Proposed Scheme for Final Year Undergraduate Program in Artificial Intelligence and Machine Learning: Semester VII/VIII (Autonomous)
Academic Year(2026-27)

Sr. No.	Course Code	Course	Teaching Scheme			Continuous Assessment (A)						Semester End Examination (B)						Aggregate (A+B)	Credits
			Theory (hrs.)	Practical (hrs.)	Tutorial (hrs.)	Term Test 1(TT1) -a	Term Test 2(TT2) -b	Assg/CP/GD/Presentation/Quiz) - c	Total (a+b+c)	Term work	CA Total	Duration	Theory	Oral	Pract	Oral & Pract	SEE Total		
Sem III																			
1	DJS23ACH1301	Computer Graphics and Virtual Reality	4	--	--	15	15	10	40	--	40	2	60	--	--	--	60	100	4
Sem IV																			
2	DJS23ALH1401	C# Programming Laboratory	--	4	--	--	--	--	--	25	25	2	--	--	--	25	25	50	2
Sem V																			
3	DJS23ACH1501	Augmented Reality and Mixed Reality	3	--	--	15	15	10	40	--	40	2	60	--	--	--	60	100	3
4	DJS23ALH1501	Augmented Reality and Mixed Reality Laboratory	--	2	--	--	--	--	--	25	25	2	--	25	--	--	25	50	1
Sem VI																			
5	DJS23ACH1601	Game Design and Gamification	3	--	--	15	15	10	40	--	40	2	60	--	--	--	60	100	3
6	DJS23ALH1601	Game Design and Gamification Laboratory	--	2	--	--	--	--	--	25	25	2	--	25	--	--	25	50	1
Sem VIII																			
7	DJS23ACH1701	Metaverse	4	--	--	15	15	10	40	--	40	2	60	--	--	--	60	100	4
		Total	**14**	**8**	**--**	**60**	**60**	**40**	**160**	**75**	**235**	**14**	**240**	**50**	**--**	**25**	**315**	**550**	**18**

Prepared by: Name and Signatures (with date)	Head of Department	Vice-Principal	Principal
	Dr. Aruna Gawde	Dr. Narendra Shekokar	Dr. Hari Vasudevan
Checked By Name and Signatures (with date)			

Continuous Assessment (A):

Course	Assessment Tools	Marks	Time (mins)
Theory	a. Term Test 1 (based on 40 % syllabus)	15	45
	b. Term Test 2 (on next 40 % syllabus)	15	45
	c. Assignment / course project / group discussion /presentation / quiz/ any other.	10	--
	Total marks (a + b + c)	40	--
Audit course	Performance in the assignments / quiz / power point presentation / poster presentation/group project / any other tool.	--	As applicable
Laboratory	Performance in the laboratory and documentation.	25	
Tutorial	Performance in each tutorial & / assignment.	--	
Laboratory & Tutorial	Performance in the laboratory and tutorial.	--	

Continuous Assessment (B):

Course	Assessment Tools	Marks	Time (hrs.)
Theory / * Computer based	Written paper based on the entire syllabus.	60	02
	* Computer based assessment in the college premises.	--	
Oral	Questions based on the entire syllabus.	--	--
Practical	Performance of the practical assigned during the examination and the output / results obtained.	--	--
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.	25	As applicable

Program: Artificial Intelligence and Machine Learning	B.Tech.	Sem: VII/VIII
Course: Metaverse (DJS23ACH1701)		

Prerequisite: Computer Graphics, Virtual Reality and Augmented Reality.

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

Course Outcomes: On completion of the course, 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.

Detailed Syllabus: Metaverse (DJS23ACH1701)		
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	10
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.	10
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).	08

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, Strategies for protecting against data breaches, digital asset theft, and cybercrime in immersive environments	08
6	**Metaverse Applications:** Gaming Metaverse, Web3 Metaverse, Meta-Business, Transhumanism and Technology, Education and training, Healthcare and wellness, 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	56

Books

Textbooks:

1. "Metaverse Fundamentals: Easy Hands-on Book on Understanding Metaverse, Buying Land, NFTs, Virtual Reality, Augmented Reality, Blockchain & Crypto Art", Notion Press, 2023. [1,2,3]
2. "The Metaverse: And How It Will Revolutionize Everything ", Mathew Ball, Liveright Publishing Corporation, 2022. [1]
3. "Interconnected Realities: How the Metaverse Will Transform Our Relationship with Technology Forever", Leslie Shannon, Wiley, 2023. [2]
4. Q. Terry and S. Keeney, The Metaverse Handbook: Innovating for the Internet's Next Tectonic Shift. Hoboken, NJ, USA: Wiley, 2022. [5]

Reference Books:

1. "Metaverse For Beginners: The Ultimate complete guide on how to invest in the new digital Metaverse" [1]
2. "The Sandbox: A Beginner's Guide" by The Sandbox Foundation" [1]
3. "The Future of Humanity: Terraforming Mars, Interstellar Travel, Immortality, and Our Destiny Beyond Earth", Dr. Michio Kaku, Doubleday, 2018. [6]

***Online Resources*:**

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)