



Paper Code: ARO 374	L	T/P	Credits									
Subject: Metaverse	3	0	3									
Marking Scheme: Teachers Continuous Evaluation: As per university examination norms from time to time. End Term Theory Examination: As per university examination norms from time to time.												
INSTRUCTIONS TO PAPER SETTERS: Maximum Marks : As per University norms												
<ul style="list-style-type: none"> ➤ There should be 9 questions in the end term examination question paper ➤ Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. ➤ Apart from Question No. 1, the rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, students may be asked to attempt only 1 question from each unit. ➤ The questions are to be framed keeping in view the learning outcomes of course/paper. The standard/ level of the questions to be asked should be at the level of the prescribed textbooks. ➤ The requirement of (scientific) calculators/ log-tables/ data-tables may be specified if required 												
Course Outcomes [Bloom's Knowledge Level (KL)]:												
CO1: Ability of students to understand metaverse and AR/VR technologies [K1, K2]												
CO2: Ability of students to understand building blocks of the metaverse [K1, K2].												
CO3: Ability of students to learn how the metaverse will revolutionize everything [K1, K2, K4]												
CO4: Ability of students to apply and analyze various successful applications of metaverse through case study [K3, K4]												
CO/PO	PO01	PO02	PO03	PO04	PO05	PO06	PO07	PO08	PO09	PO10	PO11	PO12
CO1	3	2	1	1	3	-	-	-	1	2	1	3
CO2	3	2	3	3	3	-	-	-	2	2	2	3
CO3	3	2	1	3	3	-	-	-	2	2	2	3
CO4	3	3	3	3	3	-	-	-	3	2	2	3
Course Content											No of lectures	
Unit I Introduction- what is metaverse?, A brief history of the future, Confusion and uncertainty, A definition, The next internet, Applications of the Metaverse Advantages and Challenges of the Metaverse, Demo of the Metaverse. AR/VR: Demystifying eXtended Reality, Understanding eXtended Reality, Experience XR , XR Applications, XR for Social Good, Working with XR, Design Thinking with XR, Making a Mark, Designing for XR, Setting up XR, AR/VR and the Metaverse											[10]	
Unit II Building the Metaverse: Networking, Computing, Virtual world engines, Interoperability, Hardware, Payment rails, Blockchains and metaverse.											[10]	



Unit III How the metaverse will revolutionize Everything: When will the metaverse arrive?, Meta-businesses, Metaverse winners and losers, Metaversal existence, The Metaverse vs. Web 3.0, Types of the Metaverse, Cryptocurrency and the Metaverse, NFTs and the Metaverse.	[10]
Unit IV Metaverse case study: Metaverse in Education: Vision, Opportunities, and Challenges; Metaverse Virtual Learning Management Based on Gamification Techniques Model to Enhance Total Experience; Metaverse Framework: A Case Study on E-Learning Environment (ELEM); Augmented Reality in Surgery: A Scoping Review, A Case Study on Metaverse Marketing of Jewelry Brand, Agricultural Metaverse: Key Technologies, Application Scenarios, Challenges and Prospects.	[8]
Text Books: [T1] Matthew Ball, (2022), The Metaverse: And How It Will Revolutionize Everything, Liveright, ISBN: 9781324092049 [T2] Mystakidis, S. (2022). Metaverse. Encyclopedia, 2(1), 486-497.	
Reference Books: [R1] Lin, H., Wan, S., Gan, W., Chen, J., & Chao, H. C. (2022). Metaverse in education: Vision, opportunities, and challenges. arXiv preprint arXiv:2211.14951. [R2] Srisawat, S., & PiriyaSurawong, P. (2022). Metaverse Virtual Learning Management Based on Gamification Techniques Model to Enhance Total Experience. International Education Studies, 15(5), 153-163. [R3] Dahan, N. A., Al-Razgan, M., Al-Laith, A., Alsoufi, M. A., Al-Asaly, M. S., & Alfakih, T. (2022). Metaverse framework: A case study on E-learning environment (ELEM). Electronics, 11(10), 1616. [R4] Kang, H. R. (2022). A Case Study on Metaverse Marketing of Jewelry Brand. Journal of Digital Convergence, 20(1), 285-291. [R5] Feng, C. H. E. N., Chuanheng, S. U. N., Bin, X. I. N. G., Na, L. U. O., & Haishen, L. I. U. (2022). Agricultural Metaverse: Key Technologies, Application Scenarios, Challenges and Prospects.	