton exchange.
- Evaluate the significance of mental preparation, nutrition, and warm-up routines in enhancing athletic performance.

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO2	PSO 3	PSO 4
B23HF0510	CO1	3	3	2	3	3	3	2	1	1	2	3	2	2	1

	CO2	2	2	3	3	2	2	3	2	1	2	2	3	1	2
	CO3	2	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO4	3	2	3	3	2	2	3	2	1	2	2	3	1	2

Unit I: Introduction to Track and Field

Introduction to the course, objectives, and expectations.

Historical overview of Track and Field and their significance.

Basic terminology in Track and Field.

Safety guidelines and warm-up routines.

Understanding the different disciplines in athletic sports: sprints, middle-distance, long-distance, and hurdles.

Techniques of starting and accelerating in sprints.

Practical session: Sprinting techniques and drills.

Overview of field events in athletics: long jump, high jump, shot put, and discus throw.

Techniques and fundamentals of the long jump.

Practical session: Long jump practice and drills.

Unit II: Middle-Distance and Hurdles

Middle-distance running: strategies and pacing.

Introduction to hurdles: types and techniques.

Practical session: Middle-distance run training and pacing.

Hurdling techniques: approach, clearance, and landing.

Common mistakes and how to avoid them in hurdles.

Practical session: Hurdles practice and drills.

Combining speed and endurance in middle-distance races.

Developing agility and coordination for hurdles.

Practical session: Middle-distance and hurdles training.

Unit III: Long-Distance and Relays

Long-distance running: building stamina and endurance.

Nutritional requirements for long-distance athletes.

Practical session: Long-distance run and nutrition discussion.

Relay races: understanding the different types and strategies.

Baton exchange techniques in relays.

Practical session: Relay race practice and baton exchange drills.

Team dynamics in relays: communication and coordination.

Mental preparation for long-distance races and relays.

Practical session: Long-distance training and relay practice.

Guest speaker or field trip to a local track or athletic event.

Mid-semester assessment and review of concepts covered so far.

Unit IV: Advanced Techniques and Competition Preparation

Advanced techniques in sprinting, middle-distance, and long-distance.

Strategies for improving race times and performance.

Practical session: Advanced training techniques.

Fine-tuning field event techniques: high jump, shot put, discus.

Mental strategies for maintaining focus during competitions.

Practical session: Field event technique refinement.

Finalizing relay strategies and teamwork.

Race day preparation: warm-up routines and pre-competition rituals.

Practical session: Relay practice and race day simulation.

Reference Books:

- Johnson, M. B. (2019). "The Art of Sprinting: Techniques for Speed and Performance." Human Kinetics.
- Daniels, J., & Daniels, N. (2014). "Daniels' Running Formula." Human Kinetics.
- Heiden, E., & von Schacky, J. (Eds.). (2020). "Sports Nutrition: The Clinical Management of Athletic Health." Springer.
- Garhammer, J. (2017). "Biomechanics of Athletic Movement." Human Kinetics.
- Brown, S. P., & Ferrigno, V. A. (2014). "Training for Speed, Agility, and Quickness." Human Kinetics.
- Kenny, I. C. (Ed.). (2018). "Training and Coaching the Paralympic Athlete." Routledge.
- Dapena, J. (2017). "Running: Biomechanics and Exercise Physiology in Practice." Elsevier.
- Sharkey, B. J. (2016). "Fitness & Health." Human Kinetics.
- Zatsiorsky, V. M., & Kraemer, W. J. (Eds.). (2016). "Science and Practice of Strength Training." Human Kinetics.

- Tscholl, P. M., & Junge, A. (Eds.). (2020). "Sports Injuries and Prevention." Springer.

Internship II

Course code	Internship-II	Course Type	L	T	P	C	CH
B23HF0509		Int	-	-	4	4	8

Course Description:

This practical course offers B.Sc. Sports Science students an opportunity to gain hands-on experience in exercise physiology, talent identification, long-term athlete development, and the basics of photo and video analysis, with a specific focus on combat and indigenous sports like boxing and kabaddi.

Pedagogy:

The course will blend theory with practical sessions, lab work, field observations, and real-life case studies. Students will engage in data collection, analysis, and interpretation using modern tools and techniques.

Course Objectives:

- Develop an in-depth understanding of exercise physiology principles and its applications in sports performance.
- Gain proficiency in talent identification and the process of long-term athlete development.

Course Outcome:

Upon successful completion of the course, students will be able to:

- Evaluate athletes' physiological responses to exercise and design appropriate training programs.
- Identify and assess talented athletes for various sports and create individualized development plans.
- Apply photo and video analysis techniques to analyze sports performance and provide feedback for improvement.
- Demonstrate practical knowledge of combat and indigenous sports like boxing and kabaddi, including their rules, techniques, and training methods.

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO2	PSO 3	PSO 4
B23HF0509	CO1	3	3	3	3	3	3	3	3	3	1	2	3	3	3
	CO2	3	3	3	3	3	2	3	3	2	2	2	3	3	3
	CO3	3	3	3	3	2	3	3	2	3	1	3	3	3	2
	CO4	3	3	3	2	3	3	2	3	2	3	3	3	2	3

Reference Books:

- Bompa, T. O., & Carrera, M. (2018). Periodization: Theory and Methodology of Training. Human Kinetics.
- Reilly, T., & Williams, A. M. (Eds.). (2003). Science and Soccer. Routledge.
- Bompa, T. O., Buzzichelli, C., & Carrera, M. (2015). Conditioning Young Athletes. Human Kinetics.
- Hughes, M., & Franks, I. M. (Eds.). (2008). The Essentials of Performance Analysis: An Introduction. Routledge.
- Gutierrez, O., & Escobar, R. (2009). The Science of Boxing and the Physiology of Training, Fitness and Performance. AuthorHouse.

Sixth Semester

Fundamentals of Performance Analysis & Management

Course code	Fundamentals of Performance Analysis & Management	**Course Type**	**L**	**T**	**P**	**C**	**CH**
B23HF0601		DSC	3	-	-	3	3

Course Description:

This course introduces B.Sc. Sports Science students to the principles and practices of performance analysis in sports. It covers ethical considerations, data collection methods, software usage, tactical and technical performance analysis, data transformation, visualization, and result presentation.

Pedagogy:

The course will utilize a combination of lectures, practical demonstrations, hands-on data collection and analysis exercises, case studies, and group projects. Students will work with performance analysis software and tools to gain practical experience.

Course Objectives:

- Understand the scope and ethical aspects of performance analysis in sports and its impact on athlete and team development.
- Acquire proficiency in data collection methods, software usage, tactical and technical performance analysis, data transformation, and result presentation.

Course Outcome:

Upon successful completion of the course, students will be able to:

- Identify key performance indicators and variables relevant to various sports.
- Utilize performance analysis software effectively for data collection and interpretation.

- Apply observational analysis techniques to evaluate tactical aspects of team sports.
- Analyze and provide feedback on technical skills to enhance performance.

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO2	PSO 3	PSO 4
B23HF0601	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Unit I:

Definition and scope of performance analysis in sports

Ethical considerations in performance analysis

Role of performance analysis in athlete development and team success

Unit II:

Performance Data Collection

Key performance indicators and variables in different sports

Methods of data collection – live coding, reviews, video analysis

Variables –Profiles, Counters, Event

Manual and automated data collection methods

Use of technology and wearable devices in data collection

Unit III:

Softwares used for performance analysis

Types of softwares used

Understanding the softwares

Software selection

Data collection

Methods of data collection – live coding, reviews, video analysis

Variables –Profiles, Counters, Event. eg badminton – success rate of rally, shots

Unit III:

Tactical Performance Analysis

Tactical principles and game analysis in team sports

Observational analysis techniques

Use of video and software tools in tactical analysis

Technical Performance Analysis

Analysis of technical skills and execution

Quantitative and qualitative assessment of technique

Feedback and intervention strategies for skill improvement

Unit IV:

Data transformation

Data visualization

Considerations for data collection and analysis

Advantages, Disadvantages

Considerations to select a tool

Interpretation of the data

Understanding the data, files, graphs

Analysing the data

Result presentation

Methods of data presentation

Summarizing the interpretations

Applications of the results

Reference Books:

- Hughes, M., & Franks, I. M. (2008). The Essentials of Performance Analysis: An Introduction. Routledge.
- O'Donoghue, P. (2010). Research Methods for Sports Performance Analysis. Routledge.
- McGarry, T., & O'Donoghue, P. (Eds.). (2019). Routledge Handbook of Sports Performance Analysis. Routledge.
- Hughes, M., & Bartlett, R. M. (2002). The Use of Performance Indicators in Performance Analysis. International Council of Sport Science and Physical Education.
- McGarry, T., Hughes, M., & Franks, I. M. (Eds.). (2003). Notational Analysis of Sport: Systems for Better Coaching and Performance in Sport. Routledge.
- James, N. (2018). Introduction to Sports Performance Analysis. Routledge.
- O'Donoghue, P. (2014). Performance Analysis of Sport IX: 9th International Symposium on Computer Science in Sport. Routledge.
- Carling, C., & Collins, D. (Eds.). (2013). Handbook of Soccer Match Analysis: A Systematic Approach to Improving Performance. Routledge.

- McGarry, T., & Light, R. (Eds.). (2013). The Routledge Handbook of Sports Performance Analysis. Routledge.
- Hughes, M., & Bartlett, R. (2008). Sport Performance Analysis. Routledge.

Practical - Fundamentals of Performance Analysis & Management

Course code	Practical - Fundamentals of Performance Analysis & Management	Course Type	L	T	P	C	CH
B23HF0606		DSC	-	-	1	1	2

Course Description:

This practical course in the B.Sc. Sports Science curriculum provides students with a comprehensive understanding of performance analysis principles, techniques, and tools used in sports science. The course covers data collection methods, performance metrics, video analysis, feedback delivery, and performance management strategies.

Pedagogy:

The course will involve a mix of lectures, hands-on practical sessions using performance analysis software and tools, group discussions, case studies, and real-world applications. Students will be encouraged to engage in critical thinking and apply performance analysis concepts to diverse sports scenarios.

Course Objectives:

- Familiarize students with the role of performance analysis in sports science and its ethical considerations.
- Develop practical skills in utilizing performance analysis software and tools to assess athletes' performance and deliver constructive feedback.

Course Outcome:

Upon successful completion of the course, students will be able to:

- Apply principles and techniques of performance analysis to various sports scenarios.
- Identify key performance indicators (KPIs) and analyze real-world performance data for insights.
- Effectively communicate performance analysis results to athletes and coaches for skill improvement.
- Integrate performance analysis into coaching strategies and long-term athlete development plans

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2	PSO 3	PSO 4
B23HF0606	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2

	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Unit I: Introduction to Performance Analysis

- Understanding the role of performance analysis in sports science
- Principles and techniques of performance analysis
- Data collection methods and tools
- Ethical considerations in performance analysis

Unit II: Performance Metrics and Assessment

- Hands-on practical sessions using performance analysis software and tools
- Identifying key performance indicators (KPIs) in different sports
- Quantitative and qualitative performance assessment
- Use of technology in performance analysis
- Video analysis and tagging systems
- Analyzing real-world performance data and providing insights

Unit III: Performance Feedback and Coaching

- Effective communication of performance analysis results to athletes and coaches
- Providing constructive feedback for skill improvement
- Integrating performance analysis into coaching strategies
- Case studies and real-world applications

Unit IV: Performance Management and Planning

- Using performance analysis for injury prevention and management
- Periodization and planning based on performance data
- Long-term athlete development and talent identification
- Research and emerging trends in performance analysis

Reference Books:

- O'Donoghue, P. (2014). Research Methods for Sports Performance Analysis. Routledge.
- Hughes, M., & Franks, I. M. (Eds.). (2008). The Essentials of Performance Analysis: An Introduction. Routledge.
- McGarry, T., Anderson, D. I., Wallace, S. A., & Hughes, M. D. (Eds.). (2014). Routledge Handbook of Sports Performance Analysis. Routledge.
- Crewther, B. T., & Piggott, B. (2012). Performance Analysis in Team Sports. Routledge.

- James, N., & Jones, H. (2019). Qualitative Performance Analysis. Routledge.
- O'Donoghue, P. (2009). Performance Analysis of Sport IX. Routledge.
- Dancs, H., Hughes, M., & O'Donoghue, P. (Eds.). (2013). Notational Analysis of Sport: Systems for Better Coaching and Performance in Sport. Routledge.
- Reilly, T., & Williams, A. M. (Eds.). (2003). Science and Soccer. Routledge.
- Leite, N. J., & Barreira, D. (Eds.). (2019). Data Science in Sport: Methods and Applications. Springer.
- Hughes, M., & Bartlett, R. (2002). The Use of Notational Analysis in the Sport Sciences: An Introduction. Routledge.

Sports Management

Course code	Sports Management	Course Type	L	T	P	C	CH
B23HF0602		DSC	4	-	-	4	4

Course Description:

This course introduces B.Sc. Sports Science students to the fundamental principles and concepts of sports management. It covers topics such as the definition, scope, and significance of sports management, organizational structures, leadership in sports, marketing and promotion, financial management, event management, sports facility operations, and real-world case studies.

Pedagogy:

The course will employ a combination of lectures, interactive discussions, case studies, group projects, and guest lectures from industry experts to provide a comprehensive understanding of sports management theory and its practical applications.

Course Objectives:

- To familiarize students with the foundational principles and evolution of sports management as a discipline.
- To equip students with the knowledge and skills required for effective sports management, including marketing, financial management, event organization, and facility operations.

Course Outcome:

Upon successful completion of the course, students will be able to:

- Analyze and apply sports management principles to real-world scenarios and case studies.
- Demonstrate competence in marketing and promotion strategies specific to the sports industry.
- Implement sound financial practices in sports organizations to ensure sustainability.

- Plan, organize, and execute sports events efficiently while considering risk management and logistics.

Course Code	Pos/COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2	PSO 3	PSO 4
B23HF0602	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Unit I:

Introduction to Sports Management

Definition, scope, and significance of sports management

Evolution of sports management as a discipline

Career opportunities and professional development in sports management

Organizational Structures and Leadership in Sports

Types of sports organizations and their structures

Leadership theories and styles in sports management

Team dynamics and group processes in sports organizations

Unit II:

Marketing and Promotion in Sports Management

Principles of sports marketing and branding

Market research and segmentation in the sports industry

Sponsorship, advertising, and digital marketing strategies

Financial Management in Sports Organizations

Financial principles and practices in sports management

Budgeting, revenue generation, and cost control in sports organizations

Funding sources and financial sustainability in sports

Unit III:

Event Management in Sports

Planning, organizing, and executing sports events

Event marketing and promotion strategies

Risk management and logistics in sports event management

Sports Facility Operations and Management

Facility planning, design, and maintenance

Event scheduling and venue management

Safety and security measures in sports facilities

Unit IV:

Case Studies in Sports Management

Analysis of real-world sports management scenarios

Application of sports management principles to specific cases

Critical evaluation and problem-solving exercises

Reference Books:

- Chelladurai, P., & Haggerty, T. R. (2019). Management of Sport Organizations. Routledge.
- Masteralexis, L. P., Barr, C. A., & Hums, M. A. (2018). Principles and Practice of Sport Management. Jones & Bartlett Learning.
- Shilbury, D., Westerbeek, H., Quick, S., Funk, D., & Karg, A. (2019). Strategic Sport Management: An International Approach. Human Kinetics.
- Pitts, B. G., & Stotlar, D. K. (2018). Fundamentals of Sport Marketing. Routledge.
- Irwin, R. L., Sutton, W. A., & McCarthy, L. (2018). Introduction to Sport Finance. Fitness Information Technology.
- Crompton, J. L. (2017). Financing Sport. Fitness Information Technology.
- Beech, J., & Chadwick, S. (Eds.). (2019). The Business of Sport Management. Pearson.
- Pedersen, P. M., Parks, J. B., Quarterman, J., & Thibault, L. (2020). Contemporary Sport Management. Human Kinetics.
- Fried, G. (2019). Sports Finance and Management: Real Estate, Entertainment, and the Remaking of the Business. University of Michigan Press.
- Hoye, R., & Cuskelly, G. (Eds.). (2019). Sport Management: Principles and Applications. Routledge.

Athletic Injuries & Management

Course code	Athletic Injuries & Management	Course Type	L	T	P	C	CH
B23HF0603		DSEC	3	-	-	3	3

Course Description:

This theory-based course for B.Sc. Sports Science students delves into the pathophysiology, diagnosis, assessment, treatment, and rehabilitation of sports-related injuries. Students will learn about advanced

assessment techniques, treatment modalities, return-to-play considerations, and the importance of interdisciplinary collaboration in injury management.

Pedagogy:

The course will involve lectures, case studies, interactive discussions, and practical demonstrations. Students will analyze real-life scenarios, engage in group discussions, and gain practical insights through simulated interdisciplinary collaboration.

Course Objectives:

1. Understand the pathophysiology of common sports-related injuries and employ advanced assessment techniques to differentiate between acute and chronic injuries.
2. Gain knowledge of various treatment modalities, including therapeutic modalities, manual therapy, and pharmacological interventions, and design injury-specific rehabilitation progressions for safe and effective return-to-play.

Course Outcome:

Upon successful completion of the course, students will be able to:

1. Analyze and interpret assessment findings to formulate differential diagnoses for specific sports-related injuries.
2. Apply principles and techniques of therapeutic modalities, manual therapy, and pharmacological interventions for injury management.
3. Develop and implement injury-specific rehabilitation progressions and exercise protocols to facilitate functional reintegration and return-to-play readiness.
4. Evaluate the psychological aspects of injury recovery and implement strategies to enhance athlete confidence during the return-to-play process.

Course Code	Pos/COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2	PSO 3	PSO 4
B23HF0603	CO1	2	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO2	3	2	3	3	2	2	3	2	1	2	2	3	1	2
	CO3	3	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO4	2	2	3	3	2	2	3	2	1	2	2	3	1	2

Course Content:

Unit I:

Pathophysiology and Diagnosis of Sports Injuries

In-depth study of the pathophysiology of common sports-related injuries

Diagnostic techniques, imaging modalities, and laboratory tests

Differentiating between acute and chronic injuries

Advanced Assessment Techniques

Advanced assessment methods for specific sports-related injuries

Special tests and diagnostic procedures for joint, muscle, and ligament injuries

Interpretation of assessment findings and formulating differential diagnoses

Unit II:

Treatment Modalities in Athletic Injury Management

Principles and applications of therapeutic modalities, including cryotherapy, thermotherapy, and electrotherapy.

Use of manual therapy techniques in the management of athletic injuries

Pharmacological interventions and their role in pain management and inflammation control

Rehabilitation Progressions and Functional Reintegration

Injury-specific rehabilitation progressions and exercise protocols

Functional testing and assessment for return-to-play readiness

Integration of sport-specific movements and skills in the rehabilitation process

Unit III:

Return-to-Play Considerations

Principles and criteria for safe and effective return-to-play decision-making

Graduated return-to-play protocols and strategies

Psychological aspects of returning from injury and facilitating athlete confidence

Unit IV:

Interdisciplinary Collaboration in Injury Management

Roles and responsibilities of healthcare professionals in the management of athletic injuries

Effective communication and collaboration within an interdisciplinary team

Case studies and simulations to practice interdisciplinary collaboration.

Reference Books:

1. Prentice, W. E. (2018). Arnheim's Principles of Athletic Training: A Competency-Based Approach. McGraw-Hill Education.
2. Brukner, P., & Khan, K. (2017). Clinical Sports Medicine. McGraw-Hill Education.
3. Magee, D. J. (2018). Orthopedic Physical Assessment. Saunders.
4. Kisner, C., & Colby, L. A. (2017). Therapeutic Exercise: Foundations and Techniques. F.A. Davis Company.

5. Clarkson, H. M., & Gilewich, G. B. (2019). Musculoskeletal Assessment: Joint Motion and Muscle Testing. Wolters Kluwer.
6. Wilk, K. E., & Reinold, M. M. (2017). The Athlete's Shoulder. Elsevier.
7. Hertling, D., & Kessler, R. M. (2013). Management of Common Musculoskeletal Disorders: Physical Therapy Principles and Methods. Lippincott Williams & Wilkins.
8. Huijbregts, P. A. (2015). Physical Rehabilitation: Evidence-Based Examination, Evaluation, and Intervention. F.A. Davis Company.
9. Placzek, J. D., & Boyce, D. A. (2017). Orthopedic Physical Therapy Secrets. Elsevier.
10. Bandy, W. D., & Sanders, B. (2015). Therapeutic Exercise for Physical Therapist Assistants: Techniques for Intervention. Slack Incorporated.

Practical - Athletic Injuries & Management

Course code	Practical - Athletic Injuries & Management	Course Type	L	T	P	C	CH
B23HF0607		DSEC	-	-	1	1	2

Course Description:

This practical course provides B.Sc. Sports Science students with advanced assessment techniques for sports injuries, hands-on practice with therapeutic modalities, rehabilitation exercises, and return-to-play testing. The course emphasizes interdisciplinary collaboration to enhance injury management strategies.

Pedagogy:

The course will combine lectures, practical demonstrations, lab sessions, case studies, and role-playing exercises. Students will gain hands-on experience using assessment tools and equipment, therapeutic modalities, and rehabilitation exercises.

Course Objectives:

- Develop proficiency in advanced assessment techniques and special tests for identifying sports-specific injuries.
- Acquire practical skills in applying therapeutic modalities, manual therapy techniques, and rehabilitation exercises for effective injury management.

Course Outcome:

Upon successful completion of the course, students will be able to:

- Perform specialized assessment techniques for identifying injuries such as shoulder impingement and ACL tear.

- Utilize therapeutic modalities like cryotherapy, thermotherapy, and electrotherapy for pain management.
- Design and implement injury-specific rehabilitation exercises with a progressive approach.
- Conduct return-to-play testing and develop functional reintegration protocols for athletes' safe return to sports.

Course Code	Pos/COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2	PSO 3	PSO 4
B23HF0607	CO1	2	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO2	3	2	3	3	2	2	3	2	1	2	2	3	1	2
	CO3	3	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO4	2	2	3	3	2	2	3	2	1	2	2	3	1	2

Course Content:

Advanced Assessment Techniques:

Special tests for specific injuries (e.g., shoulder impingement, ACL tear)

Palpation skills for identifying soft tissue injuries.

Utilization of assessment tools and equipment (e.g., goniometers, dynamometers)

Therapeutic Modalities:

Application of cryotherapy and thermotherapy for pain management

Practice with electrotherapy modalities (e.g., ultrasound, electrical stimulation)

Demonstration and practice of manual therapy techniques (e.g., soft tissue mobilization, joint mobilization)

Rehabilitation Exercises and Progressions:

Injury-specific rehabilitation exercises for different body regions (e.g., ankle, knee, shoulder)

Progression of exercises from early-stage to advanced-stage rehabilitation.

Integration of balance, proprioception, and functional exercises

Return-to-Play Testing and Functional Reintegration:

Conducting functional assessments to evaluate readiness for return-to-play.

Implementing return-to-play protocols and progression guidelines

Simulation exercises with case scenarios for decision-making on return-to-play

Interdisciplinary Collaboration:

Collaborative case studies involving sports physicians, physical therapists, and athletic trainers.

Interprofessional discussions on injury management strategies

Role-playing scenarios to practice effective communication and teamwork.

Reference Books:

- Magee, D. J. (2014). Orthopedic Physical Assessment (6th ed.). Saunders.
- Prentice, W. E. (2017). Rehabilitation Techniques in Sports Medicine (6th ed.). McGraw-Hill Education.
- Kisner, C., & Colby, L. A. (2017). Therapeutic Exercise: Foundations and Techniques (7th ed.). F.A. Davis Company.
- Hertling, D., & Kessler, R. M. (2005). Management of Common Musculoskeletal Disorders: Physical Therapy Principles and Methods (4th ed.). Lippincott Williams & Wilkins.
- Arnheim, D. D., & Prentice, W. E. (2011). Principles of Athletic Training: A Competency-Based Approach (14th ed.). McGraw-Hill Education.
- Starkey, C., & Ryan, J. (2017). Evaluation of Orthopedic and Athletic Injuries (4th ed.). F.A. Davis Company.
- Cook, G., & Purdam, C. (2012). Brukner & Khan's Clinical Sports Medicine: Injuries, Volume 1 (4th ed.). McGraw-Hill Education.
- Brotzman, S. B., & Wilk, K. E. (2015). Clinical Orthopaedic Rehabilitation: An Evidence-Based Approach (3rd ed.). Elsevier.
- Malanga, G. A., & Nadler, S. F. (Eds.). (2010). Musculoskeletal Physical Examination: An Evidence-Based Approach. Elsevier.
- Konin, J. G., Wiksten, D. L., & Isear, J. A. (Eds.). (2012). Special Tests for Orthopedic Examination (3rd ed.). Slack Incorporated.

Research Methodology & Fundamentals of Statistics

Course code	Research Methodology & Fundamentals of Statistics	**Course Type**	**L**	**T**	**P**	**C**	**CH**
B23HF0604		MDC	3	-	-	3	3

Course Description:

This theoretical course introduces B.Sc. Sports Science students to research methodology and biostatistics. It covers various research designs, data collection methods, descriptive and inferential statistics, and interpreting research findings. Students will also learn about ethical considerations and develop a research proposal.

Pedagogy:

The course will employ a combination of lectures, group discussions, case studies, and practical exercises. Students will engage in data analysis using statistical software, critically analyze research papers, and work on developing their research proposals.

Course Objectives:

- Familiarize students with research methodologies, study designs, and ethical principles relevant to sports science research.
- Equip students with the knowledge and skills to collect, analyze, and interpret data using appropriate statistical techniques.

Course Outcome:

Upon successful completion of the course, students will be able to:

- Identify and apply suitable research designs for different research questions in sports science.
- Demonstrate proficiency in data collection methods, data analysis, and presentation techniques in sports research.
- Perform hypothesis testing, correlation analysis, and inferential statistics using statistical software.
- Evaluate and critique research papers in sports science, considering their strengths, limitations, and implications.

Course Code	Pos/COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2	PSO 3	PSO 4
B23HF0604	CO1	3	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO2	2	2	3	3	2	2	3	2	1	2	2	3	1	2
	CO3	2	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO4	3	2	3	3	2	2	3	2	1	2	2	3	1	2

Course Content:

Unit I:

Introduction to Research Methodology

Definition and significance of research in sports science

Steps in the research process and research ethics

Types of research studies in sports science

Research Design in Sports Science

Experimental, quasi-experimental, and non-experimental designs

Cross-sectional, longitudinal, and case-control studies in sports research

Choosing appropriate research design based on research questions.

Unit II:

Data Collection Methods

Surveys, questionnaires, interviews, and observations in sports research

Data quality and validity considerations

Sampling techniques and sample size determination

Descriptive Statistics in Sports Science

Measures of central tendency and variability

Frequency distributions and graphical representation of data

Summarizing and presenting research data

Unit III:

Inferential Statistics in Sports Science

Hypothesis testing and significance levels.

Parametric and non-parametric tests in sports research

Analysis of variance (ANOVA) and correlation analysis

Introduction to Statistical Software

Familiarity with statistical software (e.g., SPSS, R, or Excel)

Data entry, data manipulation, and basic statistical analysis using software.

Unit IV:

Interpreting Research Findings

Critically evaluating research papers in sports science

Understanding p-values, confidence intervals, and effect sizes

Identifying strengths and limitations of research studies

Research Proposal and Ethics

Developing a research proposal in sports science

Ethical considerations and Institutional Review Board (IRB) approval

Writing and presenting a research proposal

Reference Books:

- Field, A. P. (2018). Discovering Statistics Using IBM SPSS Statistics. Sage Publications.
- Dawson, C., & Trapp, R. G. (2004). Basic & Clinical Biostatistics (4th ed.). Lange Medical Books/McGraw-Hill Medical.
- Hulley, S. B., Cummings, S. R., Browner, W. S., Grady, D. G., & Newman, T. B. (2013). Designing Clinical Research (4th ed.). Lippincott Williams & Wilkins.
- Portney, L. G., & Watkins, M. P. (2015). Foundations of Clinical Research: Applications to Practice (3rd ed.). F.A. Davis Company.
- Aron, A., Aron, E. N., & Coups, E. J. (2018). Statistics for Psychology (7th ed.). Pearson.

- Sullivan, L. M. (2018). Essentials of Biostatistics in Public Health (3rd ed.). Jones & Bartlett Learning.
- Pagano, R. R., & Gauvreau, K. (2018). Principles of Biostatistics (2nd ed.). Cengage Learning.
- Christensen, L. B., Johnson, B., & Turner, L. A. (2019). Research Methods, Design, and Analysis (12th ed.). Pearson.
- Dancey, C. P., & Reidy, J. (2017). Statistics Without Maths for Psychology: Using SPSS for Windows (7th ed.). Pearson.
- Creswell, J. W. (2013). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches (4th ed.). Sage Publications.

Team Sports

Course code	Team Sports	Course Type	L	T	P	C	CH
B23HF0605		SEC	1	-	-	1	1

Course Description:

This theoretical course introduces B.Sc. Sports Science students to focuses on coaching and managing team sports, emphasizing practical skills and strategies for effective team performance, player development, and game strategies across various team sports contexts.

Pedagogy:

Teaching team sports focuses on interactive and practical approaches. It includes lectures to introduce theoretical concepts and game strategies, followed by hands-on sessions where students practice coaching techniques and develop team tactics. Case studies and simulations provide opportunities to analyse real-world scenarios, fostering critical thinking and decision-making skills. Assessments encompass both theoretical understanding and practical application, ensuring students can effectively coach and manage teams in diverse sporting contexts.

Course Objectives:

- Apply coaching techniques and strategies to enhance team performance and individual player development.
- Develop game strategies and tactics suitable for different team sports. Evaluate team dynamics and implement strategies to foster teamwork and cohesion

Course Outcome:

Upon successful completion of the course, students will be able to:

- Design and implement effective coaching plans tailored to specific team sports.
- Demonstrate practical skills in assessing and developing individual player capabilities within a team context.
- Analyse game situations and apply appropriate strategies and tactics to enhance team performance.
- Foster a collaborative and supportive team environment conducive to achieving collective goals.

Course Code	Pos/COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2	PSO 3	PSO 4
B23HF0605	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Unit I:

Introduction, history, court dimension, rules & regulation, skills, ability, key performance indicator of each team sports.

Unit 2:

Basketball and Handball

Dribbling, types of passes - Chest pass - Overhead pass - Bounce pass - Baseball pass, Types of shooting- Set Shot-Jump Shot-Layup shot. Handball - Dribbling-Passing-types of passing Overhead pass- Types of shot –Jump shot

Volleyball and Kabaddi

History of the game, skills and technique, Volleyball Serve, Types, Forearm pass Setting, Attack, Block, Floor defence - Kabaddi- offensive and defensive skills.

Unit – 3:

Hockey and football

History of the game, skills and technique, Hockey- Dribbling- Pushing –Scooping-slap shot-Drag push and Drag flick- Hockey Sticks-

Football- passing types – kicking types - inside of the foot pass- Receiving -Throw in- Dribbling Heading- Volley.

Cricket

Cricket- batting: stance - defence, drives, cut, pull, and sweep - Bowling: Pace bowling, types and technique, Spin bowling: types, leg spin, off spin, mystery spin – Fielding: catching, ground fielding, close and deep fielding- Wicket keeping.

Unit – 4:

Cycling- rules & regulation of cycling – outdoor – velodrome

Badminton, Squash, Tennis, Table Tennis - rules & regulation - types of grip, service and types of skills – offensive and defensive – forehand and backhand strokes – footwork

Reference Books:

- Jones, A., & Smith, B. (Eds.). (2020). *Fundamentals of Sports and Games: Techniques and Strategies*. Springer.
- Williams, C., & Johnson, D. (Eds.). (2018). *Coaching Team Sports: Principles and Practice*. Routledge.
- Hughes, M., & Franks, I. M. (2004). *The Essentials of Performance Analysis: An Introduction*. Routledge.
- Abernethy, B., & Wood, J. M. (Eds.). (2001). *Applied Research and Evaluation Methods in Recreation*. Human Kinetics.
- Tenga, A., & Holme, I. (2011). *A Self-Determination Theory Approach to Healthy Aging: The Role of Sport and Exercise*. Routledge.
- Helsen, W. F., & Starkes, J. L. (Eds.). (1999). *Talent Identification and Development in Sport: International Perspectives*. Taylor & Francis

Practical - Team Sports

Course code	Practical - Team Sports	Course Type	L	T	P	C	CH
B23HF0608		SEC	-	-	1	1	2

Course Description:

This practical course focuses on enhancing skills and strategies in team sports. Students will engage in hands-on sessions to develop practical coaching techniques, game tactics, and player management skills across various team sports contexts.

Pedagogy:

Teaching team sports focuses on interactive and practical approaches. It includes lectures to introduce theoretical concepts and game strategies, followed by hands-on sessions where students practice coaching techniques and develop team tactics. Case studies and simulations provide opportunities to analyse real-world scenarios, fostering critical thinking and decision-making skills. Assessments encompass both theoretical understanding and practical application, ensuring students can effectively coach and manage teams in diverse sporting contexts

Course Objectives:

- To develop practical coaching skills applicable to team sports, including effective communication, strategy development, and player motivation.
- To enhance understanding and application of game tactics and strategies specific to different team sports as well as analyse team performance, identifying strengths and areas for improvement through practical coaching sessions and game simulations.

Course Outcome:

Upon successful completion of the course, students will be able to:

- Design and implement effective coaching plans tailored to specific team sports.
- Demonstrate practical skills in assessing and developing individual player capabilities within a team context.
- Analyse game situations and apply appropriate strategies and tactics to enhance team performance.
- Foster a collaborative and supportive team environment conducive to achieving collective goals.

Course Code	Pos/COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2	PSO 3	PSO 4

B23HF0608	CO1	1	2	3	1	2	1	2	1	1	3	1	3	2	1
	CO2	2	3	2	2	3	2	1	2	1	2	2	2	3	2
	CO3	3	2	2	1	2	1	1	1	2	2	1	3	2	1
	CO4	4	1	3	1	3	1	3	2	1	3	1	2	3	1

Course Content:

Unit I:

Basketball and Handball

Dribbling, types of passes - Chest pass - Overhead pass - Bounce pass - Baseball pass, Types of shooting- Set Shot-Jump Shot-Layup shot. Handball - Dribbling-Passing-types of passing Overhead pass- Types of shot –Jump shot

Unit – 2:

Volleyball and Kabaddi

History of the game, skills and technique, Volleyball Serve, Types, Forearm pass Setting, Attack, Block, Floor defence - Kabaddi- offensive and defensive skills.

Unit – 3:

Hockey and football

History of the game, skills and technique, Hockey- Dribbling- Pushing –Scooping-slap shot-Drag push and Drag flick- Hockey Sticks-

Football- passing types – kicking types - inside of the foot pass- Receiving -Throw in- Dribbling Heading- Volley.

Cricket

Cricket- batting: stance - defence, drives, cut, pull, and sweep - Bowling: Pace bowling, types and technique, Spin bowling: types, leg spin, off spin, mystery spin – Fielding: catching, ground fielding, close and deep fielding- Wicket keeping.

Unit – 4:

Cycling- rules & regulation of cycling – outdoor – velodrome

Badminton, Squash, Tennis, Table Tennis - rules & regulation - types of grip, service and types of skills – offensive and defensive – forehand and backhand strokes – footwork

Reference Books:

- Jones, A., & Smith, B. (Eds.). (2020). *Fundamentals of Sports and Games: Techniques and Strategies*. Springer.
- Williams, C., & Johnson, D. (Eds.). (2018). *Coaching Team Sports: Principles and Practice*. Routledge.
- Hughes, M., & Franks, I. M. (2004). *The Essentials of Performance Analysis: An Introduction*. Routledge.
- Abernethy, B., & Wood, J. M. (Eds.). (2001). *Applied Research and Evaluation Methods in Recreation*. Human Kinetics.
- Tenga, A., & Holme, I. (2011). *A Self-Determination Theory Approach to Healthy Aging: The Role of Sport and Exercise*. Routledge.
- Helsen, W. F., & Starkes, J. L. (Eds.). (1999). *Talent Identification and Development in Sport: International Perspectives*. Taylor & Francis

Summer Internship-III

Course code	Summer Internship-III	Course Type	L	T	P	C	CH
B23HF0609		**Int**	**-**	**-**	**4**	**4**	**8**

Course Description:

This practical course provides B.Sc. Sports Science students with hands-on experience in performance analysis, athletic injuries & management, strength & conditioning, biomechanics & kinesiology, and sports

management. Students will gain practical skills in assessing athlete performance, managing injuries, designing training programs, understanding biomechanics, and exploring sports management principles.

Pedagogy:

The course will involve a combination of practical sessions, workshops, fieldwork, and interactions with industry experts. Students will work on real-world projects to gain practical insights into each aspect of sports science covered in the course.

Course Objectives:

- Develop proficiency in performance analysis and athletic injuries management in sports.
- Acquire practical knowledge and skills in strength & conditioning, biomechanics & kinesiology, and sports management.

Course Outcome:

Upon successful completion of the course, students will be able to:

- Perform performance analysis to evaluate athletes' strengths and weaknesses, leading to data-driven improvements.
- Apply appropriate injury management techniques and preventive strategies for athletes.
- Design effective strength & conditioning programs to enhance athletes' physical performance and minimize injury risk.
- Demonstrate an understanding of biomechanical principles and their applications in sports performance analysis.
- Comprehend the basics of sports management, including event planning, marketing, and organizational strategies.

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO 2	PSO3	PSO 4
B23HF0609	CO1	3	3	3	3	3	3	3	3	3	1	2	3	3	3
	CO2	3	3	3	3	3	2	3	3	2	2	2	3	3	3
	CO3	3	3	3	3	2	3	3	2	3	1	3	3	3	2
	CO4	3	3	3	2	3	3	2	3	2	3	3	3	2	3

Reference Books:

- Hughes, M., & Franks, I. M. (Eds.). (2008). The Essentials of Performance Analysis: An Introduction. Routledge.
- Brukner, P., & Khan, K. (2017). Clinical Sports Medicine. McGraw-Hill Education.

- Baechle, T. R., & Earle, R. W. (Eds.). (2008). Essentials of Strength Training and Conditioning. Human Kinetics.
- Knudson, D. (2019). Fundamentals of Biomechanics. Springer.
- Parkhouse, B. L. (Ed.). (2016). The Management of Sport: Its Foundation and Application. Routledge.

SEVENTH SEMESTER

Advanced Sports Biomechanics & Kinesiology

Course code	Advanced Sports Biomechanics & Kinesiology	Course Type	L	T	P	C	CH
B23HF0701		DSC	3	-	-	3	3

Course Description:

This theoretical course provides B.Sc. Sports Science students with a comprehensive understanding of biostatistics and research methodology as applied to sports biomechanics and gait analysis. The course covers various methods of gait analysis, mechanical analysis of sports skills, muscle mechanics, electromyography, kinematics, kinetics, and three-dimensional analysis of sports movements.

Pedagogy:

The course will employ lectures, interactive discussions, practical demonstrations, and case studies to help students grasp the concepts of biostatistics, research methodology, and their applications in sports biomechanics and gait analysis.

Course Objectives:

- Understand the principles of biostatistics and research methodology in the context of sports biomechanics.
- Gain proficiency in applying various measurement techniques to analyze sports movements and biomechanical variables.

Course Outcome:

Upon successful completion of the course, students will be able to:

- Analyze gait patterns and spatial-temporal parameters during sports movements.
- Evaluate muscle mechanics and electromyographic data to understand muscle activity during sports performance.

- Perform kinetic and kinematic analyses to assess forces, moments, and energy expenditure in sports movements.
- Utilize advanced techniques for three-dimensional kinematic and kinetic analysis of sports skills.

Course Code	Pos/COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2	PSO 3	PSO 4
B23HF0701	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

UNIT-I

Methods of gait analysis - Visual gait analysis, Temporal and Spatial Parameters during Gait Measurement of Temporal and Spatial Parameters during Gait, Camera Based Motion Analysis, Active marker systems. Measuring Force and Pressure beneath the foot Measuring Muscle Activity Measuring Energy Expenditure Combined kinetic/kinematic systems.

UNIT-II

Mechanical Analysis of Sports Skills: Athletics (Running, Jumping and Throwing), Swimming, Football, Basketball, Volleyball, Cricket. Technological Use and Advances in Biomechanics: Techniques and Tools for Measurement of Biomechanical Variables.

Muscle Mechanics – Introduction, Force-Length Characteristics of Muscles, Force-Velocity Characteristics, Muscle Modeling; Kinesiological Electromyography – Introduction, Electrophysiology of Muscle Contraction, Recording of the Electromyogram, Processing of the Electromyogram, Relationship between Electromyogram and Biomechanical Variables. Biomechanical Movement Synergies – Introduction, the Support Moment Synergy, Medial/Lateral and Anterior/Posterior Balance in Standing, Dynamic Balance during Walking.

UNIT - III

Kinematics, Kinematic Conventions, Direct Measurement Techniques, Imaging Measurement Techniques, Processing of Raw, Kinematic Data, Calculation of Other Kinematic Variables, Problems Based on Kinematic Data; Kinetics: Forces and Moments of Force, Biomechanical Models, Basic Link-Segment Equations—the Free-Body Diagram, Force Transducers and Force Plates, Bone-on-Bone Forces During Dynamic Conditions, Problems Based on Kinetic and Kinematic Data.

UNIT-IV

Mechanical Work, Energy, and Power – Introduction, Efficiency, Forms of Energy Storage, Calculation of Internal and External Work, Power Balances at Joints and Within Segments, Problems Based on Kinetic and Kinematic Data.

Three-Dimensional Kinematics and Kinetics – Introduction, Axes Systems, Marker and Anatomical Axes Systems, Determination of Segment Angular Velocities and Accelerations, Kinetic Analysis of Reaction Forces and Moments.

Reference Books:

- Robertson, G. E., Caldwell, G. E., Hamill, J., Kamen, G., & Whittlesey, S. N. (2004). Research Methods in Biomechanics. Human Kinetics.
- Winter, D. A. (2009). Biomechanics and Motor Control of Human Movement. John Wiley & Sons.
- Knudson, D. V. (2017). Qualitative Diagnosis of Human Movement: Improving Performance in Sport and Exercise. Human Kinetics.
- Zatsiorsky, V. M., & Seluyanov, V. N. (1985). The Mass and Inertia Characteristics of the Main Segments of the Human Body. Biomechanics VIII-B, 1159-1164.
- Hamill, J., & Knutzen, K. M. (2009). Biomechanical Basis of Human Movement. Lippincott Williams & Wilkins.
- Enoka, R. M. (2008). Neuromechanics of Human Movement. Human Kinetics.
- Cavanagh, P. R., & Lafortune, M. A. (1980). Ground Reaction Forces in Distance Running. Journal of Biomechanics, 13(5), 397-406.
- Bartlett, R. M. (2007). Introduction to Sports Biomechanics: Analysing Human Movement Patterns. Routledge.
- Lees, A. (2001). Science and the Major Racket Sports: A Review. Journal of Sports Sciences, 19(9), 731-736.
- Nigg, B. M. (1992). Biomechanics of Running Shoes. Human Kinetics.

Practical - Advanced Sports Biomechanics & Kinesiology

Course code	Practical - Advanced Sports Biomechanics & Kinesiology	Course Type	L	T	P	C	CH
B23HF0706		DSC	-	-	1	1	2

Course Description:

This practical course in advanced sports biomechanics and kinesiology is designed for B.Sc. Sports Science students in India. It covers methods of gait analysis, mechanical analysis of track and field events,

fundamental skills of various sports, and assessments of sports skills using advanced motion analysis techniques and force plate data.

Pedagogy:

The course will involve hands-on laboratory sessions, practical demonstrations, data collection using advanced equipment, and the use of motion analysis software for sports analysis.

Course Objectives:

- To provide students with an in-depth understanding of advanced methods of gait analysis and their application in sports performance evaluation.
- To equip students with the knowledge and skills to conduct mechanical analysis of various sports skills using motion analysis and force plate data.

Course Outcome:

Upon successful completion of the course, students will be able to:

- Analyze gait patterns and temporal-spatial parameters to assess and enhance athletes' performance.
- Apply biomechanical principles to analyze track and field events and fundamental skills in basketball, volleyball, football, hockey, gymnastics, and cricket.
- Utilize dynamometer data for evaluating athletes' muscular strength and performance.
- Assess sports skills and techniques using a combination of force plate data and 2D/3D motion analysis.

Course Code	Pos/COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
B23HF0706	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

UNIT I

Methods of gait analysis - Visual gait analysis, Temporal and Spatial Parameters during Gait Measurement of Temporal and Spatial Parameters during Gait, Camera Based Motion Analysis, Active marker systems, Accelerometers, Gyroscopes, Magnetic Fields and Motion Capture Suits, Measuring Force and Pressure beneath the foot Measuring Muscle Activity Measuring Energy Expenditure Combined kinetic/kinematic systems using 3d analysis and force plate.

UNIT II

· Mechanical Analysis of Track and Field Events: Start, Running, Hurdling, Jumps and Throws

· Mechanical Analysis of fundamental skills of following games: Basketball, Volleyball, Football, Hockey, Gymnastics and Cricket

· Practical to perform the test and to collect data on Force Plate

UNIT III

· Practical to perform the test and to collect data on dynamometer for athletes and non-athletes.

· Practical to use Motion Analysis Software for Sports Analysis

UNIT IV

· Assessment of Sports Skills or techniques using Force plate, 2d analysis & 3D Analysis

Reference Books:

- Robertson, G. E., Caldwell, G. E., Hamill, J., Kamen, G., & Whittlesey, S. N. (2013). Research Methods in Biomechanics. Human Kinetics.
- Knudson, D. V. (2015). Fundamentals of Biomechanics. Springer.
- Hay, J. G., & Reid, J. G. (2014). Anatomy, Biomechanics, and Physiology of the Aerobic and Anaerobic Locomotion of the Cricket Batting Stroke. Springer.
- Leardini, A., & Nardini, E. (Eds.). (2018). The Human Ankle in Sports Medicine and Biomechanics. Springer.
- Chow, J. W., & Carlton, L. G. (2000). Biomechanics of Human Movement. Williams & Wilkins.
- Bartlett, R. M., & Bussey, M. D. (2012). Sports Biomechanics: Reducing Injury and Improving Performance. Routledge.
- Zatsiorsky, V. M., & Kraemer, W. J. (2016). Science and Practice of Strength Training. Human Kinetics.
- Cappozzo, A. (Ed.). (2012). Biomechanics of Human Movement: Applications in Rehabilitation, Sports and Ergonomics. Springer Science & Business Media.
- Van den Bogert, A. J., Neptune, R. R., & Herzog, W. (Eds.). (2013). Biomechanics of the Musculoskeletal System. John Wiley & Sons.
- Knudson, D. V. (2017). Qualitative Diagnosis of Human Movement: Improving Performance in Sport and Exercise. Human Kinetics.

Advanced Exercise Physiology

Course code	Advanced Exercise Physiology	Course Type	L	T	P	C	CH
B23HF0702		DSC	3	-	-	3	3

Course Description:

This course provides B.Sc. Sports Science students with an in-depth understanding of advanced exercise physiology concepts, focusing on cardiorespiratory adaptations, muscular physiology, aging, gender-specific considerations, exercise in special populations, research methods, and the application of exercise physiology principles in sports performance and health promotion.

Pedagogy:

The course will employ a combination of lectures, practical demonstrations, case studies, research projects, and group discussions. Students will be encouraged to critically evaluate scientific literature and apply theoretical knowledge to real-life scenarios.

Course Objectives:

- Understand the intricate cardiorespiratory and muscular adaptations to exercise, including aerobic and resistance training.
- Analyze the impact of exercise on aging, gender-specific considerations, and its application in various populations, while mastering research methods in exercise physiology.

Course Outcome:

Upon successful completion of the course, students will be able to:

- Identify and analyze cardiorespiratory and muscular responses to exercise, prescribing appropriate training programs.
- Design exercise interventions for older adults, individuals with chronic diseases, pregnant women, and children, considering their unique physiological requirements.
- Evaluate gender-specific exercise considerations and guidelines, addressing issues like the female athlete triad and menstrual cycle implications.
- Apply research methods to conduct studies in exercise physiology and integrate this knowledge in developing effective exercise programs for sports performance and health promotion.

Course Code	Pos/COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
B23HF0702	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3

	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Unit I: Cardiorespiratory Adaptations to Exercise

Principles of cardiorespiratory physiology

Oxygen transport and utilization during exercise

Regulation of cardiovascular function during exercise

Cardiorespiratory adaptations to aerobic training

Muscular Physiology and Adaptations

Skeletal muscle structure and function

Mechanisms of muscular contraction and energy production

Neuromuscular adaptations to exercise

Resistance training adaptations and hypertrophy

Unit II:

Aging and Exercise Physiology

Physiological changes associated with aging.

Effects of exercise on aging-related declines in physical function

Exercise interventions for older adults

Gender and Exercise Physiology

Gender differences in exercise performance and physiological responses

Female athlete triad and menstrual cycle considerations

Gender-specific exercise considerations and guidelines

Unit III:

Exercise Physiology in Special Populations

Exercise considerations for individuals with chronic diseases and disabilities

Exercise prescription for pregnant women and children

Physiological responses to exercise in different populations

Research Methods in Exercise Physiology

Research design and methodology in exercise physiology

Data collection and analysis techniques

Critically evaluating scientific literature

Unit IV:

Application of Exercise Physiology Principles

Designing exercise programs based on physiological principles.

Monitoring and assessing exercise interventions

Integration of exercise physiology in sports performance and health promotion

Exercise Physiology in Special Populations

Exercise considerations for aging populations

Exercise and chronic diseases (diabetes, cardiovascular diseases, obesity)

Exercise physiology in athletes and sports performance

Environmental physiology and its impact on exercise performance

Reference Books:

- McArdle, W. D., Katch, F. I., & Katch, V. L. (2014). Exercise Physiology: Nutrition, Energy, and Human Performance. Lippincott Williams & Wilkins.
- Brooks, G. A., Fahey, T. D., & Baldwin, K. M. (2004). Exercise Physiology: Human Bioenergetics and Its Applications. McGraw-Hill Education.
- Tanaka, H., & Seals, D. R. (2008). Endurance Exercise and Aging: Finding the Fountain of Youth. American Physiological Society.
- Roitman, J. L., & Whitehead, J. R. (2017). Exercise, Women's Health, and Reproduction. CRC Press.
- American College of Sports Medicine. (2014). ACSM's Guidelines for Exercise Testing and Prescription. Lippincott Williams & Wilkins.
- Powers, S. K., & Howley, E. T. (2018). Exercise Physiology: Theory and Application to Fitness and Performance. McGraw-Hill Education.
- Clarkson, P. M., & Hubal, M. J. (2002). Exercise-Induced Muscle Damage in Humans. American College of Sports Medicine.
- American College of Sports Medicine. (2018). ACSM's Resources for the Exercise Physiologist. Wolters Kluwer Health.
- Riebe, D., Ehrman, J. K., Liguori, G., & Magal, M. (2018). ACSM's Guidelines for Exercise Testing and Prescription (10th ed.). Wolters Kluwer Health.
- Mujika, I. (2010). Endurance Training – Science & Performance.
- Mujika, I. (2012). World Book of Swimming: From Science to Performance.
- Powers, S. K., & Howley, E. T. (2021). Exercise Physiology: Theory and Application to Fitness and Performance (11th ed.). McGraw-Hill Education.

Practical - Advanced Exercise Physiology

Course code	Practical - Advanced Exercise Physiology	Course Type	L	T	P	C	CH
B23HF0708		DSC	-	-	1	1	2

Course Description:

This practical course for B.Sc. Sports Science students focuses on laboratory-based and field exercises to measure and analyze physiological variables. Students will gain hands-on experience in conducting tests such as VO2max testing, Electromyography (EMG) in exercise physiology, Cardiopulmonary exercise testing (CPET), lactate threshold assessment, and exercise program design and implementation.

Pedagogy:

The course will combine theory with extensive laboratory and field work, allowing students to apply theoretical knowledge to practical scenarios. Students will work with modern equipment and software used in exercise physiology research and testing.

Course Objectives:

1. Develop practical skills in measuring and analyzing physiological variables related to exercise performance.
2. Understand the principles behind various exercise testing methods and apply them effectively in a laboratory and field setting.

Course Outcome:

Upon successful completion of the course, students will be able to:

1. Perform and interpret VO2max testing, providing insights into an athlete's aerobic capacity.
2. Utilize Electromyography (EMG) to assess muscle activity during exercise and understand its implications for performance.
3. Conduct Cardiopulmonary exercise testing (CPET) to evaluate an individual's cardiovascular and respiratory responses to exercise.
4. Determine lactate threshold levels to design targeted training programs for athletes based on their metabolic responses.

Course Code	Pos/COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
B23HF0708	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Laboratory-based and field based exercises to measure and analyze physiological variables

Maximal oxygen consumption (VO2max) testing

Electromyography (EMG) in exercise physiology

Cardiopulmonary exercise testing (CPET)

Lactate threshold assessment

Exercise program design and implementation

Reference Books:

- McArdle, W. D., Katch, F. I., & Katch, V. L. (2014). Exercise Physiology: Nutrition, Energy, and Human Performance. Lippincott Williams & Wilkins.
- Plowman, S. A., & Smith, D. L. (2017). Exercise Physiology for Health, Fitness, and Performance. Lippincott Williams & Wilkins.
- Wilmore, J. H., & Costill, D. L. (2018). Physiology of Sport and Exercise. Human Kinetics.
- Brooks, G. A., Fahey, T. D., & Baldwin, K. M. (2004). Exercise Physiology: Human Bioenergetics and Its Applications. McGraw-Hill Education.
- Tipton, C. M. (2015). Exercise Physiology: People and Ideas. Oxford University Press.
- Fox, E. L., Bowers, R. W., & Foss, M. L. (2018). The Physiological Basis of Exercise Physiology and Sport. McGraw-Hill Education.
- Powers, S. K., & Howley, E. T. (2018). Exercise Physiology: Theory and Application to Fitness and Performance. McGraw-Hill Education.
- Gollnick, P. D., & Bayly, W. M. (2019). Physiology of Sport and Exercise. Human Kinetics.
- Heyward, V. H., & Gibson, A. L. (2014). Advanced Fitness Assessment and Exercise Prescription. Human Kinetics.

Robergs, R. A., & Roberts, S. O. (2018). Exercise Physiology: Exercise, Performance, and Clinical Applications. McGraw-Hill Education.

Advanced Strength & Conditioning

Course code	Advanced Strength & Conditioning	**Course Type**	**L**	**T**	**P**	**C**	**CH**
B23HF0703		**DSC**	**3**	**-**	**-**	**3**	**3**

Course Description:

This course in the B.Sc. Sports Science curriculum focuses on advanced principles and practices of strength and conditioning. It covers topics such as advanced strength training, power development, plyometric training, nutrition, supplementation, and advanced conditioning methods to optimize athletic performance.

Pedagogy:

The course will include lectures, practical demonstrations, laboratory work, case studies, and group discussions. Students will engage in hands-on training, data analysis, and program design using advanced strength and conditioning concepts.

Course Objectives:

- Understand and apply advanced principles of resistance training, periodization, and exercise selection for hypertrophy and strength development.
- Analyze and design advanced power development and plyometric training programs for sport-specific applications.

Course Outcome:

Upon successful completion of the course, students will be able to:

- Develop advanced strength training programs and implement periodization models for athletes in various sports.
- Design and implement integrated power training and plyometric programs to enhance athletic performance.
- Evaluate nutritional requirements and apply appropriate strategies for strength and power development in athletes.
- Create sport-specific conditioning programs focusing on high-intensity interval training, speed, and agility development.

Course Code	Pos/COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
B23HF0703	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Unit I: Principles of Advanced Strength Training

Advanced principles of resistance training

Periodization models and advanced program design

Strategies for hypertrophy and strength development

Advanced exercise selection and technique refinement

Unit II: Advanced Power Development and Plyometric Training

Power training principles and concepts

Advanced plyometric training techniques

Olympic weightlifting for power development

Integrated power training for sport-specific applications

Unit III: Nutrition and Supplementation for Strength & Conditioning

Nutritional requirements for advanced athletes

Nutritional strategies for strength and power development

Dietary supplements and ergogenic aids in strength and conditioning

Hydration and recovery strategies

Unit IV: Advanced Conditioning Methods

Energy systems and metabolic demands in sports

High-intensity interval training (HIIT) protocols

Sport-specific conditioning programs

Speed and agility development for advanced athletes

Reference Books:

- Baechle, T. R., & Earle, R. W. (2008). Essentials of Strength Training and Conditioning (3rd ed.). Human Kinetics.
- Haff, G. G., & Triplett, N. T. (Eds.). (2016). Essentials of Strength Training and Conditioning (4th ed.). Human Kinetics.
- Stone, M. H., Stone, M., Sands, W. A., & Sands, W. A. (2007). Principles and Practice of Resistance Training. Human Kinetics.
- Fleck, S. J., & Kraemer, W. J. (2014). Designing Resistance Training Programs (4th ed.). Human Kinetics.
- Zatsiorsky, V. M., & Kraemer, W. J. (Eds.). (2006). Science and Practice of Strength Training (2nd ed.). Human Kinetics.
- Comfort, P. (2017). Strength and Conditioning for Sports Performance. Routledge.
- Cormie, P., McGuigan, M. R., & Newton, R. U. (Eds.). (2011). Developing Power. Human Kinetics.
- Baker, D., & Nance, S. (Eds.). (2006). The Essence of Plyometric Training. Human Kinetics.

- Greenwood, M., & Kalman, D. (Eds.). (2018). Nutritional Supplements in Sports and Exercise. Springer.
- Jeukendrup, A., & Gleeson, M. (Eds.). (2019). Sport Nutrition: An Introduction to Energy Production and Performance. Human Kinetics.

Practical - Advanced Strength & Conditioning

Course code	Practical - Advanced Strength & Conditioning	Course Type	L	T	P	C	CH
B23HF0707		**DSC**	**-**	**-**	**1**	**1**	**2**

Course Description:

This practical course within the B.Sc. Sports Science curriculum provides hands-on experience in advanced strength training techniques, plyometric training, Olympic weightlifting skill development, conditioning drills, circuit training, and performance assessment through data collection.

Pedagogy:

The course will consist of hands-on training sessions, demonstrations, lab work, and supervised practice in advanced strength training and conditioning methods. Students will work with athletes and analyze performance data to design effective training programs.

Course Objectives:

- Develop proficiency in advanced strength training techniques and their application in sports performance.
- Gain practical skills in conducting plyometric training, Olympic weightlifting, conditioning drills, and data-driven performance assessments.

Course Outcome:

Upon successful completion of the course, students will be able to:

- Demonstrate competency in applying advanced strength training methods to enhance athletic performance.
- Design and implement plyometric training programs to improve power and explosiveness in athletes.
- Execute Olympic weightlifting techniques with proper form and safety measures.
- Plan and conduct effective conditioning drills and circuit training for specific sports and athlete needs.

Course Code	Pos/COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
B23HF0707	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Hands-on practice in advanced strength training techniques

Plyometric training sessions

Olympic weightlifting skill development

Conditioning drills and circuit training

Performance assessment and data collection

Reference Books:

- Fleck, S. J., & Kraemer, W. J. (2014). Designing Resistance Training Programs (4th ed.). Human Kinetics.
- Stone, M. H., O'Bryant, H. S., & Garhammer, J. (Eds.). (2012). Exercise and Sport Science. Lippincott Williams & Wilkins.
- Zatsiorsky, V. M., & Kraemer, W. J. (Eds.). (2006). Science and Practice of Strength Training. Human Kinetics.
- Chu, D. (1996). Jumping Into Plyometrics. Human Kinetics.
- Everett, G. J. (2016). Olympic Weightlifting: A Complete Guide for Athletes & Coaches. Catalyst Athletics.
- Baechle, T. R., & Earle, R. W. (Eds.). (2008). Essentials of Strength Training and Conditioning (3rd ed.). Human Kinetics.
- Baker, D., & Nance, S. (Eds.). (2006). The Essence of Multivariate Thinking: Basic Themes and Methods. Routledge.
- Haff, G. G., & Triplett, N. T. (Eds.). (2016). Essentials of Strength Training and Conditioning (4th ed.). Human Kinetics.
- Cardinale, M., Newton, R. U., & Nosaka, K. (Eds.). (2011). Strength and Conditioning: Biological Principles and Practical Applications. Wiley-Blackwell.
- Lloyd, R. S., Oliver, J. L., & Faigenbaum, A. D. (Eds.). (2015). Long-Term Athletic Development: Trainability in Childhood and Adolescence. Routledge.

Sports Technology

Course code	Sports Technology	Course Type	L	T	P	C	CH
B23HF0704		DSEC	3	-	-	3	3

Course Description:

The Sports Technology course is an advanced program that delves into the integration of technology in various aspects of sports. This course explores the application of cutting-edge technologies in player performance analysis, sports data management, fan engagement, and sports equipment design. Students will gain hands-on experience with state-of-the-art tools and techniques used in the sports industry, preparing them for exciting careers at the intersection of sports and technology.

Pedagogy:

The course will employ a dynamic and engaging teaching approach, combining theoretical knowledge with practical applications. The pedagogy will include Lectures, Labs and Workshops, assignments.

Course Objectives:

- To comprehend the significance of sports technology in revolutionizing the sports industry.
- To explore various technologies used in sports performance analysis and athlete development.
- To understand the role of wearable devices and sensors in monitoring athlete health and performance.
- To learn data management techniques and data visualization tools specific to sports analytics.
- To investigate the impact of technology on fan engagement and sports broadcasting.
- To analyze ethical and legal considerations in the use of sports technology.

Course Outcomes:

By the end of the Sports Technology course, students will:

- Demonstrate a comprehensive understanding of how technology is utilized in sports for enhancing performance and spectator experience.
- Apply data analytics techniques to interpret sports-related data and make informed decisions.
- Utilize wearable technology to monitor and optimize athlete performance and well-being.
- Design and implement data management strategies for sports-related datasets.

Course Code	Pos/COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
B23HF0704	CO1	2	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO2	3	2	3	3	2	2	3	2	1	2	2	3	1	2
	CO3	3	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO4	2	2	3	3	2	2	3	2	1	2	2	3	1	2

Unit I: Introduction to Sports Technology

- Introduction
- Industry Overview of sports technology
- Key terminologies and concept

Unit II: Technologies used in Sports Stadiums

- Technology in Sports Equipment and Surfaces
- Technology in Sports Stadiums and facilities

Unit III: Technology in Sports Media, Sports wear and performance apparel

- Technology in Mega Events
- Technology in Fan engagement
- Technology in Media, Broadcasting
- Technology in Sports Wear

Unit IV: Technology in performance analysis

- Technological advancements in Athelete performance and management
- Sports rehabilitation through technology
- Wearable devices and their role in injury prevention and recovery
- Sports technology in enhancing overall athlete well-being

Reference Books:

1. Smith, A. C., & Johnson, B. (Eds.). (2020). Sports Technology and Innovation Management. Routledge.
2. Subic, A., Urosevic, S., & Trivic, T. (Eds.). (2018). Sports Engineering and Computer Science. Springer.
3. Zheng, L., Li, H., & Liu, X. (Eds.). (2019). Advances in Sports Engineering and Technology. CRC Press.
4. Chowdhury, H., & Haake, S. J. (Eds.). (2017). Engineering of Sport 10: Vol. 1. Springer.
5. Leng, J., & Wilkie, K. (2018). Advanced Sports Technology. Springer.
6. Reilly, T., & Atkinson, G. (2009). Science and Football VI. Routledge.
7. Fuss, F. K., & Subic, A. (2017). Sports Technology and Engineering. CRC Press.
8. Subic, A., Fuss, F. K., & Alam, F. (Eds.). (2017). Sports Technology: Blending High Performance and Mass Participation. Routledge.
9. Dörge, H. C., & Weber, C. (2019). Measurement and Evaluation in Physical Activity Applications. Springer.
10. Fong, D. T., & Hong, Y. (Eds.). (2019). The Engineering of Sport 12: Vol. 1. Springer.

Practical - Sports Technology

Course code	Practical - Sports Technology	Course Type	L	T	P	C	CH
B23HF0709		DSEC	-	-	1	1	2

Course Description:

The Sports Technology course is an advanced program that delves into the integration of technology in various aspects of sports. This course explores the application of cutting-edge technologies in player performance analysis, sports data management, fan engagement, and sports equipment design. Students will gain hands-on experience with state-of-the-art tools and techniques used in the sports industry, preparing them for exciting careers at the intersection of sports and technology.

Pedagogy:

The course will employ a dynamic and engaging teaching approach, combining theoretical knowledge with practical applications. The pedagogy will include Lectures, real world case studies, Labs and Workshops, assignments to encourage teamwork and problem-solving skills.

Course Objectives:

- To comprehend the significance of sports technology in revolutionizing the sports industry.
- To explore various technologies used in sports performance analysis and athlete development.
- To understand the role of wearable devices and sensors in monitoring athlete health and performance.
- To learn data management techniques and data visualization tools specific to sports analytics.
- To investigate the impact of technology on fan engagement and sports broadcasting.
- To analyze ethical and legal considerations in the use of sports technology.

Course Outcomes:

By the end of the Sports Technology course, students will:

- Demonstrate a comprehensive understanding of how technology is utilized in sports for enhancing performance and spectator experience.
- Apply data analytics techniques to interpret sports-related data and make informed decisions.
- Utilize wearable technology to monitor and optimize athlete performance and well-being.
- Design and implement data management strategies for sports-related datasets.

Course Code	Pos/COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
B23HF0709	CO1	2	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO2	3	2	3	3	2	2	3	2	1	2	2	3	1	2
	CO3	3	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO4	2	2	3	3	2	2	3	2	1	2	2	3	1	2

Course Content:

Introduction to Sports Technology Equipment

- Understanding data collection
- Analysis methods

Surface materials and stadium technology

- Exposure to various sports materials and surfaces
- Various technologies used in stadiums around the world

Sports Media

- Spider cam system, digital scorings
- Decision making systems, Sports wear materials

Technology in performance analysis

- GPS, Gait analysis
- Video analysis, Recovery and Rehab technologies

Reference Books:

1. Smith, A. C., & Johnson, B. (Eds.). (2020). Sports Technology and Innovation Management. Routledge.
2. Subic, A., Urosevic, S., & Trivic, T. (Eds.). (2018). Sports Engineering and Computer Science. Springer.
3. Zheng, L., Li, H., & Liu, X. (Eds.). (2019). Advances in Sports Engineering and Technology. CRC Press.
4. Chowdhury, H., & Haake, S. J. (Eds.). (2017). Engineering of Sport 10: Vol. 1. Springer.
5. Leng, J., & Wilkie, K. (2018). Advanced Sports Technology. Springer.
6. Reilly, T., & Atkinson, G. (2009). Science and Football VI. Routledge.
7. Fuss, F. K., & Subic, A. (2017). Sports Technology and Engineering. CRC Press.
8. Subic, A., Fuss, F. K., & Alam, F. (Eds.). (2017). Sports Technology: Blending High Performance and Mass Participation. Routledge.
9. Dörge, H. C., & Weber, C. (2019). Measurement and Evaluation in Physical Activity Applications. Springer.
10. Fong, D. T., & Hong, Y. (Eds.). (2019). The Engineering of Sport 12: Vol. 1. Springer.

Ergogenic Aids for Exercise Performance

Course code	Ergogenic Aids for Exercise Performance	Course Type	L	T	P	C	CH
B23HF0705		DSEC	3	-	-	3	3

Course Description:

This course explores the various ergogenic aids used to enhance exercise performance, including nutritional supplements, pharmaceuticals, and training techniques. Students will critically evaluate the scientific evidence behind these aids and their ethical implications in sports and exercise contexts.

Pedagogy:

The course employs a combination of lectures, interactive discussions, case studies, and practical demonstrations to engage students in understanding the effects, mechanisms, and controversies related to ergogenic aids.

Course Objectives:

- Understand the different categories of ergogenic aids and their mechanisms of action.
- Analyze scientific research to critically evaluate the efficacy and safety of various ergogenic aids.
- Examine the ethical considerations and legal regulations surrounding the use of ergogenic aids in exercise and sports.
- Apply knowledge gained to make informed decisions regarding the use of ergogenic aids for optimizing exercise performance.

Course Outcome:

By the end of the course, students will be able to:

- Identify and classify various ergogenic aids and explain their physiological mechanisms.
- Evaluate scientific studies to assess the effectiveness and potential risks of ergogenic aids.
- Discuss ethical dilemmas and regulatory frameworks related to the use of ergogenic aids in exercise and sports.
- Make informed recommendations about the appropriate use of ergogenic aids based on scientific evidence and individual goals.

Course Code	Pos/COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
B23HF0705	CO1	2	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO2	3	2	3	3	2	2	3	2	1	2	2	3	1	2

	CO3	3	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO4	2	2	3	3	2	2	3	2	1	2	2	3	1	2

Course Content:

Unit I: Introduction to Ergogenic Aids and Performance Enhancement

Overview of ergogenic aids and their role in exercise performance enhancement.

Classification of ergogenic aids: nutritional, pharmacological, mechanical, and psychological.

Historical context and evolution of ergogenic aid usage in sports and exercise.

Ethical considerations and regulations surrounding the use of ergogenic aids.

Unit II: Nutritional Ergogenic Aids

Understanding macronutrients and micronutrients as performance enhancers.

Role of carbohydrates, proteins, fats, vitamins, and minerals in energy production and recovery.

Pre-exercise and post-exercise nutrition strategies for optimal performance.

Examination of popular nutritional supplements: creatine, caffeine, beta-alanine, and more.

Critical evaluation of scientific studies on nutritional ergogenic aids.

Unit III: Pharmacological and Mechanical Ergogenic Aids

Exploration of pharmaceutical agents like anabolic steroids, growth hormones, and blood doping.

Mechanisms of action, potential benefits, and risks associated with pharmacological aids.

Overview of mechanical aids: compression garments, altitude training, and hyperbaric chambers.

Discussing the physiological effects and evidence behind these interventions.

Unit IV : Psychological Aspects and Individualized Approaches

The role of psychological ergogenic aids in enhancing motivation, focus, and mental resilience.

Visualization, goal setting, and mindfulness techniques for improving performance.

Individual variability in response to ergogenic aids and the concept of "responders" vs. "non-responders."

Developing personalized strategies for athletes based on their goals, genetics, and training status.

Reference Books:

- Williams, M. H. (2017). Nutrition for Health, Fitness, and Sport. McGraw-Hill Education.
- Haff, G. G., & Triplett, N. T. (Eds.). (2016). Essentials of Strength Training and Conditioning. Human Kinetics.
- Antonio, J., & Stout, J. R. (Eds.). (2015). Sports Supplements. Lippincott Williams & Wilkins.
- Maughan, R. J., & Burke, L. M. (Eds.). (2018). Sports Nutrition: More Than Just Calories – Triggers

for Adaptation. Springer.

- Tarnopolsky, M. A. (2016). Nutritional Support for Exercise-Induced Injuries. CRC Press.
- Burke, L. M., & Deakin, V. (2015). Clinical Sports Nutrition. McGraw-Hill Education.
- Ivy, J. L., & Portman, R. (2017). Nutrient Timing: The Future of Sports Nutrition. Basic Health Publications.
- Kreider, R. B., & Stout, J. R. (Eds.). (2020). Exercise and Sport Nutrition: Principles, Promises, Science, and Recommendations. Routledge.
- Maughan, R. J. (2018). The Encyclopaedia of Sports Medicine: Sports Nutrition. Wiley-Blackwell.
- Burke, L. M. (2019). Practical Sports Nutrition. Human Kinetics.

Practical - Ergogenic Aids for Exercise Performance

Course code	Practical - Ergogenic Aids for Exercise Performance	Course Type	L	T	P	C	CH
B23HF0710		DSEC	-	-	1	1	2

Course Description:

Explore the role of ergogenic aids in enhancing exercise performance through scientific analysis and ethical considerations.

Pedagogy:

Engage through interactive lectures and practical sessions to understand the effects, mechanisms, and application of ergogenic aids.

Course Objectives:

- Understand the classifications and mechanisms of ergogenic aids.
- Critically evaluate research on ergogenic aids' efficacy and ethical implications.

Course Outcome:

- Classify and explain the mechanisms of various ergogenic aids.
- Analyze research to make informed decisions on their use.
- Apply practical skills to assess ergogenic aid effects.
- Formulate strategies for personalized exercise programs integrating ergogenic aids.

Course Code	Pos/COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
B23HF0710	CO1	2	3	2	3	3	3	2	1	1	2	3	2	2	1

	CO2	3	2	3	3	2	2	3	2	1	2	2	3	1	2
	CO3	3	3	2	3	3	3	2	1	1	2	3	2	2	1
	CO4	2	2	3	3	2	2	3	2	1	2	2	3	1	2

Course Content:

Unit I: Introduction to Ergogenic Aids

Overview of ergogenic aids and their role in exercise performance enhancement

Classification of ergogenic aids based on mechanisms of action

Ethical considerations and regulations in the use of ergogenic aids

Unit II: Nutritional Ergogenic Aids

Study of nutritional supplements and their impact on exercise performance

Analysis of macronutrient and micronutrient supplementation

Practical session: Assessing dietary strategies for pre- and post-exercise nutrition

Unit 3: Pharmacological and Physiological Ergogenic Aids

Examination of pharmaceutical interventions and their effects on exercise outcomes

Exploration of physiological strategies such as blood doping and altitude training

Practical session: Simulating altitude training effects and measuring associated physiological changes

Unit 4: Ergogenic Aids and Training Techniques

Study of training methodologies that can act as ergogenic aids

Analysis of factors influencing training adaptations and performance enhancement

Critical evaluation of wearable technologies and their impact on exercise optimization

Practical session: Designing personalized training plans considering ergogenic aid integration

Reference Books:

- Williams, M. H. (2017). Nutrition for Health, Fitness, and Sport. McGraw-Hill Education.
- Haff, G. G., & Triplett, N. T. (Eds.). (2016). Essentials of Strength Training and Conditioning. Human Kinetics.
- Antonio, J., & Stout, J. R. (Eds.). (2015). Sports Supplements. Lippincott Williams & Wilkins.
- Maughan, R. J., & Burke, L. M. (Eds.). (2018). Sports Nutrition: More Than Just Calories – Triggers for Adaptation. Springer.
- Tarnopolsky, M. A. (2016). Nutritional Support for Exercise-Induced Injuries. CRC Press.
- Burke, L. M., & Deakin, V. (2015). Clinical Sports Nutrition. McGraw-Hill Education.
- Ivy, J. L., & Portman, R. (2017). Nutrient Timing: The Future of Sports Nutrition. Basic Health

Publications.

- Kreider, R. B., & Stout, J. R. (Eds.). (2020). Exercise and Sport Nutrition: Principles, Promises, Science, and Recommendations. Routledge.
- Maughan, R. J. (2018). The Encyclopaedia of Sports Medicine: Sports Nutrition. Wiley-Blackwell.
- Burke, L. M. (2019). Practical Sports Nutrition. Human Kinetics.

EIGHTH SEMESTER

Advanced scientific Applications in Team Sports

Course code	Advanced scientific Applications in Team Sports	Course Type	L	T	P	C	CH
B23HF0801		DSC	3	-	-	3	3

Course Description:

This course explores advanced scientific principles in team sports (Cricket/Football/Hockey), focusing on biomechanics, physiology, and psychology to optimize performance and strategy.

Pedagogy:

Utilizing lectures, practical demonstrations, case studies, and expert insights, students engage with real-world applications of biomechanics, physiology, and psychology in team sports.

Course Objectives:

- Apply biomechanical analysis for skill enhancement and injury prevention.
- Design periodized training programs using physiological principles.
- Understand psychological factors affecting team dynamics and performance.
- Develop strategic game plans integrating scientific analysis.

Course Outcome:

By the course's end, students will be able to:

- Apply biomechanical principles to enhance skill efficiency and prevent injuries in team sports.
- Design evidence-based training programs for team sport athletes.
- Analyze psychological factors influencing team cohesion and leadership for better performance.
- Formulate effective game strategies by combining scientific insights with tactical planning.

Course Code	Pos/COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
B23HF0801	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2

	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Unit I: Biomechanical Analysis in Team Sports

Analysis of fundamental skills (batting, passing, dribbling) using biomechanical tools.

Kinematic and kinetic analysis for enhancing skill efficiency.

Injury prevention strategies based on biomechanical assessment.

Unit II: Physiological Conditioning in Team Sports

Energy system demands in Cricket, Football, and Hockey.

Periodization and training program design for optimizing team sport performance.

Recovery techniques and strategies for managing athlete fatigue.

Unit III: Sports Psychology and Team Dynamics

Psychological aspects of team cohesion, communication, and leadership.

Mental preparation for high-pressure situations and managing performance anxiety.

Building a resilient team culture and enhancing athlete motivation.

Unit IV: Tactical Analysis and Game Strategy

Integration of scientific analysis into tactical planning for team sports.

Video analysis of game scenarios to develop effective strategies.

Adapting tactics based on opponent analysis and in-game situations.

Reference Books:

- Hughes, M., & Franks, I. (2004). The Essentials of Performance Analysis: An Introduction. Routledge.
- Bompa, T. O., & Haff, G. G. (2018). Periodization: Theory and Methodology of Training. Human Kinetics.
- James, N., & Mellalieu, S. D. (Eds.). (2010). Applied Sport Psychology: A Case-Based Approach. Wiley-Blackwell.
- Bartlett, R. M., & Buszard, T. (Eds.). (2019). Skill Acquisition in Sport: Research, Theory and Practice. Routledge.
- Jeffreys, I. (2015). Developing Speed. Human Kinetics.
- Reilly, T., & Williams, A. M. (2003). Science and Soccer. Routledge.
- Carling, C., & Dupont, G. (Eds.). (2011). Football (Soccer) Science. Newnes.

- Wisbey, B., Montgomery, P. G., Pyne, D. B., & Rattray, B. (Eds.). (2018). The Physiology of Training: Advances in Sport and Exercise Science Series. Churchill Livingstone.
- Miller, S. A., & Cunniffe, B. (2016). Strength and Conditioning for Team Sports: Sport-Specific Physical Preparation for High Performance. Routledge.
- Robertson, S., & Joyce, D. (2015). Periodization Training for Sports. Human Kinetics.

Practical - scientific Applications in Team Sports (Practical)

Course code	Practical - Advanced scientific Applications in Team Sports	Course Type	L	T	P	C	CH
B23HF0805		DSC	-	-	1	1	2

Course Description:

This course offers B.Sc Sports & Exercise Science students an in-depth exploration of advanced scientific principles as applied to cricket, football, or hockey. Students will analyze physiological, biomechanical, and tactical components to optimize team performance.

Pedagogy:

The course employs a combination of practical sessions, interactive discussions, case studies, and technology-driven analyses to engage students in hands-on learning and critical thinking about advanced concepts in team sports.

Course Objectives:

- Enhance students' understanding of the unique physiological and biomechanical demands of cricket, football, hockey, or Volleyball.
- Develop students' ability to analyze tactical strategies, advanced skills and game scenarios for improved team performance.

Course Outcome:

By the end of the course, students will be able to:

- Apply advanced physiological and biomechanical concepts to assess and enhance performance in cricket, football, hockey, or Volleyball.
- Utilize technology and analysis tools to evaluate tactical decisions and develop strategic insights.
- Collaborate effectively in analyzing match scenarios and proposing performance optimization strategies.

- Demonstrate practical skills in injury prevention, recovery strategies, and biomechanical feedback tailored to team sports contexts.

Course Code	Pos/COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
B23HF0805	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Unit I: Sport-Specific Physiology and Energy Systems

Understanding the energy demands of cricket/football/hockey.

Analysis of sport-specific physiological requirements.

Training strategies to enhance energy system development.

Practical: Assessing and designing energy system-focused training protocols.

Unit II: Biomechanical Analysis and Performance Enhancement

Biomechanical principles in cricket/football/hockey actions.

Techniques for motion analysis and kinematic assessment.

Identifying key performance indicators and their biomechanical determinants.

Practical: Conducting motion analysis and biomechanical feedback sessions.

Unit III: Tactical Insights and Game Analysis

Tactical nuances in cricket/football/hockey.

Analyzing team formations, strategies, and decision-making.

Utilizing technology for match analysis and opponent scouting.

Practical: Collaborative game analysis and strategy refinement.

Unit IV: Injury Prevention and Recovery Strategies

Common injuries in cricket/football/hockey and their causes.

Designing injury prevention programs tailored to each sport.

Strategies for post-match recovery and injury rehabilitation.

Practical: Developing prehabilitation exercises and recovery protocols.

Reference Books:

- Williams, M. H. (2017). Nutrition for Health, Fitness, and Sport. McGraw-Hill Education.
- Haff, G. G., & Triplett, N. T. (Eds.). (2016). Essentials of Strength Training and Conditioning.

Human Kinetics.

- Antonio, J., & Stout, J. R. (Eds.). (2015). Sports Supplements. Lippincott Williams & Wilkins.
- Maughan, R. J., & Burke, L. M. (Eds.). (2018). Sports Nutrition: More Than Just Calories – Triggers for Adaptation. Springer.
- Lees, A., & Asai, T. (2018). Biomechanics in Sport: Performance Enhancement and Injury Prevention. Routledge.
- Hughes, M., & Franks, I. (2008). The Essentials of Performance Analysis: An Introduction. Routledge.
- Reilly, T., & Williams, A. M. (Eds.). (2003). Science and Soccer. Routledge.
- Hughes, M., & Bartlett, R. (Eds.). (2008). Sport and Exercise Biomechanics. Routledge.
- McGarry, T., O'Donoghue, P., & Sampaio, J. (Eds.). (2014). Routledge Handbook of Sports Performance Analysis. Routledge.
- Gabbett, T. J. (2016). Strength and Conditioning for Team Sports: Sport-Specific Physical Preparation for High Performance. Routledge.

Advanced scientific Applications Athletics Events (Track & Field)

Course code	Advanced scientific Applications Athletics Events (Track & Field)	Course Type	L	T	P	C	CH
B23HF0802		DSC	3	-	-	3	3

Course Description:

This course explores advanced scientific applications in track and field events, encompassing biomechanical analysis, physiological adaptations, training strategies, and technological advancements, tailored for B.Sc. Sports & Exercise Science students.

Pedagogy:

Engaging lectures, practical demonstrations, case studies, expert guest lectures, and video analysis are employed to provide students with a comprehensive understanding of the scientific principles and practices in track and field events.

Course Objectives:

- Understand the intricate biomechanical and physiological factors influencing performance in various track and field disciplines.
- Apply advanced training methodologies and periodization strategies for designing event-specific training programs.

Course Outcome:

By the end of the course, students will be able to:

- Analyze and critique biomechanical and physiological components crucial to optimizing track and field performance.
- Design event-specific training regimens based on scientific principles, encompassing diverse disciplines.
- Assess the impact of technology on athlete performance, injury prevention, and training effectiveness.
- Apply ethical considerations to technological interventions and advancements in sports performance.

Course Code	Pos/COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
B23HF0802	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Unit I: Biomechanics in Track & Field Events

Principles of biomechanical analysis in athletics.

Techniques for analyzing sprinting, jumping, throwing, and hurdling mechanics.

Identifying key kinematic and kinetic factors for performance optimization.

Case studies on biomechanical analysis of elite athletes.

Unit II: Physiological Adaptations and Training Strategies

Energy systems in track and field events.

Training principles and periodization for different event groups (sprints, endurance, jumps, throws).

Understanding the role of strength and conditioning in event-specific training.

Monitoring physiological markers for performance enhancement.

Unit III: Event-Specific Training Methodologies

Event-specific demands and performance indicators.

Designing training programs for sprints, middle-distance, long-distance, jumps, and throws.

Incorporating speed, agility, and plyometric training.

Case studies of successful event-specific training regimens.

Unit IV: Technological Advances and Performance Optimization

Role of technology in athlete performance analysis and enhancement.

Use of motion capture, force plates, wearable devices, and performance analytics.

Injury prevention strategies through biomechanical and physiological monitoring.

Ethical considerations and limitations of technological interventions.

Reference Books:

- Mann, R. V. (2013). The Mechanics of Sprinting and Hurdling: 2013 Edition. CreateSpace Independent Publishing Platform.
- Winter, D. A. (2009). Biomechanics and Motor Control of Human Movement. John Wiley & Sons.
- Kenney, W. L., Wilmore, J. H., & Costill, D. L. (2019). Physiology of Sport and Exercise. Human Kinetics.
- Bompa, T. O., & Haff, G. G. (2018). Periodization: Theory and Methodology of Training. Human Kinetics.
- Dapena, J. (2015). The Science of Hitting: Mechanics, Pitching, and Launch Angles. Morgan James Publishing.
- Enoka, R. M. (2008). Neuromechanics of Human Movement. Human Kinetics.
- Tidow, G. (2016). Advanced Strength and Conditioning: An Evidence-Based Approach. Routledge.
- Bartlett, R., & Gratton, C. (2011). Introduction to Sports Biomechanics: Analysing Human Movement Patterns. Routledge.
- Stone, M. H., & Stone, M. (2007). Practical Program Design. Loadstone Press.
- Hickey, G., & Chapman, D. W. (2018). Advances in Performance Analysis of Sport. Routledge.

Practical - Advanced scientific Applications Athletics Events (Track & Field)

Course code	Practical - Advanced scientific Applications Athletics Events (Track & Field)	Course Type	L	T	P	C	CH
B23HF0806		DSC	-	-	1	1	2

Course Description:

This course delves into advanced scientific methodologies for optimizing athletic performance in track and field events, covering biomechanics, physiology, strength training, and nutrition strategies.

Pedagogy:

The course employs a blend of interactive lectures, hands-on practical sessions, case study analyses, and student presentations to facilitate in-depth learning and application of advanced concepts.

Course Objectives:

- Equip students with advanced knowledge in biomechanical analysis and physiological training principles for track and field events.
- Develop skills in designing evidence-based strength training programs and athlete-specific nutritional strategies.

Course Outcome:

By the course's conclusion, students will be able to:

- Apply advanced biomechanical and physiological concepts to analyze and enhance athletes' performance in various track and field disciplines.
- Design evidence-based strength training regimens that cater to the specific demands of different events, fostering improved power and technique.
- Formulate personalized nutrition strategies that align with athletes' training goals, optimizing recovery and fueling performance.
- Communicate effectively by presenting athlete-specific case studies, showcasing a comprehensive understanding of the course's scientific principles and their practical applications.

Course Code	Pos/COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
B23HF0806	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Unit I: Biomechanics and Performance Analysis in Track & Field

Introduction to biomechanics principles applied to athletics events.

Techniques for video analysis of sprinting, jumping, and throwing events.

Quantitative assessment of biomechanical parameters for performance enhancement.

Case studies of biomechanical analysis in elite athletes.

Unit II: Physiological Aspects of Endurance Training for Distance Events

Energy systems relevant to distance running and race walking.

Training methodologies for improving aerobic capacity and endurance.

Monitoring and evaluating physiological adaptations in distance athletes.

Practical sessions on designing and implementing endurance training programs.

Unit III: Strength and Power Training for Field Events

Biomechanical principles of throwing and jumping events.

Periodization and programming for strength and power development.

Plyometric exercises and their application in improving athletic performance.

Practical sessions demonstrating strength and power training techniques.

Unit IV: Nutrition and Recovery Strategies for Track & Field Athletes

Nutritional requirements for sprinters, jumpers, throwers, and distance athletes.

Hydration strategies for peak performance in various weather conditions.

Post-competition recovery techniques and their impact on training adaptations.

Practical sessions on designing athlete-specific nutrition and recovery plans.

Reference Books:

- Winter, E. M., & Fowler, N. (Eds.). (2016). Strength and Conditioning for Sports Performance. Routledge.
- Bartlett, R. M., & Stockill, N. P. (Eds.). (2017). Advances in Sport Science and Computer Science. Taylor & Francis.
- Zatsiorsky, V. M., & Kraemer, W. J. (2006). Science and Practice of Strength Training. Human Kinetics.
- Stone, M. H., & Cardinale, M. (2019). Scientific Principles of Strength Training. Routledge.
- Wilmore, J. H., & Costill, D. L. (2017). Physiology of Sport and Exercise. Human Kinetics.
- Enoka, R. M. (2008). Neuromechanics of Human Movement. Human Kinetics.
- Bompa, T. O., & Carrera, M. (2018). Periodization Training for Sports. Human Kinetics.
- Tipton, K. D., & Wolfe, R. R. (Eds.). (2013). Protein and Amino Acids for Athletes. CRC Press.
- Ivy, J. L., & Portman, R. (Eds.). (2017). Nutritional Supplements in Sports and Exercise. CRC Press.
- Hay, J. G. (1993). The Biomechanics of Sports Techniques. Prentice-Hall.
- Maughan, R. J., & Burke, L. M. (Eds.). (2015). Sports Nutrition: More Than Just Calories – Triggers for Adaptation. Springer.

Advanced scientific Applications in Combat and Indigenous sports

Course code	Advanced scientific	Course Type	L	T	P	C	CH

B23HF0803	**Applications in Combat and Indigenous sports**	**DSC**	**3**	**-**	**-**	**3**	**3**

Course Description:

This course delves into the advanced scientific principles underlying combat and indigenous sports, exploring biomechanics, training methodologies, technology integration, and psychological aspects for enhanced performance and injury prevention.

Pedagogy:

The course employs a combination of interactive lectures and discussions, practical demonstrations, case studies, and student presentations to foster a comprehensive understanding of the scientific foundations of combat and indigenous sports.

Course Objectives:

Understand the biomechanical and physiological intricacies of combat and indigenous sports.

Apply advanced training methods, technology, and tactical analysis to optimize athlete performance.

Cultivate awareness of injury prevention strategies and mental conditioning techniques.

Course Outcome:

By the end of this course, students will be able to:

- Analyze combat and indigenous sports techniques through a scientific lens, identifying areas for improvement.
- Design and implement evidence-based training programs, integrating modern technology.
- Evaluate and mitigate injury risks in combat and indigenous sports, while fostering mental resilience for competitive success.

Course Code	Pos/COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
B23HF0803	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Unit I: Fundamentals of Combat and Indigenous Sports

Definition and significance of combat and indigenous sports

Historical context and cultural importance

Brief overview of popular combat and indigenous sports

Biomechanical principles in combat techniques

Physiological demands of combat and indigenous sports

Role of strength, flexibility, and endurance in performance

Unit II: Scientific Training Methods

Principles of training specific to combat and indigenous sports

Introduction to periodization and its application

Creating training plans based on competition schedules

Nutritional requirements for optimal performance

Hydration and fueling strategies

Recovery techniques for combat and indigenous sports athletes

Unit III: Technology and Performance Analysis

Overview of technology applications (wearables, sensors, video analysis) in sports

Role of technology in enhancing training, performance, and injury prevention

Video analysis for tactical insights

Understanding opponent analysis and strategy development

Utilizing data to enhance decision-making during matches

Unit IV: Injury Prevention and Sports Psychology

Common injuries in combat and indigenous sports

Injury prevention strategies and warm-up routines

Rehabilitation techniques and return-to-play protocols

Importance of mental strength in combat sports

Techniques for managing stress and anxiety

Visualization, focus, and goal-setting for optimal performance

Reference Books:

- Weyand, P. G., & Sanderson, D. J. (Eds.). (2020). Biomechanics of Sports: Techniques and Applications. Academic Press.
- Enoka, R. M. (2016). Neuromechanics of Human Movement. Human Kinetics.
- Bompa, T. O., & Haff, G. G. (2018). Periodization: Theory and Methodology of Training. Human Kinetics.

- Jeukendrup, A. E., & Gleeson, M. (Eds.). (2019). Sports Nutrition: From Lab to Kitchen. Routledge.
- Hrysomallis, C. (Ed.). (2017). Biomechanics in Applications. InTechOpen.
- Hughes, M., & Franks, I. (2008). The Essentials of Performance Analysis: An Introduction. Routledge.
- Plummer, N., & Camacho, M. D. (2018). Combat Sports Medicine. Springer.
- Andersen, T. B., & Mooney, M. A. (Eds.). (2019). The Routledge Handbook of Sport and Data. Routledge.
- Knight, C. J. (2016). An Introduction to Sports Coaching: Connecting Theory to Practice. Routledge.
- Weinberg, R. S., & Gould, D. (2018). Foundations of Sport and Exercise Psychology. Human Kinetics.

Practical - Advanced scientific Applications in Combat and Indigenous sports

Course code	Practical - Advanced scientific Applications in Combat and Indigenous sports	Course Type	L	T	P	C	CH
B23HF0807		DSC	-	-	1	1	2

Course Description:

Explore the science of Ergogenic Aids and their impact on exercise performance enhancement in sports and fitness activities.

Pedagogy:

Engage in interactive lectures, group discussions, case studies, and hands-on experiments to grasp the nuances of ergogenic aids and their practical implications.

Course Objectives:

- Understand the classification and mechanisms of various ergogenic aids.
- Analyze scientific literature to assess the efficacy and ethical considerations of ergogenic aids.

Course Outcome:

By course end, students will be able to:

- Differentiate between different types of ergogenic aids and their effects.
- Critically evaluate the benefits, risks, and ethical implications of ergogenic aids.

- Apply knowledge to develop informed strategies for exercise performance enhancement.
- Effectively communicate findings and recommendations on ergogenic aids.

Course Code	Pos/COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
B23HF0807	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Unit I: Introduction to Advanced Scientific Principles in Sports

Introduction to the course and its objectives

Overview of advanced scientific principles in sports

Importance of integrating science into combat and indigenous sports

Ethical considerations in sports science research

Unit II: Biomechanics and Movement Analysis in Combat and Indigenous Sports

Fundamentals of biomechanics and its role in sports performance

Analysis of body mechanics and movement patterns in combat and indigenous sports

Application of motion capture and technology in movement analysis

Case studies and practical demonstrations of biomechanical analysis

Unit III: Physiology and Nutrition for Enhanced Performance

Understanding the physiological demands of combat and indigenous sports

Energy systems and their relevance in different sports contexts

Nutritional requirements and strategies for optimizing performance

Hydration, supplementation, and recovery techniques

Guest lecture by a nutrition expert or athlete

Unit IV: Sports Psychology and Mental Conditioning

Exploring the psychological aspects of combat and indigenous sports

Mental resilience, focus, and stress management techniques

Goal setting, visualization, and self-motivation strategies

Team dynamics and communication skills in sports

Practical sessions on mindfulness and mental conditioning techniques

Reference Books:

- Williams, M. H. (2017). Nutrition for Health, Fitness, and Sport. McGraw-Hill Education.
- Haff, G. G., & Triplett, N. T. (Eds.). (2016). Essentials of Strength Training and Conditioning. Human Kinetics.
- Antonio, J., & Stout, J. R. (Eds.). (2015). Sports Supplements. Lippincott Williams & Wilkins.
- Maughan, R. J., & Burke, L. M. (Eds.). (2018). Sports Nutrition: More Than Just Calories – Triggers for Adaptation. Springer.
- Tarnopolsky, M. A. (2016). Nutritional Support for Exercise-Induced Injuries. CRC Press.
- Burke, L. M., & Deakin, V. (2015). Clinical Sports Nutrition. McGraw-Hill Education.
- Kreider, R. B. (2017). Creatine: The Power Supplement. Human Kinetics.
- McArdle, W. D., Katch, F. I., & Katch, V. L. (2018). Exercise Physiology: Nutrition, Energy, and Human Performance. Wolters Kluwer.
- Hay, J. G. (1993). The Biomechanics of Sports Techniques. Prentice-Hall.
- Joy, J. M., Vogel, R. M., Moon, J. R., & Falcone, P. H. (Eds.). (2020). Ergogenic Aids in Sport. Springer.
- Slater, G. J., & Phillips, S. M. (Eds.). (2017). Nutrition and Skeletal Muscle. CRC Press.

Yoga in Sports and Fitness

Course code	Yoga in Sports and Fitness	Course Type	L	T	P	C	CH
B23HF0804		DSEC	3	-	-	3	3

Course Description:

This course explores the integration of yoga principles into sports and fitness, emphasizing its impact on physical performance, mental well-being, and injury prevention.

Pedagogy:

Combining theoretical lectures with practical sessions, this course engages students in experiential learning, enabling them to understand, practice, and teach yoga techniques for optimizing sports and fitness outcomes.

Course Objectives:

- Understand the philosophy and history of yoga, and its relevance to sports and exercise science.
- Apply yogic principles, including asanas, pranayama, mindfulness, and visualization, to enhance athletic performance and holistic well-being.

Course Outcome:

Upon completion, students will be able to:

- Integrate yoga practices into sports training and recovery routines effectively.
- Assess the benefits of yoga on physical flexibility, strength, and mental focus.
- Design customized yoga-based strategies to prevent injuries and enhance sports-specific performance.
- Apply mindfulness techniques for stress reduction, emotional resilience, and improved sports outcomes.

Course Code	Pos/COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
B23HF0804	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Unit I: Introduction to Yoga in Sports and Fitness

Overview of the role of yoga in sports and fitness

Historical context and evolution of yoga practices

Principles of Yoga Philosophy

Exploration of the Eight Limbs of Yoga

Understanding the connection between mind, body, and spirit in sports and fitness

Benefits of Yoga in Sports and Fitness

Analysis of physical, mental, and emotional benefits for athletes and fitness enthusiasts

Case studies showcasing improved performance through yoga practice

Unit II: Yogic Asanas and Alignment

Fundamentals of Yogic Asanas

Introduction to basic asanas (postures)

Importance of alignment and proper execution

Asanas for Flexibility and Injury Prevention

Exploration of asanas to enhance flexibility and prevent injuries

Role of yoga in maintaining joint health

Asanas for Strength and Endurance

Study of asanas that build muscular strength and endurance

Integration of yoga poses into sports-specific training routines

Unit III: Breathing Techniques and Mindfulness

Pranayama: Yogic Breathing Techniques

Introduction to pranayama techniques for athletes and fitness enthusiasts

Benefits of controlled breathing in enhancing performance

Mindfulness and Concentration

Exploring meditation techniques to improve focus and concentration

Application of mindfulness in sports psychology

Visualization and Mental Rehearsal

Understanding the use of visualization for goal achievement

Practical exercises in mental rehearsal for sports performance enhancement

Yoga Nidra and Relaxation Techniques

Introduction to Yoga Nidra for deep relaxation and recovery

Incorporating relaxation practices in post-training routines

Unit IV: Integrating Yoga into Training and Recovery

Yoga for Pre-Workout Warm-up

Designing dynamic sequences for pre-training warm-up

Importance of activating relevant muscle groups

Yoga for Post-Workout Recovery

Creating sequences for post-training cooldown and recovery

Addressing muscle soreness and fatigue through yoga poses

Yoga in Sports-Specific Contexts

Examining how different sports benefit from specific yoga practices

Case studies showcasing successful integration of yoga in professional sports

Yoga for Mental Resilience

Strategies for using yoga to manage stress and enhance mental resilience

Exploring the connection between yoga, emotional well-being, and sports performance

Course Review and Future Applications

Recap of key concepts and practices covered throughout the course

Discussing how students can continue integrating yoga principles into their careers as sports and exercise science professionals

Reference Books:

- Iyengar, B. K. S. (2006). Light on Yoga: The Bible of Modern Yoga. HarperCollins.
- Saraswati, S. S. (2003). Asana Pranayama Mudra Bandha. Bihar School of Yoga.
- McCall, T. (2007). Yoga as Medicine: The Yogic Prescription for Health and Healing. Bantam.
- Farhi, D. (2006). The Breathing Book: Good Health and Vitality Through Essential Breath Work. Henry Holt and Co.
- Swenson, D. (2004). Ashtanga Yoga: The Practice Manual. Ashtanga Yoga Productions.
- Goleman, D., & Schwartz, G. (2011). The Science of Meditation: How to Change Your Brain, Mind and Body. TarcherPerigee.
- Kaminoff, L., & Matthews, A. (2012). Yoga Anatomy. Human Kinetics.
- Boon, M. Y., & Hede, A. (2014). Yoga in the Modern World: Contemporary Perspectives. Routledge.
- Sovik, R. (2016). Relax and Renew: Restful Yoga for Stressful Times. Rodmell Press.
- Khalsa, S. B. S., & Stauth, C. (2011). The Pain-Free Yoga Practice: Transforming Your Yoga Practice and Your Life. Da Capo Lifelong Books.

Practical - Yoga in Sports and Fitness

Course code	Practical - Yoga in Sports and Fitness	Course Type	L	T	P	C	CH
B23HF0808		DSEC	3	-	-	3	3

Course Description:

This course introduces B.Sc Sports and Exercise Science students to the integration of yoga principles, techniques, and practices within sports and fitness contexts, focusing on enhancing physical performance, mental resilience, and overall well-being.

Pedagogy:

The course employs a combination of practical sessions, theoretical discussions, case studies, and experiential learning to provide students with hands-on experience in incorporating yoga practices into sports and fitness regimens.

Course Objectives:

- To familiarize students with the foundations of yoga philosophy and its relevance to sports and exercise science.
- To enable students to apply various yoga techniques for improving flexibility, strength, mental focus, and recovery in athletic pursuits.

Course Outcome:

Upon completion of the course, students will be able to:

- Integrate fundamental yoga practices into sports and fitness routines for enhanced physical conditioning.
- Design and implement specialized yoga-based interventions tailored to specific sports disciplines.
- Demonstrate an understanding of the relationship between yoga, mental training, and performance under pressure.
- Critically evaluate the role of yoga in promoting holistic well-being among athletes and fitness enthusiasts.

Course Code	Pos/COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
B23HF0808	CO1	3	3	2	2	1	2	1	1	3	1	3	2	1	2
	CO2	2	2	3	3	2	1	2	1	2	2	2	3	1	2
	CO3	3	3	3	2	1	1	1	2	2	1	3	2	1	3
	CO4	2	2	2	3	1	3	2	1	3	1	2	3	1	2

Course Content:

Unit I: Introduction to Yoga and Its Relevance in Sports and Fitness

Introduction to Yoga: Historical background, philosophical foundations, and different paths of yoga.

Yoga in Sports and Fitness: Understanding the benefits of yoga in enhancing athletic performance, injury prevention, and mental focus.

Basic Yogic Principles: Exploration of Yamas and Niyamas (ethical guidelines) and their application in sports and fitness context.

Unit II: Fundamental Asanas and Alignment

Hatha Yoga: Introduction to Hatha yoga and its role in physical conditioning.

Asanas: Study and practice of fundamental yoga postures for strength, flexibility, and balance.

Alignment and Breathing: Importance of proper alignment in asanas and synchronization of breath with movement.

Unit III: Yoga for Performance Enhancement

Dynamic Yoga: Incorporating dynamic sequences for improved muscular endurance and cardiovascular health.

Yoga for Flexibility: Techniques for increasing range of motion and preventing injuries.

Pranayama and Mindfulness: Introduction to breathing exercises and mindfulness practices to enhance mental focus and relaxation.

Unit IV: Specialized Applications of Yoga in Sports and Fitness

Yoga for Recovery: Using yoga for post-workout recovery and injury rehabilitation.

Yoga for Specific Sports: Tailoring yoga practices to meet the needs of different sports disciplines.

Sport-Specific Mind Training: Applying yogic techniques to develop mental resilience, concentration, and performance under pressure.

Yoga in Fitness Programming: Designing yoga-based workouts for general fitness and specific goals.

Reference Books:

- Iyengar, B. K. S. (2005). Light on Yoga: The Bible of Modern Yoga. HarperOne.
- Swenson, D. (2007). Ashtanga Yoga: The Practice Manual. Ashtanga Yoga Productions.
- Desikachar, T. K. V. (1999). The Heart of Yoga: Developing a Personal Practice. Inner Traditions.
- Kaminoff, L., & Matthews, A. (2011). Yoga Anatomy. Human Kinetics.
- Farhi, D. (2000). The Breathing Book: Good Health and Vitality Through Essential Breath Work. Holt Paperbacks.
- Birch, B. (2007). Power Yoga: The Total Strength and Flexibility Workout. Fireside.
- Lasater, J. H. (2000). Relax and Renew: Restful Yoga for Stressful Times. Rodmell Press.
- Satchidananda, S. (2012). The Yoga Sutras of Patanjali. Integral Yoga Publications.
- Farhi, D. (2004). The Breathing Book: Vitality and Good Health Through Essential Breath Work. Henry Holt and Company.
- Schwarzenegger, A., & Dobbins, B. (2012). The New Encyclopedia of Modern Bodybuilding: The Bible of Bodybuilding, Fully Updated and Revised. Simon & Schuster.

Internship-IV

Course code	Internship IV	Course Type	L	T	P	C	CH
B23HFP0809		Int	-	-	4	4	8

Course Description:

This internship offers B.Sc Sports & Exercise Science students the opportunity to gain practical experience in real-world sports and fitness settings, applying theoretical knowledge to enhance their skills and understanding of the field.

Pedagogy:

The internship employs a hands-on approach, enabling students to actively engage with professionals in sports and exercise environments, fostering experiential learning and skill development.

Course Objectives:

- To provide students with a comprehensive understanding of the practical aspects of sports and exercise science through direct exposure to industry settings.
- To develop students' professional competencies, communication skills, and adaptability within diverse sports and fitness contexts.

Course Outcome:

- Students will demonstrate the ability to integrate theoretical concepts into practical scenarios within sports and exercise settings.
- Through interaction with professionals, students will enhance their communication, teamwork, and problem-solving skills.
- Students will gain insights into career pathways, refining their aspirations and making informed decisions in the sports and exercise science field.
- The internship experience will contribute to students' overall academic growth, bridging the gap between classroom learning and real-world application.

Course Code	Pos/COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
B23HF0809	CO1	3	3	3	3	3	3	3	3	3	2	2	3	3	3
	CO2	3	3	3	3	3	2	3	3	2	3	2	3	3	3
	CO3	3	3	3	3	2	3	3	2	3	2	3	3	3	2
	CO4	3	3	3	2	3	3	2	3	2	3	3	3	2	3

Reference Books:

- Smith, J. A. (2019). "Sports Nutrition: Enhancing Athletic Performance." Publisher.
- Johnson, R. L., & Smith, M. A. (Eds.). (2020). "Exercise Physiology: Integrating Theory and

Application." Publisher.

- Brown, S. D., & White, A. J. (2018). "The Psychology of Sport and Exercise." Publisher.
- Williams, P. T. (2017). "Applied Biomechanics: Concepts and Connections." Publisher.
- Thompson, W. R. (2021). "ACSM's Guidelines for Exercise Testing and Prescription." Publisher.
- Enoka, R. M. (2015). "Neuromechanics of Human Movement." Publisher.
- Hatfield, F. C. (Ed.). (2019). "Fitness: The Complete Guide." Publisher.
- Burke, L. M. (2007). Practical Sports Nutrition. Human Kinetics.
- Jeukendrup, A. E. (2019). Sports Nutrition. Human Kinetics.
- McArdle, W. D., Katch, F. I., & Katch, V. L. (2022). "Exercise Physiology: Nutrition, Energy, and Human Performance." Publisher.
- Fleck, S. J., & Kraemer, W. J. (2014). "Designing Resistance Training Programs." Publisher.
- Baechle, T. R., & Earle, R. W. (Eds.). (2018). "Essentials of Strength Training and Conditioning." Publisher.

Research Project/Dissertation

Course code	Research project	Course Type	L	T	P	C	CH
B23HFP0810		**RP**	**-**	**-**	**12**	**12**	**24**

Course Description:

This practical course for B.Sc. Sports Science students focuses on conducting a research project or dissertation in a specialized area of sports science. Students will be guided through the research process, from formulating research questions to data collection, analysis, and presentation of findings.

Pedagogy:

Students will work closely with faculty mentors to choose a research topic, design the study, and carry out data collection. The course will involve workshops on research methodologies, data analysis, and academic writing.

Course Objectives:

- Develop skills in conducting independent research and applying scientific methodologies in sports science.
- Enhance critical thinking and problem-solving abilities by addressing real-world issues in sports science research.

Course Outcome:

Upon successful completion of the course, students will be able to:

- Formulate a well-defined research question and design a research study to address it.
- Collect, analyze, and interpret data using appropriate statistical methods and research techniques.
- Communicate research findings effectively through written reports and oral presentations.
- Demonstrate a comprehensive understanding of the research process and its relevance to sports science.

Course Code	Pos/COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4
B23HF0810	CO1	3	3	3	3	3	3	3	3	3	2	2	3	3	3
	CO2	3	3	3	3	3	2	3	3	2	3	2	3	3	3
	CO3	3	3	3	3	2	3	3	2	3	2	3	3	3	2
	CO4	3	3	3	2	3	3	2	3	2	3	3	3	2	3

Reference Books:

- Creswell, J. W. (2014). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. Sage Publications.
- Leedy, P. D., & Ormrod, J. E. (2019). Practical Research: Planning and Design. Pearson.
- Silverman, D. (Ed.). (2016). Qualitative Research. Sage Publications.
- Field, A. (2018). Discovering Statistics Using IBM SPSS Statistics. Sage Publications.
- Neuman, W. L. (2016). Social Research Methods: Qualitative and Quantitative Approaches. Pearson.
- Sekaran, U., & Bougie, R. (2016). Research Methods for Business: A Skill Building Approach. Wiley.
- Bryman, A. (2015). Social Research Methods. Oxford University Press.
- Thomas, J. R., Nelson, J. K., & Silverman, S. J. (2018). Research Methods in Physical Activity. Human Kinetics.
- Cohen, L., Manion, L., & Morrison, K. (2018). Research Methods in Education. Routledge.
- Johnson, R. B., & Christensen, L. (2019). Educational Research: Quantitative, Qualitative, and Mixed Approaches. Sage Publications.

LIST OF FACULTY MEMBERS

S.No	Name of faculty	Designation	Subject	Contact details& mail id
1.	Dr.S.Srividhya	HOD & Associate Professor	Sports Biochemistry	8892923811 Srividhya.s@reva.edu.in
2.	Mr.Manikandan K	Assistant professor	Biomechanics, Anatomy	8610953364 manikandan.kannan@reva.edu.in
3.	Mr.Sudip Ghatak	Teaching Associate	Physiology	8653030022 sudip.ghatak@reva.edu.in
4.	Mr.Sharath Arun Maney	Assistant Professor	Strength & Conditioning	9980844748 sharatharun.maney@reva.edu.in

Careers in Sports Science

Sports Science is one of the fastest growing and evolving health professions. Completing a B.Sc. in Sports and Exercise Science (Honours) can lead to various career opportunities in the sports and fitness industry. Here are some potential career paths:

1. Sports Scientist
2. Exercise Physiologist
3. Fitness & Wellness in Corporate, Hospital and University
4. Strength/Conditioning Coach
5. Performance analyst
6. Sports Administrator
7. Sports Talent identification officer
8. Many choose academic progression and pursue Masters of sports science in a specific field of specialization which they are passionate about, following which they can pursue doctoral research- PhD.
9. Others choose research, education, administration as career path.
10. There are many opportunities to work or study in foreign countries.
11. Many choose academic progression and pursue Masters of sports science in a specific field of specialization which they are passionate about, following which they can pursue doctoral research- PhD.
12. Others choose research, education, administration as career path.
13. There are many opportunities to work or study in foreign countries.