REVA UNIVERSITY
Bengaluru, India

School of Allied Health Sciences

BACHELOR OF SCIENCE (Hons.)
SPORTS AND EXERCISE SCIENCE

HANDBOOK

2023-2027

Rukmini Knowledge Park

Kattigenahalli, Yelahanka, Bengaluru – 560064

Phone No: +91-080-46966966, Fax: 080-28478539

www.reva.edu.in

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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 enough to 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 expertsat 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

The last two decades have seen a remarkable growth in higher, education in India and across the globe. The move towards inter-disciplinary studies and interactive learning have opened several options as well as created multiple challenges.

India is at a juncture where a huge population of young crowd is opting for higher education. With the tremendous growth of privatization of education in India, the major focus is on creating a platform for quality in knowledge enhancement and bridging the gap between academia and industry.

A strong believer and practitioner of the dictum "Knowledge is Power", REVA University has been on the path of delivering quality education by developing the young human resources on the foundation of ethical and moral values, while boosting their leadership qualities, research culture and innovative skills. Built on as prowling 45 acres of green campus, this' temple of learning' has excellent and state-of-the-art infrastructure facilities conducive to higher teaching-learning environment and research. The main objective of the University is to provide higher education of global standards and hence, all the programs are designed to meet international standards. Highly experienced and qualified faculty members, continuously engaged in the maintenance and enhancement of student-centric learning environment through innovative pedagogy, form the backbone of the University.

All the programs offered by REVA University follow the Choice Based Credit System (CBCS) with Outcome Based Approach. The flexibility in the curriculum has been designed with industry-specific goals in mind and the educator enjoys complete freedom to appropriate the syllabus by incorporating the latest knowledge and stimulating the creative minds of the students. Bench marked with the course of studiesof various institutions of repute, our curriculum is extremely contemporary and is a culmination of efforts ofgreat think-tanks-a large number of faculty members, experts from industries and research level organizations. The evaluation mechanism employs continuous assessment with grade point averages. We believe sincerely that it will meet

the aspirations of all stakeholders – students, parents and the employers of the graduates and postgraduates of REVA University.

At REVA University, research, consultancy and innovation are regarded as our pillars of success. Most of the faculty members of the University are involved in research by attracting funded projects from various research level organizations like DST, VGST, DBT, DRDO, AICTE and industries. The outcome of the research is passed on to students through live projects from industries. The entrepreneurial zeal of the students is encouraged and nurtured through EDPs and EACs.

REVA University has entered into collaboration with many prominent industries to bridge the gap between industry and University. Regular visits to industries and mandatory internship with industries have helped our students. REVA University has entered into collaboration with many prominent industries to bridge thegap between industry and University. Regular visits to industries and mandatory internship with industries have helped our students become skilled with relevant to industry requirements. Structured training programson soft-skills and preparatory training for competitive exams are offered here to make students more employable. 100% placement of eligible students speaks the effectiveness of these programs. The entrepreneurship development activities and establishment of “Technology Incubation Centre’s” in the University extend full support to the budding entrepreneurs to nurture their ideas and establish an enterprise.

With firm faith in the saying, “Intelligence plus character –that is the goal of education” (Martin Luther King,Jr.), I strongly believe REVA University is marching ahead in the right direction, providing a holistic educationto the future generation, and playing a positive role in nation building. We reiterate our endeavour to provide premium quality education accessible to all and an environment for the growth of over-all personality development leading to generating “GLOBAL PROFESSIONALS”.

Welcome to the portals of REVA University!

Dr. M. Dhanamjaya

Vice Chancellor, REVA University

Associate Dean's Message for students

Dear students,

I hope this message finds you in good health and high spirits as we embark on a new academic year in the field of Allied Health Sciences, specifically in the exciting realm of Sports Science. Welcome to our esteemed program!

Sports Science is a multidisciplinary field that merges the worlds of health, exercise, and athletics. It is a domain that requires a deep understanding of the human body, its physiological responses, and the intricate mechanics behind human performance.

During your time in this program, you will delve into various subjects, including exercise physiology, biomechanics, nutrition, psychology, and injury prevention. These areas of study are interconnected and will provide you with a comprehensive understanding of the factors influencing human performance. Our dedicated faculty members are renowned experts in their respective fields, and they are committed to guiding you through this journey of knowledge and skill acquisition.

To excel in this course, I encourage you to actively engage in both theoretical and practical components of your studies. Participate in discussions, ask questions, and seek clarification when needed. Take advantage of the

state-of-the-art laboratory facilities we have to offer, as they will serve as invaluable tools for hands-on learning and skill development. By immersing yourself fully in the learning process, you will not only gain knowledge but also cultivate the essential critical thinking and problem-solving skills necessary to excel in the field.

Collaboration is another key aspect of your journey. I urge you to foster a sense of camaraderie and teamwork among your peers. The ability to work effectively in interdisciplinary teams is vital in the Allied Health Sciences, and by embracing collaboration, you will learn from one another and develop the skills necessary for future professional success.

Lastly, never underestimate the importance of practical experience. Seek out internships, volunteer opportunities, and industry placements to gain real-world exposure. Sports Science is a field that thrives on practical application, and by actively engaging with sports teams, fitness centers, and rehabilitation clinics, you will bridge the gap between theory and practice, enhancing your employability.

I am confident that with your dedication, enthusiasm, and the wealth of knowledge you will gain from this course, you will become leaders in the field of Sports Science. Remember, your journey here is not just about acquiring a degree—it is about embracing a lifelong commitment to improving the health and performance of individuals through evidence-based practices.

I wish you a rewarding and transformative experience in our Allied Health Sciences Sports Science course. Embrace the challenges, seize the opportunities, and always strive for excellence.

Sincerely,

Dr. P. Visweswara Rao

Associate Dean of Allied Health Sciences

REVA University

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 and government 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 privilegedchildren 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 areasof 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 Degreeprograms 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 reputeduniversities/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 importantfunctions 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, Strategic Leadership and Innovative Entrepreneurship, Functional Development Management, Resource Management and Sustainable Development, Cyber Security, General Studies, Feminism, ComputerAssisted 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. As a 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 eventstudents 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 thisoccasion, the students who have achieved to pranks and won medals and prizes in academic, culturaland 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 honored with many more such honors 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 centers
- 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 differentdisciplines.
- 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 acompetitive manner.

ABOUT SCHOOL OF ALLIED HEALTH SCIENCES

The School of Allied Health Sciences offers graduate and post graduate 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 neitherscience 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. Pasupuleti Visweswara Rao** Associate Dean, School of Allied Health Sciences dir.ir@reva.edu.in , +91900636261	**Chairman**
2	**Dr. S. Srividhya,** Associate Professor & Program Coordinator, Department of Sports & Exercise Science srividhya.s@reva.edu.in, +918892923811	Internal Member
3	**Mr. Rudragouda Patil** Programme Lead, Department of Sports & Exercise Science Rudragouda.patil@reva.edu.in , +919643342359	Internal Member
4	**Dr.Tilak Kumar B S** Associate Professor, Department of Sports & Exercise Science Tilakkumar.bs@reva.edu.in, +919844393965	Internal Member
5	**Dr. P. Rajinikumar** Assistant Professor Tamilnadu Physical Education and Sports University Rajinipkp88@gmail.com, +919941923899	External Member
6	**Dr. Saju Joseph** Ex-High Performance Director (SAI), Consultant for University of Malaya, Kuala Lumpur, Malaysia. Sajujoseph91@gmail.com, +919886462264	External Member
7	**Dr. Athoni Rhetso** Scientific Officer (Department of Anthropometry) Faculty of Sports Science Sports Authority of India, Netaji Subhas Southern Centre, Bangalore. athoni.sai@gov.in , +91 85537 15847	External Member
8	**Dr. Praveen Nair** In-charge of Sports Science Scientific Officer (Department of Biomechanics) Faculty of Sports Science Sports Authority of India, Netaji Subhas Southern Centre, Bangalore. Praveennair.sai@gmail.com , +919888253633	External Member
9	**Ms. Geetha Ghaliyavar** Sports Nutritionist - International Olympic Committee, Registered Dietitian, CDE, IBS-FODMAPS certified geethaghaliyavar@gmail.com , +91 98803 36545	External Member
10	**Mr. Ashish Kaushik** Managing Director, YOS Sports Health Specialists ak.@yossportshealth.com, +919900818020	External Member

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 31st December of the year of admission.

Every candidate before admission to the course shall furnish to the Principal of the Institution a certificate of Medical Fitness from an authorized Government Medical Officer to the effect, that the candidate is physically fit to undergo B.Sc. (Hons.) Sports and Exercise Science course.

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 for Choice Based Credit System (CBCS) and Continuous Assessment Grading Pattern (CAGP) for Science Graduate Degree Programs, 2023-2027

(Framed as per the provisions under Section 35 (ii), Section7 (x) and Section 8 (xvi) & (xxi) of the REVA University Act, 2012)

1. Title and Commencement:

1.1. These Regulations shall be called the **"REVA University Regulations for Choice Based CreditSystem (CBCS) and Continuous Assessment Grading Pattern (CAGP) for Undergraduate Degree Programs-2023".**

1.2. These Regulations shall come into force from the date of assent of the Chancellor.

2. The Programs:

The following graduate degree program introduced in REVA University follow the regulations:

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

3. Definitions:

Course: Every course offered will have three components associated with the teaching-learning process of the course, namely:

(i) L=Lecture (ii) T=Tutorial (iii) P=Practice; where:

L stands for **Lecture** session consisting of classroom instruction.

T stands for **Tutorial** session consisting participatory discussion / self-study/ deskwork/ brief seminar presentations by students and such other novel methods that make a student to absorb and as simulate more effectively the contents delivered in the Lecture classes.

P stands for **Practice** session, and it consists of Hands-on Experience / Laboratory Experiments/Field Studies / Case Studies that equip students to acquire the much-required skill component.

4. Courses of study and Credits

4.1 The study of various subjects in B.Sc., degree program is grouped under various courses. Eachof these course carries credits which are based on the number of hours of teaching and learning.

4.1.1. In terms of credits, every **one-hour session of L amounts to 1 credit per Semester** and **a minimum of two-hour session of T or P amounts to 1 credit per Semester** over aperiod of one Semester of 16 weeks for teaching-learning process.

4.1.2. **The total duration of a semester is 20 weeks inclusive of semester-end examination.**

4.1.3. **A course shall have either or all the four components.** That means a course may have only lecture component, or only practical component or combination of any two or all the three components.

4.1.4. The concerned BoS will assign Credit Pattern for every course based on the requirement. However, generally, courses can be assigned with 1-4 Credits depending on the size of the course.

4.1.5. Different Courses of Study are labelled and defined as follows:

5. Scheme, Duration and Medium of Instructions:

5.1. 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.

5.2. The medium of instruction shall be English.

6. Credits and Credit Distribution

6.1. 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)	80
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)	22
Total	**176**

6.2. The concerned BOS based on the credit's distribution pattern given above shall prescribe the credits to various types of courses and shall assign title to every course as Discipline Specific Core Course, Discipline

Specific Elective Course, Multidisciplinary Course, Ability Enhancement Compulsory Course, Skill Enhancement Course, Skill Enhancement Course, Value Added Course, Internship/Research Project.

6.3. Every course including project work, practical work, Internship should be entitled as Discipline Specific Core Course, Discipline Specific Elective Course, Multidisciplinary Course, Ability Enhancement Compulsory Course, Skill Enhancement Course, Skill Enhancement Course, Value Added Course, Internship/Research Project by the BoS concerned.

6.4. The concerned BOS shall specify the desired Program Objectives, Program Educational Objectives, Program Specific Outcomes and Course Outcomes while preparing the curriculum of a particular program.

6.5. Only such full-time candidates who register for a minimum prescribed number of credits in eachsemester from I semester to VIII semester and complete successfully 176 credits in 8 successive semesters shall be considered for declaration of Ranks, Medals, Prizes and are eligible to applyfor Student Fellowship, Scholarship, Free ships, and such other rewards /advantages which could be applicable for all full-time students.

7. Add-on Proficiency Certification/Diploma:

7.1. Add-on Proficiency Certification:

To acquire Add on Proficiency Certification a candidate can opt to complete a minimum of 2 extra credits either in the same discipline /subject or in different discipline /subject in excess to 176 credits for the Four-Year Graduate degree programs.

7.2. Add on Proficiency Diploma:

To acquire Add on Proficiency Diploma, a candidate can opt to complete a minimum of 2 extra credits either in the same discipline /subject or in different discipline / subject in excess to 176 credits for the Four-Year Graduate degree programs.

Component	Description	Conduction	Weight Percentage
C1	Test-1: IA1	6th week from the starting date of semester	15
	Test-2: IA2	12th week from the starting date of semester	15
C2	1 Assignment & Seminar 1	7th week	10
	2 Assignment & Seminar 2	13th week	10

C3	**SEE including practical & ClinicalPostings Report**	**Between 17th Week - 20th Week**	**50**
Results to be Announced			**By the end of 21st Week**

The Add on Proficiency Certification /Diploma so issued to the candidate contains the coursesstudied and grades earned.

8. Assessment and Evaluation

a) Each course is assessed for a total weight of 100%. Out of the total 100% weight; 50% weight isfor Continuous Internal Assessment (CIA or IA) and the remaining 50% for the Semester End Examination (SEE). This is applicable for theory, laboratory and any such courses.

b) Out of 50% weight earmarked for Internal Assessment (IA)-15% for test-1, 15% for test-2 and 20% for Assignment & Seminar and this is applicable for theory-based courses.

c) The tests and assignments are conducted as per the semester academic calendar provided by the University.

The details as given in the table.

Note: IA or CIA includes C1 and C2

Each test must be conducted for duration of 60 minutes, setting the test question paper for a maximum of 30 marks. The final examination must be conducted for duration of 3 hours and the question paper must be set for a maximum of 100 marks.

d) Students are required to complete courses like technical skills, placement related courses, Open electives and any such value addition or specialized courses through online platforms like SWAYAM/MOOC/Any other reputed online education aggregator. Students are required to choose the courses on the advice of their course coordinator /Director and required to submit the course completion certificate along with percentage of marks/grade scored in the assessment conducted by the online education aggregator. If the online education aggregator has issued a certificate along with the grade or marks scored to students, such courses will be considered for SGPA calculations, in case the aggregator has issued only a certificate and not marks scored, then such courses will be graded through an examination by concerned School, in case, if grading is not possible, students will be given a pass grade and award the credit and the credits will not be considered for SGPA calculations. The Online/ MOOCs courses will not have continuous internal

assessment component. Such of those students who would like to discontinue with the open elective course that they have already registered for earning required credits can do so, however, they need to complete the required credits by choosing an alternative open elective course.

Setting question paper and evaluation of answer scripts.

i. For SEE, three sets of question papers shall be set for each theory course out of which two sets will be by the internal examiners and one set will be by an external examiner.In subsequent years by carrying forward the unused question papers, an overall three sets of question papers should be managed and depending on the consumption ofquestion papers either internal or external examiner be called for setting the question paper to maintain an overall tally of 3 papers with the conditions mentioned earlier. The internal examiner who sets the question paper should have been course tutor.

ii. The Chairman of BoE shall get the question papers set by internal and external examiners.

iii. The Board of Examiners shall scrutinize and approve the question papers and scheme of valuation. It is the responsibility of the BoE to see that all questions contained in the question paper are within the prescribed syllabus of the concerned course.

iv. There shall be single valuation for all theory papers by internal examiners. However, there shall be moderation by the external examiner who has the subject background. In case no external examiner with subject background is available, a senior faculty member within the discipline shall be appointed as moderator.

v. The SEE examination for Practical work / Field work / Project work/Internship will be conducted jointly by internal and external examiners as detailed below: However,the BoE on its discretion can also permit two internal examiners.

vi. If a course is fully of (L=0):T:(P=0) type or course is partly P type i.e, (L=3):(T=0) (P=1), then the examination for SEE component will be as decided by the BoS concerned.

9. Evaluation of Practical's and Minor Project / Major Project / Dissertation

9.1. A practical examination shall be assessed on the basis of:

a) Knowledge of relevant processes.

b) Skills and operations involved.

c) Results/ products including calculation and reporting.

9.2. In case a course is fully of P type (L=0:T=0:P=4),the performance of a candidate shall be assessed for a maximum of 100 marks as explained below:

- Continuous Internal assessment (CIA) = 50 marks
- Semester end practical examination (SEE)=50 marks

The 50 marks for continuous assessment shall further be allocated as under (IA or CIA):

	Conduction of regular practical throughout the semester	20 marks
	Maintenance of lab records/ industry reports	15 marks
	Laboratory test and viva	15 marks
	Total	50 marks

The 50 marks meant for Semester End Examination, shall be allocated as under:

	Conduction of semester end practical examination	30 marks
	Write up about the experiment /practical conducted	10 marks
	Viva Voice	10 marks
	Total	50 Marks

9.3. The SEE for Practical work will be conducted jointly by internal and external examiners. However, if external examiner does not turn up, then both the examiners will be internal examiners.

9.4. In case a course is partly P type i.e., (L=3): (T=0) (P=1), then the examination for SEE component will be as decided by the BoS concerned.

9.5. The duration for semester- end practical examination shall be decided by the concernedSchool/Board.

9.6. Evaluation of Internship:

Right from the initial stage of defining the problem, the candidate has to submit the progress reportsperiodically 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 to the project/dissertation, as the case maybe, for final evaluation. The components of evaluation are as follows:

Clinical Observational Postings	Should be done at the commencement of 3rd semester, continued till end of 4th semester	Weightage: 0%
Internship	7th week of 5th semester, continued till end of 6th semester	Weightage: 25%
Internship	14th week from the start date of project semester, till end of 8th semester	Weightage: 25%
Project work	7th and 8th semester	Weightage: 25% for Dissertation
Internship	After successful completionof all 8 semesters	Weightage: 25%

10. Provision for Appeal

If a candidate is not satisfied with the evaluation of C1, C2 components, he/she can approach the grievance cell with the written submission together with all facts, the assignments, 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 tolevy 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.

For every program there will be one grievance cell. The composition of the grievance cell is as follows:

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

11. Eligibility to Appear Semester End Examination (SEE)

11.1. 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 course(s), as provided in the succeeding sections, shall be eligible

to appear for SEE examination.

11.2. Requirements to Pass a Course

Students are required to score a total minimum of 40% (Continuous Internal assessment and SEE) in each course offered by the University/ Department for a pass (other than online courses) with a minimum of 25% (12) marks in final examination.

12. Requirements to Pass the Semester

To pass the semester, a candidate has to secure minimum of 40% marks in each subject / course of the study prescribed in that semester.

12.1. Provision to Carry Forward the Failed Subjects / Courses:

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

12.2. Provision to Withdraw Course:

A candidate can withdraw any course within ten days from the date of notification of final results. Whenever a candidate withdraws a course, he/she has to register for the same course in case it is hard core course, the same course or an alternate course if it is Soft Core Course or Open Elective Course.

A DROPPED course is automatically considered as a course withdrawn.

12.3. Re-Registration and Re-Admission:

a) In case a candidate's class attendance in aggregate of all courses in a semester is less than75%or as stipulated by the University, such a candidate is considered as dropped the semester and is not allowed to appear for end semester examination (C3) 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.

13. Attendance Requirement:

13.1 All students must attend every lecture, tutorial and practical classes, clinical postings.

13.2 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 othersuch contingencies like medical emergencies, the attendance requirement shall be minimum of75% of the classes taught.

a) Any student with less than 75% of attendance in aggregate of all the courses including practicalcourses / field visits etc, during a semester shall not be permitted to appear to the end semester (C4) examination and such student shall seek re-admission as provided.

b) Teachers offering the courses will place the above details in the School Board meeting during the last week of the semester, before the commencement of C3, and subsequently a notification pertaining to the above will be brought out by the Director of the School before the commencement of C3 examination. A copy of this notification shall also be sent to the office of the Registrar & Registrar (Evaluation).

14. Absence during Mid Semester Examination:

In case a student has been absent from a mid-semester (C1, C2) examination 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 Head of the School, for make-up examination. The Head 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 test for such candidate(s) well in advance before the C3 examination of that respective semester. Under no circumstances C1, C2 test shall be held after C3 examination.

15. Grade Card and Grade Point

15.1. Provisional Grade Card: The tentative/provisional grade card will be issued by the Registrar (Evaluation) at the end of every semester indicating the courses completed successfully. The provisional grade card provides **Semester Grade Point Average** (SGPA).

15.2. Final Grade Card: Upon successful completion of B.Sc., Degree a Final Grade card consisting of grades of all courses successfully completed by the candidate will be issued by the Registrar (Evaluation).

15.3. 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	Grade Point (GP = V x G)	Letter Grade
90>100	v*10	O
80>90	v*9	A+
70>80	v*8	A
60>70	v*7	B+
55>60	v*6	B
50>55	V*5.5	C+
40>50	v*5	P
0-40	v*0	F

O-Outstanding; A-Excellent; B-Very Good; C-Good; D-Fair; E-Satisfactory; F-Fail

Here, P is the percentage of marks (P=[C1+C2+C3]) 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.

15.3.1. Computation of SGPA and CGPA

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 coursesundergone by a student in a given semester, i.e.:

SGPA(Si)=∑(CixGi)/∑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.

Cumulative Grade Point Average (CGPA):

Overall Cumulative Grade Point Average (CGPA) of a candidate after successful completion of the required number of credits (96) for Two year Post Graduate degree program is calculated taking intoaccount all the courses undergone by a student overall the semesters of a program i.e.,

CGPA=∑(CixSi)/ ∑Ci

Where Si is the SGPA of the i^{th} semester and Ci is the total number of credits in that semester.The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

CONVERSION OF GRADES INTO PERCENTAGE:

Conversion formula for the conversion of CGPA into Percentage is:

Percentage of marks scored =CGPA Earned x10

Illustration: CGPA Earned 8.10x10=81.0

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>=CGPA10	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
>5CGPA <5.5	5.5	C	Average	
>4 CGPA <5	5	P	Pass	Satisfactory
Overall percentage=10*CGPA				

15. Challenge Valuation

a) A student who desires to apply for challenge valuation shall obtain a photocopy of the answer script 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 Registrar (Evaluation) within 10 days after the announcement of the results. This challenge valuation is only for SEE.

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

c) With regard to any specific case of ambiguity and unsolved problem, the decision of the Vice-Chancellor shall be final.

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
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
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
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	15	15	10	10	50	100
2.	**B23AHK101**	Language II: Kannada – I	AECC	3	15	15	10	10	50	100
3.	**B23AHH101**	Language II: Hindi – I	AECC	3	15	15	10	10	50	100
4.	**B23AHA101**	Additional English-I: English – I	AECC	3	15	15	10	10	50	100
5.	**B23HF0101**	Human Anatomy- I	DSC	3	15	15	10	10	50	100
6.	**B23HF0102**	Human Physiology – I	DSC	3	15	15	10	10	50	100
7.	**B23HF0103**	Biochemistry	DSC	3	15	15	10	10	50	100
8.	**B23HF0104**	Motor Control & Development	DSEC	4	15	15	10	10	50	100
	Practical									
9.	**B23HF0105**	Human Anatomy- I	DSC	1	10	-	-	5	10	25
10.	**B23HF0106**	Human Physiology – I	DSC	1	10	-	-	5	10	25
11.	**B23HF0107**	Biochemistry	DSC	1	10	-	-	5	10	25
12.	**B23HF0108**	Yoga	VAC	1	10	-	-	5	10	25
Total				**23**						

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	15	15	10	10	50	100
2.	**B23AHK201**	Language II: Kannada – II	AECC	3	15	15	10	10	50	100
3.	**B23AHH201**	Language II: Hindi – II	AECC	3	15	15	10	10	50	100
4.	**B23AHA201**	Additional English-I: English – II	AECC	3	15	15	10	10	50	100
5.	**B23HF0201**	Human Anatomy-II	DSC	3	15	15	10	10	50	100
6.	**B23HF0202**	Human Physiology-II	DSC	3	15	15	10	10	50	100
7.	**B23HF0203**	Fundamentals of Sports & Exercise Science	DSC	3	15	15	10	10	50	100
8.	**B23HF0204**	First Aid & CPR	DSEC	3	15	15	10	10	50	100
9.	**B23HF0205**	Computer Skills & Applications	SEC	2	10	10	-	5	25	50
10.		Tree plantation in tropical region: Benefits and strategic planning	VAC	1	10	-	-	5	10	25
	Practical									
11.	**B23HF0206**	Human Anatomy-II	DSC	1	10	-	-	5	10	25
12.	**B23HF0207**	Human Physiology-II	DSC	1	10	-	-	5	10	25
13.	**B23HF0208**	Fundamentals of Sports & Exercise Science	DSC	1	10	-	-	5	10	25
14.	**B23HF0209**	First Aid & CPR	DSEC	1	10	-	-	5	10	25
Total				**25**						

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	15	15	10	10	50	100
2.	**B23AHH301**	Language II: Hindi – III	AECC	3	15	15	10	10	50	100
3.	**B23AHA301**	Additional English-I: English – III	AECC	3	15	15	10	10	50	100
4.		Constitution of India	SEC	2	10	10	-	5	25	50
5.		Soft skills Training	SEC	2	10	10	-	5	25	50
6.	**B23HF0301**	Fundamentals of Sports Biomechanics	DSC	3	15	15	10	10	50	100
7.	**B23HF0302**	Sports Psychology	DSC	3	15	15	10	10	50	100
8.	**B23HF0303**	Fundamentals of Sports Coaching	DSC	3	15	15	10	10	50	100
9.	**B23HF0304**	Basics of Sports Journalism	MDC	3	15	15	10	10	50	100
10.	**B23HF0305**	Racket Sports	VAC	1	10	-	-	5	10	25
	Practical									
11.	**B23HF0306**	Fundamentals of Sports Biomechanics	DSC	1	10	-	-	5	10	25
12.	**B23HF0307**	Sports Psychology	DSC	1	10	-	-	5	10	25
13.	**B23HF0308**	Fundamentals of Sports Coaching	DSC	1	10	-	-	5	10	25
14.	**B23HF0309**	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	4	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.		Environmental Science & Health	MDC	3	15	15	10	10	50	100
6.	**B23HF0405**	Combat & Indigenous Sports	VAC	1						25
	Practical									
7.	**B23HF0406**	Fundamentals of Exercise Physiology	DSC	1	10	-	-	5	10	25
8.	**B23HF0408**	Combat & Indigenous Sports	VAC	1	10	-	-	5	10	25
9.	**B23HF0409**	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**	Athletic Sports	VAC	1	10	-	-	5	10	25
	Practical									
6.	**B23HF0506**	Fundamentals of Strength and Conditioning	DSC	1	10	-	-	5	10	25
7.	**B23HF0507**	Sports Nutrition	DSC	1	10	-	-	5	10	25
8.	**B23HF0508**	Sports Anthropometry	DSC	1	10	-	-	5	10	25
9.	**B23HF0509**	Internship-II	Int	4	-	-	-	-	-	100
10.	**B23HF0510**	Athletic 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**	Swayam/MOOC	SEC	2	10	10	-	5	25	50
	Practical									
6.	**B23HF0606**	Fundamentals of Performance Analysis & Management	DSC	1	10	-	-	5	10	25
7.	**B23HF0607**	Athletic Injuries & Management	DSEC	1	10	-	-	5	10	25
8.	**B23HF0608**	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**	Advanced Sports Biomechanics & Kinesiology	DSC	1	10	-	-	5	10	25
7.	**B23HF0707**	Advanced Strength & Conditioning	DSC	1	10	-	-	5	10	25
8.	**B23HF0708**	Advanced Exercise Physiology	DSC	1	10	-	-	5	10	25
9.	**B23HF0709**	Sports Technology	DSEC	1	10	-	-	5	10	25
10.	**B23HF0710**	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**	Advanced scientific Applications in Team Sports	DSC	1	10	-	-	5	10	25
6.	**B23HF0806**	Advanced Scientific Applications in Athletics Events (Track & Field)	DSC	1	10	-	-	5	10	25
7.	**B23HF0807**	Advanced Scientific Applications in Combat and Indigenous sports	DSC	1	10	-	-	5	10	25
8.	**B23HF0808**	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.	**B23HF0805**	*Advanced scientific Applications in Team Sports	DSC	1	10	-	-	5	10	25
5.	**B23HF0806**	*Advanced Scientific Applications in Athletics Events (Track & Field)	DSC	1	10	-	-	5	10	25
6.	**B23HF0807**	*Advanced Scientific Applications in Combat and Indigenous sports	DSC	1	10	-	-	5	10	25
7.	**B23HF0810**	Research Project	RP	12	-	-	-	-	-	100
		Total		**20**						

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

Scheme of Instruction
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
	Practical							

9.	**B23HF0105**	Human Anatomy- I	DSC	-	-	1	1	2
10.	**B23HF0106**	Human Physiology – I	DSC	-	-	1	1	2
11.	**B23HF0107**	Biochemistry	DSC	-	-	1	1	2
12.	**B23HF0108**	Yoga	VAC	-	-	1	1	2
Total							**23**	**27**

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
10.		Tree plantation in tropical region: Benefits and strategic planning	VAC	1	-	-	1	1
	Practical							
11.	**B23HF0206**	Human Anatomy-II	DSC	-	-	1	1	2
12.	**B23HF0207**	Human Physiology-II	DSC	-	-	1	1	2
13.	**B23HF0208**	Fundamentals of Sports & Exercise Science	DSC	-	-	1	1	2
14.	**B23HF0209**	First Aid & CPR	DSEC	-	-	1	1	2
	Total						**25**	**29**

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
4.		Constitution of India	SEC	2	-	-	2	2
5.		Soft skills Training	SEC	2	-	-	2	2
6.	**B23HF0301**	Fundamentals of Sports Biomechanics	DSC	3	-	-	3	3
7.	**B23HF0302**	Sports Psychology	DSC	3	-	-	3	3
8.	**B23HF0303**	Fundamentals of Sports Coaching	DSC	3	-	-	3	3
9.	**B23HF0304**	Basics of Sports Journalism	MDC	3	-	-	3	3
10.	**B23HF0305**	Racket Sports	VAC	1	-	-	1	1
	Practical							
11.	**B23HF0306**	Fundamentals of Sports Biomechanics	DSC	-	-	1	1	2
12.	**B23HF0307**	Sports Psychology	DSC	-	-	1	1	2
13.	**B23HF0308**	Fundamentals of Sports Coaching	DSC	-	-	1	1	2
14.	**B23HF0309**	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	4	-	-	4	4
2.	**B23HF0402**	Fundamentals of Exercise Physiology	DSC	3	-	-	3	3
3.	**B23HF0403**	Health, Fitness and Wellness	DSEC	4	-	-	4	4
4.	**B23HF0404**	Basics of Photo & Video Analysis	MDC	3	-	-	3	3
5.		Environmental Science & Health	MDC	3	-	-	3	3
6.	**B23HF0405**	Combat & Indigenous Sports	VAC	1	-	-	1	1
	Practical							
7.	**B23HF0406**	Fundamentals of Exercise Physiology	DSC	-	-	1	1	2
8.	**B23HF0408**	Combat & Indigenous Sports	VAC	-	-	1	1	2
9.	**B23HF0409**	Internship-I	Int	-	-	2	2	4
		Total					**22**	**26**

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

4.	**B23HF0504**	Basics of Sports Law & Ethics	MDC	3	-	-	3	3
5.	**B23HF0505**	Athletic Sports	VAC	1	-	-	1	1
	Practical							
6.	**B23HF0506**	Fundamentals of Strength and Conditioning	DSC	-	-	1	1	2
7.	**B23HF0507**	Sports Nutrition	DSC	-	-	1	1	2
8.	**B23HF0508**	Sports Anthropometry	DSC	-	-	1	1	2
9.	**B23HF0509**	Internship-II	Int	-	-	4	4	8
10.	**B23HF0510**	Athletic Sports	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
4.	**B23HF0604**	Research Methodology & Fundamentals of Statistics	MDC	3	-	-	3	3
5.	**B23HF0605**	Swayam/MOOC	SEC	2	-	-	2	2
	Practical							
6.	**B23HF0606**	Fundamentals of Performance Analysis & Management	DSC	-	-	1	1	2
7.	**B23HF0607**	Athletic Injuries & Management	DSEC	-	-	1	1	2
8.	**B23HF0608**	Internship-III	Int	-	-	4	4	8
		Total					**21**	**27**

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**	Advanced Sports Biomechanics & Kinesiology	DSC	-	-	1	1	2
7.	**B23HF0707**	Advanced Strength & Conditioning	DSC	-	-	1	1	2
8.	**B23HF0708**	Advanced Exercise Physiology	DSC	-	-	1	1	2
9.	**B23HF0709**	Sports Technology	DSEC	-	-	1	1	2
10.	**B23HF0710**	Ergogenic Aids for Exercise Performance	DSEC	-	-	1	1	2
		Total					**20**	**25**

EIGHTH SEMESTER (B.Sc 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**	Advanced scientific Applications in Team Sports	DSC	1	-	-	1	2
6.	**B23HF0806**	Advanced Scientific Applications in Athletics Events (Track & Field)	DSC	1	-	-	1	2
7.	**B23HF0807**	Advanced Scientific Applications in Combat and Indigenous sports	DSC	1	-	-	1	2
8.	**B23HF0808**	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.	**B23HF0805**	*Advanced scientific Applications in Team Sports	DSC	1	-	-	1	2

5.	**B23HF0806**	*Advanced Scientific Applications in Athletics Events (Track & Field)	DSC	1	-	-	1	2
6.	**B23HF0807**	*Advanced Scientific Applications in Combat and Indigenous sports	DSC	1	-	-	1	2
7.	**B23HF0810**	Research Project	RP	-	-	12	12	24
		Total					**20**	**34**

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

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.

Human Anatomy-I Practical

Course code	Human Anatomy-I Practical	Course Type	L	T	P	C	CH
B23HF0105		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
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

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.

Human Physiology – I Practical

Course code	Human Physiology – I Practical	Course Type	L	T	P	C	CH
B23HF0106		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/	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PSO	PSO	PSO	PSO

	COs	1	2	3	4	5	6	7	8	9	10	1	2	3	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 Laboratory Techniques:

Familiarization with laboratory safety protocols and equipment.

Introduction to basic laboratory techniques and measurements.

Nervous System:

Neurophysiological experiments: nerve conduction velocity, reflexes.

Electromyography (EMG): measurement and analysis of muscle activity.

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:

Basal metabolic rate measurement.

Analysis of energy expenditure during exercise.

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.

Biochemistry Practical

Course code		Course Type	L	T	P	C	CH
B23HF0107	**Biochemistry Practical**	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
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 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.

Yoga

Course code		Course Type	L	T	P	C	CH
B23HF0108	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
B23HF0108	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.

Human Anatomy-II (Practical)

Course code	Human Anatomy-II (Practical)	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.

Human Physiology-II (Practical)

Course code	Human Physiology – II (Practical)	**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.

First Aid & CPR (practical)

Course code	First Aid & CPR (Practical)	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 &**	**Course Type**	**L**	**T**	**P**	**C**	**CH**

B23HF0203	**Exercise Science**	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.

Fundamentals of Sports & Exercise Science (Practical)

Course code	Fundamentals of Sports & Exercise Science (Practical)	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.

TREE PLANTATION IN TROPICAL REGION: BENEFITS AND STRATEGIC PLANNING

Course code	Tree plantation in tropical region: Benefits and strategic planning	Course Type	L	T	P	C	CH
		VAC	1	-	-	1	1

Course Description

This course introduces significance of trees that provide us with a great many ecosystem services, including air quality improvement, energy conservation, stormwater interception, and atmospheric carbon dioxide reduction. These benefits must be weighed against the costs of maintaining trees, including planting, pruning, irrigation, administration, pest control, liability, cleanup, and removal.

Students are expected to involve in planting a tree and nurturing till the completion of their degree program. Successful maintenance of tree is considered to be one of the eligibility criterions for the award of university degree.

Course Goals:

After the completion of the course, the student will be able to:

- Interpret the possible key benefits of trees arresting climate change and global warming.
- Develop the ability to identify the type of a tree to be planted in urban areas, agricultural fields and forestry areas
- Make use of reading different literature on climate change and global warming by adopting various reading strategies (Reading Skills)
- Take part in planting a tree and nurturing it.

Course Code		Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2	PS O3	PSO 4
	CO1	3	3	3	3	2	3	2	2	1	2	3	2	2	1	1
	CO2	3	2	3	2	2	3	3	3	2	3	2	3	2	2	1
	CO3	3	3	3	3	2	3	2	2	1	2	3	2	3	1	1
	CO4	2	2	3	2	2	3	3	3	2	3	2	3	2	2	1

Course Content:

Unit 1: Introduction: The tropical region, Benefits and costs of urban and community forests

Unit 2: General Guidelines for Selecting and Placing Trees Guidelines for Energy Savings, Guidelines for Reducing Carbon Dioxide, Guidelines for Reducing Stormwater Runoff, Guidelines for Improving Air Quality Benefits, Guidelines for Avoiding Conflicts with Infrastructure, Guidelines for Maximizing Long-Term Benefits, Trees for Hurricane-Prone Areas

Activity based learning.

Every student has to thoroughly understand the significance of planting a tree, identify type of tree and place to be planted, plant a tree and nurture till the completion of the degree.

Reference Books:

- Kelaine E. Vargas, E. Gregory McPherson, James R. Simpson, Paula J. Peper, Shelley L. Gardner, and Qingfu Xiao, “Tropical community tree guide: Benefits, Costs and Strategic Planting”, U.S.

Department of Agriculture, Forest Service Pacific Southwest Research Station Albany, California, 2008

- Peter Wohlleben, The Heartbeat of Trees, Penguin Books, 2021
- Daniel Chamovitz, "What a Plant Knows: A Field Guide to the Senses", 2020

SEMESTER THREE

FUNDAMENTALS OF SPORTS BIOMECHANICS

Course code	Fundamentals of Sports Biomechanics	Course Type	L	T	P	C	CH
B23HF0301		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
B23HF03 01	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.

FUNDAMENTALS OF SPORTS BIOMECHANICS (Practical)

Course code	Fundamentals of Sports Biomechanics (Practical)	**Course Type**	**L**	**T**	**P**	**C**	**CH**
B23HF0306		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
B23HF0306	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**
B23HF0302		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
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

Course Content:

Unit I: Introduction to Sports Psychology, Personality and Individual Differences

Overview of sports psychology as a discipline.

Historical perspectives and key theories in sports psychology.

Ethical considerations in sports psychology practice.

The role of personality traits in sports performance.

Psychological factors related to individual differences among athletes.

Unit II: Motivation and Goal Setting

Theories of motivation and their application in sports.

Goal setting principles and strategies.

Arousal, Anxiety, and Stress Management

Understanding arousal, anxiety, and stress in sports performance.

Strategies for arousal regulation and stress management.

Unit III: Imagery and Mental Skills Training

The use of imagery and visualization in sports performance.

Mental skills training: focus, concentration, and self-talk.

Confidence and Self-Efficacy

Enhancing athletes' self-confidence and self-efficacy.

Cognitive strategies for building and maintaining confidence.

Unit IV: 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 and rehabilitation.

Psychological interventions for enhancing athletes' recovery.

Performance Enhancement and Mental Toughness

Strategies for enhancing overall performance and mental toughness.

Mental preparation for competitions and peak performance.

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.

SPORTS PSYCHOLOGY (Practical)

Course code	Sports Psychology (Practical)	**Course Type**	**L**	**T**	**P**	**C**	**CH**
B23HF0307		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
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

Course Content:

Psychological Assessment Tools:

Introduction to various psychological assessment tools used in sports psychology.

Practical training in administering and interpreting psychological assessments.

Case studies and discussions based on assessment results.

Motivation Enhancement Techniques:

Practical application of motivational strategies, such as goal setting and reinforcement.

Designing and implementing motivational programs for athletes.

Role-playing exercises to enhance motivation in different scenarios.

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.

Developing individualized stress management plans for athletes.

Mental Skills Training:

Practical training in mental skills such as visualization, self-talk, and concentration.

Guided imagery sessions to enhance performance and confidence.

Designing and implementing mental skills training programs for athletes.

Team Dynamics and Communication Skills:

Team-building activities and exercises to improve group cohesion.

Role-playing scenarios to enhance communication and conflict resolution skills within a team.

Facilitating discussions on team dynamics and leadership styles.

Psychological Injury Rehabilitation Support:

interventions to support athletes during injury rehabilitation.

Developing strategies for maintaining motivation and resilience during the recovery process.

Case studies and role-playing exercises for providing psychological support to injured athletes.

Performance Enhancement Techniques:

Developing pre-performance routines and rituals for athletes.

Mental preparation strategies for competition and peak performance.

Practical application of techniques to enhance mental toughness and focus.

Self-Reflection and Personal Development:

Self-awareness exercises for students to explore their own strengths and limitations.

Reflective journaling on personal experiences and insights gained during the course.

Facilitated discussions on personal development as sports psychology practitioners.

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**
B23HF0303		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
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 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.

Fundamentals of Sports Coaching (Practical)

Course code	Fundamentals of Sports Coaching (Practical)	**Course Type**	**L**	**T**	**P**	**C**	**CH**
B23HF0308		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**
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:

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**
B23HF0304		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
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

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
		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
		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**
	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**
B23HF0305		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
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

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.

Racket Sports (Practical)

Course code	Racket Sports (Practical)	Course Type	L	T	P	C	CH
B23HF0309		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
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

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	4	-	-	4	4

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.

Fundamentals of Exercise Physiology

Course code	Fundamentals of Exercise Physiology	**Course Type**	**L**	**T**	**P**	**C**	**CH**
B23HF0402		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.

Fundamentals of Exercise Physiology (Practical)

Course code	Fundamentals of Exercise Physiology (Practical)	**Course Type**	**L**	**T**	**P**	**C**	**CH**
B23HF0406		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
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

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**
		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
	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
B23HF0405		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
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

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.

Combat & Indigenous Sports (Practical)

Course code	Combat & Indigenous Sports (Practical)	**Course Type**	**L**	**T**	**P**	**C**	**CH**
B23HF0408		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
B23HF0408	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
B23HF0409		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/	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO	PSO2	PSO	PSO

	COs											1		3	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

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.

Fundamentals of Strength & Conditioning (practical)

Course code	Fundamentals of Strength & Conditioning (practical)	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.

Sports Nutrition

Course code	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.

Sports Anthropometry (Practical)

Course code	**Sports Anthropometry (practical)**	**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	**Course Type**	**L**	**T**	**P**	**C**	**CH**

B23HF0504	Law & Ethics	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.

Athletic Sports

Course code	Athletic Sports	Course Type	L	T	P	C	CH
B23HF0505		VAC	1	-	-	1	1

Course Description:

This course introduces students to the world of athletic sports, 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 athletic sports.

Course Objectives:

- To provide students with a solid foundation in the fundamental principles of athletic sports 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 athletic sports, 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 Athletic Sports

Definition and significance of athletic sports

Historical evolution of athletic sports

Various categories and events in athletic sports

Basic rules and regulations of athletic competitions

Unit II: Fundamentals of Athletic 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 athletics

Role of nutrition and hydration in optimizing athletic performance

Unit III: Techniques and Skills in Athletic 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.

Athletic Sports (Practical)

Course code	Athletic Sports (Practical)	**Course Type**	**L**	**T**	**P**	**C**	**CH**
B23HF0510		VAC	-	-	1	1	2

Course Description:

This course introduces students to the fundamentals of athletic sports, 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 athletic sports.
- Cultivate physical fitness, agility, coordination, and teamwork necessary for successful participation in various athletic 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 Athletic Sports

Introduction to the course, objectives, and expectations.

Historical overview of athletic sports and their significance.

Basic terminology in athletic sports.

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.

Fundamentals of Performance Analysis & Management (Practical)

Course code	Fundamentals of Performance Analysis & Management (Practical)	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.

Athletic Injuries & Management (Practical)

Course code	Athletic Injuries & Management (Practical)	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 &	**Course Type**	**L**	**T**	**P**	**C**	**CH**

B23HF0604	Fundamentals of Statistics	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.

Swayam/MOOC

Course code	Swayam/MOOC	Course Type	L	T	P	C	CH
B23HF0605		SEC	2	-	-	2	2

Course Description:

This course introduces B.Sc Sports & Exercise Science students in India to the Swayam/MOOC platform, focusing on its digital learning tools, resources, and interactive features to enhance their understanding of sports science and exercise principles.

Pedagogy:

Through a blend of online lectures, interactive modules, peer discussions, and self-assessment quizzes, students will engage with cutting-edge content, collaborate with peers, and develop critical thinking skills in the field of sports and exercise science.

Course Objectives:

- Familiarize students with the Swayam/MOOC platform, enabling them to navigate and utilize digital resources effectively for their academic growth.
- Cultivate independent learning skills, digital literacy, and the ability to critically evaluate sports science content available online.

Course Outcome:

Upon completing the "Swayam/MOOC" course in B.Sc Sports & Exercise Science, students will:

1. Demonstrate proficient navigation of the Swayam/MOOC platform, effectively accessing a wide array of sports science resources and courses.
2. Develop enhanced digital literacy skills, enabling them to critically evaluate and utilize online content for academic and professional growth.
3. Apply their newfound knowledge to real-world scenarios, fostering evidence-based practices in sports science and exercise principles.
4. Exhibit independent learning capabilities and a proactive approach to continuous self-improvement, positioning themselves as competent and adaptable professionals in the field.

Course Code	Pos/ COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO 2	PSO 3	PSO 4
B23HF0605	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

References:

- https://www.mooc.org/
- https://swayam.gov.in/

Summer Internship-III

Course code	Summer Internship-III	Course Type	L	T	P	C	CH
B23HF0608		**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
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

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.

Advanced Sports Biomechanics & Kinesiology (Practical)

Course code	Advanced Sports Biomechanics &	Course Type	L	T	P	C	CH

B23HF0706	**Kinesiology (Practical)**	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.

Advanced Exercise Physiology (Practical)

Course code	Advanced Exercise Physiology (practical)	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		**Course Type**	**L**	**T**	**P**	**C**	**CH**

B23HF0703	Advanced Strength & Conditioning	**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.

Advanced Strength & Conditioning (Practical)

Course code	Advanced Strength & Conditioning (Practical)	**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.

Sports Technology (Practical)

Course code	Sports Technology (Practical)	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.

Ergogenic Aids for Exercise Performance (Practical)

Course code	Ergogenic Aids for Exercise Performance (Practical)	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.

Advanced scientific Applications in Team Sports (Practical)

Course code	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	Course Type	L	T	P	C	CH

B23HF0802	**Applications Athletics Events (Track & Field)**	**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.

Advanced scientific Applications Athletics Events (Track & Field) (Practical)

Course code	Advanced scientific Applications Athletics Events (Track & Field) (Practical)	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.

Advanced scientific Applications in Combat and Indigenous sports (Practical)

Course code	Advanced scientific Applications in Combat and Indigenous sports (Practical)	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.

Yoga in Sports and Fitness (Practical)

Course code	Yoga in Sports and Fitness (Practical)	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.

Faculty Members for Sports and Exercise Science

Sports & Exercise Science Faculty	Designation
Dr. Deepak CS	Director (Physical Education & Sports)
Dr. S. Srividhya	Associate Professor
Dr.Tilak Kumar B S	Associate Professor
Mr. Rudragouda Patil	Programme Head
Mr. Jismon Jose	Assistant Professor
Mr. Murukan	Assistant Physical Education Director
Miss. Varsha	Assistant Professor

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. High 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.