

Course Code	Course Name	Credits
26PE504	AI for Sports Technology	04

### Course Objectives

- Introduce the evolution of sports technology from traditional tools to smart and digital systems.
- Explain the role of IoT, smart equipment, and advanced materials in modern sports performance.
- Understand AI, big data analytics, and machine learning in sports decision-making and talent identification.
- Apply VR/AR-based immersive environments for skill development and training simulation.
- Analyze digital officiating systems and automated sports management tools.
- Evaluate the impact of emerging technologies on performance, training, and sports administration.

### Learning Outcomes

Upon successful completion of this course, it is intended that a student will be able to:

- Understand the evolution and scope of modern sports technology.
  - Apply knowledge of IoT-based devices and smart equipment in sports contexts.
  - Analyze performance data using AI and machine learning concepts.
  - Use VR/AR concepts for training and skill enhancement.
  - Evaluate digital officiating systems such as VAR, Hawk-Eye, and goal-line technology.
- Interpret the role of digital tools in sports management and organization

**Unit 1-The Evolution of Sports Tech:** History of Technology in Sports - From Stopwatch to Smart-sensors. The role of the "Internet of Things" (IoT) in connecting equipment. Overview of the Smart Stadium concept and automated fan experiences.

**Unit 2-Smart Equipment and Materials:** Meaning and functions of Smart Balls (with embedded chips), Smart Bats, and Sensor-based Footwear. Advances in high-performance materials (e.g., carbon fiber in cycling and specialized textiles in swimming).

**Unit 3-AI and Data Analytics:** Introduction to Big Data in Sports - How AI processes massive datasets for predictive coaching. Player Performance Profiling and Talent Identification using Machine Learning models.

**Unit 4-Immersive Training Environments:** Understanding Virtual Reality (VR) and Augmented Reality (AR) in sports. Using simulators for skill acquisition in high-risk or weather-dependent sports (e.g., Skiing, Cricket batting, or Formula 1).

**Unit 5-Digital Officiating and Management:** AI in Decision Making - Hawk-Eye, Goal-Line Technology, and VAR. The transition to Digital Sports Management: Automated scheduling, resource allocation, and cloud-based athletic records.

### Reference Books:

1. Baca, A. (2024) – *Computer Science in Sport: An Introduction*. Routledge.
2. Miah, A. (2017) – *Sport 2.0: Transformations in Control, Health, and Experience*. MIT Press.
3. Ransdell, L., et al. (2023) – *Technology in Physical Education: A Guide for Teachers and Coaches*.
4. Deshpande, S. H. (2014) – *Physical Education in Ancient India* (for historical context of equipment evolution).
5. Duch, J., et al. (2010) – *Quantifying the Performance of Individual Players in a Team Activity*.
6. Bhatia, K.K. & Narang, C.L. – *Philosophical & Sociological Bases of Education* (to discuss the ethics of tech in sports).