Course code		**INDUSTRY 4.0: AUGMENTED REALITY** (Reference Book Chapters)	**L**	**T**	**P**	**C**
Core/Elective/Supportive		Core	**4**			**4**
Pre-requisite		Nil	**Syllabus Version**			

Course Objectives:

The main objectives of this course are to:

1. To understand the importance of augmented reality in Industry 4.0 with real-time examples
2. To describe the history and recent developments of AR
3. To provide the need on emerging technologies AR and VR
4. To discuss the revolution and impact of AR
5. To understand the applications of AR and VR

Unit:1	**Introduction to Augmented Reality**	**12-- hours**

History of AR (4-4.2.1) - Augmented reality characteristics (1-1.1.1) – Difference between Augmented Reality and Virtual Reality (1-1.1.2) – AR technological components (1-1.2.1.1) – Technologies used in AR– Feature Extraction (1-1.2.2) – Hardware components (1-1.3) – AR devices (1-1.3.3) – Importance of AR (2-2.2.1) - Real world uses of AR – AR types (2-2.2.2) – Software tools available for AR (1-1.5)

Unit:2	**Need of technologies for Augmented Reality**	**12-- hours**

Hardware technology (5-5.4) – virtual scenes (5-5.4) – 3D objects (5-5.4) – AR components (5-5.4.1) – Display (5-5.4.2) – HMD – Eyeglasses (5-5.4.4) – Contact Lenses(5-5.4.5) – significance of AR(5-5.5) – AR powered devices (7-7.4)– AR application development drawbacks (7-7.4) – Compatibility – Performance (7-7.4) – AR libraries (7-7.6) – Motion tracking (7-7.7) – Environmental understanding – Anchors (7-7.8)

Unit:3	**Technology Integration and Implementation of AR**	**12-- hours**

Technology use and integration in industrial settings (5-5.6) – Assistive training to faculty members (5-5.7) – Planning and administration for implementation (5-5.8) – AR implications (5-5.8.1) – Practical data – AR labs (5-5.8.2) – Platforms to form AR content (5-5.10.2) – Coordinated utilization of AR applications – Hands-on preparation (5-5.11)

Unit:4	**Augmented Reality and Virtual Reality for Micro Learning**	**12-- hours**

Micro learning techniques (5-5.11 [9]) – Utilizing VR for learning – VR for Practical online assessment (5-5.11 [9 A])– VR info graphics (5-5.11)– Virtual case considerations (5-5.11) - Utilizing AR for learning (4-4.4) – Accessible learning (5-5.12) – sensible data (5-5.12) – elevated learner engagement (5-5.12) - VR technology (2-2.3) – Components of VR (2-2.3.1) – VR Hardware (2-2.3.2) – VR applications (2-2.3.3) – Civil Engineering (2-2.3.3) – Real Estate (2-2.3.3) – Biology and Medicine (2-2.3.3) – Virtual Mall (2-2.3.3) – VR in Education (2-2.3.3) – Virtual Laboratory – Factory Planning – Automobile Industry (2-2.3.3)

Unit:5	**Tools and Applications of Augmented Reality**	**12-- hours**

Tools available for Augmented Reality and Recognition (1-1.5) – Software Tools (1-1.5.1) – Google Poly – Unity – software approaches – recognition types (1-1.5.2) – native software solutions (1-1.5.2.1)

– ARKit (7-7.6) – ARCore (7-7.6, 7.10.3) – software development kit - Cloud services - AR business applications (1-1.4) – weather prediction (1-1.4.2) – market prediction (1-1.4.3) – smart cities (1-4.4) - AR application for Education (4-4.3) - AR application for Healthcare sector (8-8.3) – Agriculture – Civil Engineering – Architecture – Archaeology – Crime and Security (2-2.2.7) – Games (6-6.2) – IoT (8-8.3.3) – Use cases (7-7.9) – Social Media (7-7.9.1) – Gaming (7-7.9.2) – Education (7-7.9.3) – Healthcare (7-7.9.4) – Shopping and Business (7-7.9.5)			
		Total Lecture hours	**60-- hours**

Reference Book	
1	Kaliraj P, Devi T, (2021). Innovating with Augmented Reality: Applications in Education and Industry (P. Kaliraj, Ed.) (1st ed.). Auerbach Publications. https://doi.org/10.1201/9781003175896
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