Course code: Course Title	Course Structure			Pre-Requisite
	L	T	P	
SE326: Artificial Intelligence for Sports Surfaces and Equipment	3	0	2	NIL

Course Objective: The course will focus on the application of Artificial intelligence in sports infrastructure, wearable technologies and equipment.

S. NO	Course Outcomes (CO)
CO1	Understand the role of artificial intelligence in sports surfaces, wearable technologies, and preventive equipment.
CO2	Illustrate sports surfaces with an emphasis on future innovations and maintenance solutions.
CO3	Analyze use of internal sensors to assess an athlete's physiological and psychological response.
CO4	Demonstrate usage of wearable technology such as GPS tracking, video processing, and sensors to improve the design, analysis, and performance in various sports.
CO5	Develop data-driven applications to track player movement, and analyze the impact of surfaces.

S. NO	Contents	Contact Hours
UNIT 1	**Introduction:** Applicability of artificial intelligence for sports surfaces, wearable technologies, preventive & protective equipment. Different types of wearable devices to improve training loads, performance and recovery. Types of sensors used within the wearable devices and methods to collate the data coming from sensors to provide insights, such as training intensity and physiologic "readiness", for optimum performance and external measures of "load" and "effort".	8
UNIT 2	**Sports Surfaces:** Future of Sports Surfaces. Different types of artificial sport pitch surfaces. Synthetic vs. Natural Surfaces. Factors to consider specific surface. Sustainability at the core. Multi-Sport Versatility.	8
UNIT 3	**Wearable Technology - 1:** Internal sensors to provide a glimpse of how individual athlete responds to the physiological and psychological stress induced by training and competition. Internal measures to evaluate individual's innate potential and methodic used on team training and recovery.	10
UNIT 4	**Wearable Technology - 2:** Wearable technology, including GPS tracking, sensors, and video processing, to enhance the design, analysis, and application of surfaces and equipment across various sports like athletics, swimming, racket sports (e.g., Badminton/Tennis etc.), and field games (e.g., hockey/football etc.), and combat sports (e.g., Wrestling/Boxing etc.).	10
UNIT 5	**Applications:** Track player's movement, monitoring impact of surfaces, analyzing strokes and training techniques, and assessing environmental conditions affecting sports performance.	6
	TOTAL	42

REFERENCES		
S.No.	Name of Books/Authors/Publishers	Year of Publication / Reprint

1	Sharon Dixon, Paul Fleming, Iain James, Matt Carre, "The Science and Engineering of Sport Surfaces", Routledge, 1st Edition.	**2016**
2	Daniel Memmert, Dominik Raabe, "Data Analytics in Football", Routledge, 1st Edition.	**2018**
3	International Olympics Committee official website (https://olympics.com/ioc/overview).	**2024**