Shri Vile Parle Kelavani Mandal's

Dwarkadas J. Sanghvi College of Engineering

(Autonomous College Affiliated to the University of Mumbai)

Scheme and detailed syllabus of DJ19

HonorsProgram in Immersive Technologies

Revision: 1 (2019)

With effect from the Academic Year: 2024-2025

Proposed Scheme for Final Year Undergraduate Program in Artificial Intelligence and Machine Learning: Semester VIII (Autonomous) Academic Year (2024-25)

Sr.	Course Code	Course	Teaching Scheme (hrs.)				Continuous Assessment (A) (marks)			Semester End Assessment (B) (marks)					(A+B)	Total Credits
			Th	P	T	Credits	Th	T/W	Total CA (A)	Th / Cb	O	P	O & P	Total SEA (B)		
Sem V																
1	DJ19AMLHN1C1	**Computer Graphics**	4	--	--	4	25	--	25	75	--	--	--	75	100	**4**
Sem VI																
2	DJ19AMLHN1C2	**Augmented Reality and Virtual Reality**	4	--	--	4	25	--	25	75	--	--	--	75	100	**4**
3	DJ19AMLHN1L1	**Augmented Reality and Virtual Reality Laboratory**	--	2	--	1	--	25	25	--	25	--	--	25	50	**1**
Sem VII																
4	DJ19AMLHN1C3	**Game Design and Gamification**	4	--	--	4	25	--	25	75	--	--	--	75	100	**4**
5	DJ19AMLHN1L2	**Game Design and Gamification Laboratory**	--	2	--	1	--	25	25	--	25	--	--	25	50	**1**
Sem VIII																
6	DJ19AMLHN1C4	**Metaverse**	4	--	--	4	25	--	25	75	--	--	--	75	100	**4**
		Total	**16**	**4**	**0**	**18**	**140**	**50**	**150**	**300**	**50**	**0**	**0**	**350**	**500**	**18**

Continuous Assessment (A):

Course	Assessment Tools	Marks	Time (hrs.)
Theory	One Term test (based on 40 % syllabus)	25 each	1
	Second Term test (next 40 % syllabus) / presentation / assignment / course project / group discussion / any other.		As applicable
Audit Course	Performance in the assignments / quiz / power point presentation / poster presentation / group project / any other tool.	- -	
Laboratory	Performance in the laboratory and documentation.	- -	
Tutorial	Performance in each tutorial & / assignment.	- -	
Laboratory & Tutorial	Performance in the laboratory and tutorial.	- -	

Course	Assessment Tools	Marks	Time (hrs.)
Theory / * Computer based	Written paper based on the entire syllabus.	75	3
	* Computer based assessment in the college premises.		
Oral	Questions based on the entire syllabus.	25	As applicable
Practical	Performance of the practical assigned during the examination and the output / results obtained.	--	2
Oral & Practical	Project based courses - Performance of the practical assigned during the examination and the output / results obtained. Based on the practical performed during the examination and on the entire syllabus.	--	2

Program: Artificial Intelligence & Machine Learning **B.Tech Semester: VIII**

Course: Metaverse (DJ19AMLHN1C4)

Pre-requisite: -- Virtual Reality, Augmented Reality and Mixed Reality.

Objectives: The course aims to provide details of the key technologies powering the Metaverse and its ecosystem, and addresses the various applications of the Metaverse across different industries.

Outcomes: On completion of the course, the learner will be able to:
1. Comprehend the key technologies fueling the Metaverse (VR, AR, blockchain, AI).
2. Categorize and discuss the various applications of the Metaverse across different industries.
3. Explore the legal frameworks governing the Metaverse and intellectual property rights.
4. Discover emerging technologies that may shape the future of the Metaverse.

Metaverse (DJ19AMLHN1C4)		
Unit	**Description**	**Duration**
1	**Metaverse Introduction**: Understanding the Metaverse, definitions, confusion and uncertainty, its components, and key characteristics, History and evolution, challenges in Metaverse, the next internet, Key technologies: such as VR, AR, Blockchain, and AI. Example of Metaverse platforms: Sandbox, Decentraland and Horizon World	**8**
2	Metaverse Ecosystem: Metaverse Pyramid, VR, AR, MR and XR,, The Importance of Interoperability, , Interoperability: Standard facility, Data Exchange, User Account Management. Networking: scalability, latency, security, Computing: processing, storage, distributed computing, Virtual World engines. Hardware: VR/AR Devices, Computing Devices, Governance and management of Metaverse ecosystems, Economic systems within the Metaverse, Privacy and Data protection.	**8**
3	**Blockchain in the Metaverse**: Introduction to blockchain, Decentralization, Security, Transparency, Immutability, Cryptography: Hash functions, public-private key pairs, digital signatures, Consensus mechanisms, Smart contracts, Distributed Ledger Technology (DLT): Architecture and components. Blockchain's Role in the Metaverse, Blockchain Platforms for the Metaverse, Challenges and Future Trends: scalability, energy consumption and regulations.	**10**
4	**NFTs in the Metaverse**: Introduction to NFTs, definitions, need for NFTs, working, why are NFTs valuable, tokenization, virtual land, digital collectables, in-game items, avatar customizations, benefits and challenges of NFTs in Metaverse. Legal Frameworks and Intellectual Property in the Meta verse: Introduction to legal frameworks governing virtual environments, Intellectual property rights, copyright, and patent laws applied to digital assets (e.g., NFTs).	**8**
5	**Legal, Ethical, and Social Implications of the Metaverse** Digital Identity and Privacy Challenges in Immersive Environments: Issues of digital identity verification in the Metaverse, User privacy, data ownership, and protection of personal information in virtual worlds. Ethical Dilemmas in Virtual Worlds: Ethical considerations surrounding virtual property rights and ownership, the impact of the Metaverse on user behaviour, including potential issues like addiction. Cyber security Threats and Data Protection in Virtual Worlds: Overview of cyber security issues in the Metaverse,	**8**

	Strategies for protecting against data breaches, digital asset theft, and cybercrime in immersive environments	
6	**Metaverse Applications:** Gaming Metaverse, Web3 Metaverse, Meta-Business, Transhumanism and Technology, Education and training, Healthcare and wellness, Investment Architecture, Arts, Entertainment and sports, other use cases. Metaverse Future and Trends: Emerging technologies: Exploring future technologies that may shape the Metaverse, such as haptics and brain-computer interfaces. Societal impact: Analysing the potential societal implications of the Metaverse. Industry trends: Keeping up with the latest trends and developments in the Metaverse.	**10**
	TOTAL	**52**

Books Recommended

Textbooks:

1. "Metaverse Fundamentals: Easy Hands-on Book on Understanding Metaverse, Buying Land, NFTs, Virtual Reality, Augmented Reality, Blockchain & Crypto Art", Notion Press, 2023.
2. "The Metaverse: And How It Will Revolutionize Everything ", Mathew Ball, Liveright Publishing Corporation, 2022.
3. "Interconnected Realities: How the Metaverse Will Transform Our Relationship with Technology Forever", Leslie Shannon, Wiley, 2023.
4. Q. Terry and S. Keeney, The Metaverse Handbook: Innovating for the Internet's Next Tectonic Shift. Hoboken, NJ, USA: Wiley, 2022.

Reference Books:

1. "The Business of Metaverse", Kireeti Kesavamurthy, Notion Press Media Pvt Ltd 2023.
2. "The Future of Humanity: Terraforming Mars, Interstellar Travel, Immortality, and Our Destiny Beyond Earth", Dr. Michio Kaku, Doubleday, 2018.
3. "Metaverse", John Stock, Writat Publications, 2022.
4. "Metaverse Investing: The Ultimate Guide", Noah Herrmann, Noah Herrmann Publication, 979-8215567913, 2023.

Online References:

1. https://www.coursera.org/learn/what-is-the-metaverse
2. https://www.udemy.com/course/metaverse-masterclass-learn-everything-about-the-metaverse
3. https://www.youtube.com/watch?v=WXkPDqdi2JQ&list=PLHEcKKWWhXy9Ihu_8ZvI28MeTrMRDYxQz (Metaverse)
4. https://www.youtube.com/watch?v=-U3ZmJ8qUSM (Blockchain, Art, Metaverse)
5. https://www.youtube.com/watch?v=t-VpFrqd0W0 (Business Case Study)