PROGRAMME DETAILS

PROGRAMME EDUCATIONAL OBJECTIVES

PEO 1 Techno Commercial Engineer: To develop the ability to think critically, analyse and make innovative design for offering techno-commercially feasible solutions.

PEO 2 Governance of Super Intelligence: To apply current tools and technologies to contribute for industries, public sectors, research organization for solving time critical problems.

PEO 3 Enduring Exploration: To impart the knowledge of inventive design skills and lifelong learning to succeed in their professional challenges

PROGRAMME OUTCOMES

PO1 Engineering Knowledge: Apply knowledge of mathematics, natural science, computing, engineering fundamentals and an engineering specialization as specified in WK1 to WK4 respectively to develop to the solution of complex engineering problems.

PO2 Problem Analysis: Identify, formulate, review research literature and analyze complex engineering problems reaching substantiated conclusions with consideration for sustainable development. (WK1 to WK4)

PO3 Design/Development of Solutions: Design creative solutions for complex engineering problems and design/develop systems/components/processes to meet identified needs with consideration for the public health and safety, whole-life cost, net zero carbon, culture, society and environment as required. (WK5)

PO4 Conduct Investigations of Complex Problems: Conduct investigations of complex engineering problems using research-based knowledge including design of experiments, modelling, analysis & interpretation of data to provide valid conclusions. (WK8).

PO5 Engineering Tool Usage: Create, select and apply appropriate techniques, resources and modern engineering & IT tools, including prediction and modelling recognizing their limitations to solve complex engineering problems. (WK2 and WK6)

PO6 The Engineer and The World: Analyze and evaluate societal and environmental aspects while solving complex engineering problems for its impact on sustainability with reference to economy, health, safety, legal framework, culture and environment. (WK1, WK5, and WK7).

PO7 Ethics: Apply ethical principles and commit to professional ethics, human values, diversity and inclusion; adhere to national & international laws. (WK9)

PO8 Individual and Collaborative Team work: Function effectively as an individual, and as a member or leader in diverse/multi-disciplinary teams.

PO9 Communication: Communicate effectively and inclusively within the engineering community and society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations considering cultural, language, and learning differences

PO10 Project Management and Finance: Apply knowledge and understanding of engineering management principles and economic decision-making and apply these to one's own work, as a member and leader in a team, and to manage projects and in multidisciplinary environments.

PO11 Life-Long Learning: Recognize the need for, and have the preparation and ability for i) independent and life-long learning ii) adaptability to new and emerging technologies and iii) critical thinking in the broadest context of technological change. (WK8)

K.S.R COLLEGE OF ENGINEERING
AUTONOMOUS | TIRUCHENGODE
DEPARTMENT OF COMPUTER SCIENCE AND DESIGN
JUNE - 2025 VOLUME 2/ISSUE 2

MINDS SPARK


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Introduction

Design of AR & Architecture

Education & Training

Future of AR

AR
The Future of Education

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K.S.R. COLLEGE OF ENGINEERING

VISION OF THE INSTITUTE

We envision to achieve status as an excellent educational institution in the global knowledge hub, making self-reliance, experts, ethical and responsible engineers, technologists, scientists, managers, entrepreneurs and leaders with good citizenship enabling them to meet the challenges and ensure sustainable growth of the nation and the world.

MISSION OF THE INSTITUTE

To inculcate in the students' self-learning abilities that enable them to become competitive and innovative professionals and institutions through state-of-art laboratory facilities and industrial collaborations improving the level of education, mentoring environmental and social needs. To foster and maintain a mutually beneficial partnership with global industries and Institutions through knowledge transfer, collaborative research, and innovation.

DEPARTMENT OF COMPUTER SCIENCE AND DESIGN

VISION OF THE DEPARTMENT

To produce professionals for designing technology with ethical values, ingenious attitude and team spirit required for the continual development of the society and the nation.

MISSION OF THE DEPARTMENT

To behave academic environment for the development of skilled professionals qualified with knowledge, skills, values and ethics, thereby take a role in the field of computer science and design.

To behave holistic, creative learning and ethical attitude for embracing global challenges and leadership qualities in the field of computer science and design.

To influence graduates with the skills to become self-employed entrepreneurs and future leaders.

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Introduction to Augmented Reality

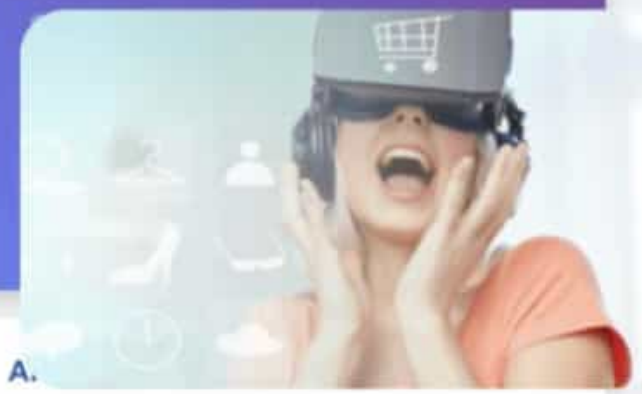
What is Augmented Reality?

Augmented Reality (AR) is revolutionizing the way we conceptualize, create, and interact with design. By bridging the gap between digital imagination and physical reality, AR is enhancing the entire design experience.

It matters in design due to its ability to offer enhanced visualization capabilities, support real-time design iteration, improve client communication, strengthen spatial understanding, enable cost-effective prototyping, and foster collaborative experiences.

Key Benefits

AR technology provides designers with unprecedented tools to visualize concepts in real-world contexts, making abstract ideas tangible and accessible to clients and stakeholders.



A.

- Enhanced visualization capabilities
- Real-time design iteration
- Improved client communication
- Spatial understanding enhancement
- Cost-effective prototyping
- Collaborative design experiences

Retail and E-commerce

Try Before You Buy Revolution

AR lets users "try before they buy"—from virtual fitting rooms to placing furniture in your room via mobile AR apps. This revolutionary approach is transforming the retail landscape by reducing return rates and increasing customer satisfaction.

Virtual Try-On Technology

Customers can now visualize products in their personal space before making a purchase decision, leading to more informed buying choices and reduced buyer's remorse.

Retailers like Nike and Lenskart use AR for virtual try-ons, allowing customers to see how products look and fit without physical interaction. This technology has proven especially valuable during the pandemic era.

Leading AR Retail Implementations

- Nike - Virtual sneaker try-ons
- Lenskart - Eyewear fitting
- IKEA - Furniture placement
- Sephora - Makeup try-ons
- Amazon - Product visualization

Customer Benefits

- ✓ Reduced return rates
- ✓ Better product visualization
- ✓ Enhanced shopping confidence
- ✓ Convenient home try-ons
- ✓ Interactive product exploration
- ✓ Personalized shopping experience

Sujith.C II/CSD

MINDS SPARK JUNE - 2025 VOLUME 2/ISSUE 2

Healthcare Applications

AR technology is revolutionizing healthcare by providing surgeons with enhanced visualization during procedures and enabling medical students to practice on virtual patients.

Surgical Precision Enhancement

AR overlays critical patient information directly onto the surgeon's field of view, improving accuracy and reducing operation time.

Medical AR Benefits

- Enhanced surgical precision
- Medical training simulations
- Patient education tools
- Remote consultation support
- Rehabilitation therapy assistance

Medical professionals can now visualize complex anatomical structures in 3D, practice procedures without risk, and provide better patient care through AR-enhanced diagnostics.

Industrial Applications

Manufacturing and industrial sectors leverage AR for equipment maintenance, quality control, and worker training, significantly improving efficiency and safety standards.

Smart Manufacturing

AR guides workers through complex assembly processes with step-by-step visual instructions overlaid on equipment.

Key Industrial Uses

Boeing: AR assembly line guidance
General Electric: Equipment maintenance AR
Volkswagen: Quality inspection systems

Workers can access real-time instructions, technical documentation, and expert assistance through AR interfaces, reducing errors and increasing productivity across manufacturing processes.

Naveen.S II/CSD

Drawing

Education and Training

AR is revolutionizing how we learn—from interactive science lessons to medical simulations. Imagine anatomy students examining 3D organs in real space.

Interactive Learning

Students can now manipulate 3D models, explore historical sites virtually, and conduct safe virtual experiments that would be impossible in traditional classrooms.

Designers must ensure clarity, simplicity, and purpose in every overlay to create effective educational experiences.

Key Design Principles

Clear visual hierarchy, intuitive interactions, and purposeful content placement

Yogesh.S II/CSD

Mithra.A II/CSD

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Gaming and Entertainment

AR games and experiences blend physical environments with interactive elements, offering immersive storytelling and interaction.

Immersive Gaming Experience

Mixed reality escape rooms and live AR concerts are growing trends that combine physical and digital entertainment.

AR Gaming Features

- Real-world environment integration
- Social multiplayer experiences
- Location-based gameplay
- Physical activity encouragement
- Immersive storytelling

Games are experiences. Visuals and sound shape the tone and mood. 2D/3D Art: Characters, environments, objects, effects create compelling interactive worlds.

What is AR, Really?

AR enhances our perception of the world by superimposing computer-generated visuals, sounds, or information onto physical environments—typically via smartphones, tablets, smart glasses, or AR headsets.

Augmented Reality Definition

A type of technology that allows digital images and information to be displayed onto the physical environment.

Augmented Reality

[ɑg-'men-tad rē-'a-la-tē]

A type of technology that allows digital images and information to be displayed onto the physical environment.

Popular AR Examples

Pokémon Go: Location-based AR gaming
IKEA Place: Virtual furniture placement
Snapchat Filters: Face augmentation technology

Think of Pokémon Go, IKEA Place (virtual furniture), or Snapchat filters—all using AR technology to blend digital content with real-world environments.

Kishore.M II/CSD

Architecture Design

Architects can walk clients through virtual building models in real environments, making spatial planning more intuitive and engaging.

Virtual Building Walkthrough

Clients can "walk through" their homes before they're built, experiencing the space and making informed design decisions.

AR Architecture Benefits

- Interactive 3D building models
- Real-time design modifications
- Enhanced client presentations
- Spatial relationship visualization
- Construction planning assistance

Traditional tap and scroll UI doesn't apply in AR. Instead, users interact using hand gestures, gaze tracking, voice commands, and spatial triggers. This means designers must build intuitive, context-aware interfaces that respond naturally and non-disruptively.

Vignesh.S, II/CSD

Design Challenges

Despite its potential, AR design brings new challenges that designers must carefully consider when creating user experiences.

Key Design Challenges

Device limitations: Battery, field of view
Latency issues: Real-time interaction delays
Accessibility: Inclusive design for all users
Visual overload: Balancing information density

Designers must ensure clarity, simplicity, and purpose in every overlay. The challenge lies in creating experiences that enhance rather than overwhelm the user's perception of reality.

Abinaya Sri.S, II/CSD

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Designing for AR: A New Skillset

AR demands a unique blend of 3D design, spatial thinking, UI/UX knowledge, and interaction design. Unlike flat screens, AR operates in real-world space, meaning designers must consider:

AR Design Fundamentals

Designing for augmented reality requires understanding depth perception, user movement, and environmental context integration.

Essential AR Design Skills

- Depth and distance perception
- User orientation and movement
- Lighting and environmental context
- Gesture and voice-based inputs

Unity 3D | Adobe Aero | Blender | ARCore

Tools like Unity, Adobe Aero, and Blender have become essential for AR prototyping and asset creation.

Harinisri.C, II/CSD

AR & VR: Future of Education

AR and VR technologies are transforming education by providing immersive learning experiences that make complex concepts tangible and engaging. Students can explore historical sites, conduct virtual experiments, and interact with 3D models in ways never before possible.

Mahalakshmi.S II/CSD