

Faculty of Computer Applications & Information Technology



WORLD OF METAVERSE

Message From Dean, FCAIT-UG



Embracing Metaverse as our current edition's theme, let us engage in understanding the new trends of our ever-evolving technology field. Metaverse, being another important milestone in the digital world, refers to a collective virtual space wherein people can live, work, play and socialize in digital spaces. In simpler terms, it's like a huge digital universe where people can interact with each other and digital objects in real-time using avatars or digital representations of themselves. This networked digital environment provides a platform for creativity, cooperation, and development. Therefore, I encourage you to explore its vast opportunities with curiosity and responsibility.

Metaverse is a field in which one needs to engage thoughtfully, cognizant of how your actions will affect this changing environment. Respect honesty, cultivate relationships, and embrace variety when navigating online environments. Remember that although the Metaverse offers fascinating opportunities, it also necessitates vigilance against its challenges. Hence, the students will obtain multiple opportunities to explore the field of virtual reality and gain holistic insights about the computer generated environment.

At our University, we offer a dynamic learning environment to students. Our commitment to excellence in education ensures that our students are equipped with the knowledge, skills, and mindset to thrive in this technologically driven era. Through a multifaceted approach encompassing National Technical Festivals, Tech Talks and Seminars, our objective is to provide immersive learning which not only enhances comprehension and retention but also fosters creativity and innovation. Furthermore, through hands-on projects, experiential learning opportunities, and interdisciplinary collaboration, we are preparing our students to become future leaders and innovators in the ever-evolving landscape of technology and digital innovation.

In this issue of DKOSMOS, we explore the intriguing field of Metaverse while also offering insights into the varied range of seminars, workshops, educational initiatives, and industrial visits that have enhanced the academic environment within the Faculty of Computer Applications and Information Technology (FCAIT).

----- Dr. Tripti Dodiya

From Editorial Desk

Welcome to the latest issue of our magazine, where we embark on an exploration of the Metaverse, a realm that promises to redefine the way we perceive and interact with digital spaces. The Metaverse represents a convergence of technology, creativity, and human ingenuity, offering boundless opportunities for innovation and connection. As we delve into its depths, we discover a world where virtual reality, augmented reality, and artificial intelligence converge to create immersive experiences that transcend physical limitations.

As you navigate through the pages of DKOSMOS, we invite you to join us on a journey through the Metaverse, where we'll uncover its potential impact on industries, communities, and individual lives. The magazine also brings out glimpses of events organized at the department. Throughout the year, FCAIT has been a hub of intellectual discourse, hosting a series of seminars and workshops featuring renowned scholars and industry experts. We believe in the transformative power of interdisciplinary collaboration. By fostering partnerships with other faculties and academic institutions, we encourage cross-pollination of ideas and integration of diverse perspectives. Tech Talks and Seminars play a pivotal role in augmenting academic discourse and promoting industry-academia collaboration. Renowned experts and thought leaders are invited to share insights, discuss best practices, and decipher emerging trends in areas such as machine learning, data science, natural language processing, and robotics. These interactions not only broaden students perspectives but also provide valuable networking opportunities and foster mentorship relationships with industry professionals. Our TechTalk series continues to be a cornerstone of knowledge sharing and professional development within the FCAIT community.

We welcome your suggestions and remarks via email, so please get in touch with for reviews at dkosmos@glisica.org. Thank you for joining us on this journey of exploration and discovery. We hope you enjoy reading DKOSMOS as much as we have enjoyed bringing it to you.

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Introduction

The metaverse is a collective virtual shared space, created by the convergence of virtually enhanced physical reality and physically persistent virtual reality, including the sum of all virtual worlds, augmented realities, and the internet. It is characterized by immersive digital environments where users can interact with each other and the environment through avatars, engage in various activities, and create and share content. The key aspects are as follows:

Immersive Experience: Utilizes technologies like VR (Virtual Reality) and AR (Augmented Reality) to create engaging, lifelike-experiences.

Persistence: The virtual environment continues to exist and evolve even when users are not logged in.

Interactivity: Users can interact with the environment and other users in real-time.

User-Generated Content: Encourages users to create, modify, and share content within the metaverse.

Social Interaction: Provides platforms for socializing, gaming, education, work, and other activities in a shared virtual space.

Economy: Features virtual economies where users can buy, sell, and trade virtual goods and services, often using cryptocurrencies or other digital assets.

The metaverse aims to blend the digital and physical worlds, creating seamless and immersive experiences across various applications.

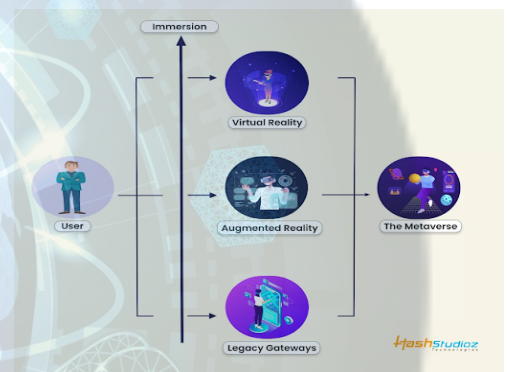
Key Technologies

Metaverse is all about virtual worlds. It provides an immersive way to visualize, collaborate and socialize things in extended reality. Extended reality comprises Augmented reality, Virtual reality and Mixed reality.

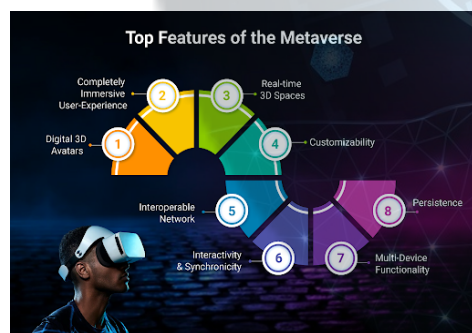
Augmented Reality (AR)— An interactive experience of the real-world environment where virtual objects are augmented over real-world objects. This can be achieved by computer-generated perceptual information, across multiple sensory modalities such as visual, auditory, haptic, somatosensory and olfactory.

Virtual Reality (VR) — Teleports users into a virtual world that simulates a physical presence in places in the real world or in the imaginary world. It can create sensory experiences which include sight, touch, hearing and smell.

Mixed Reality (MR) — Virtual content is not only overlaid on the real environment but also users can interact with that environment.



Features of Metaverse



Digital 3D Avatars: Digital 3D avatar is one of the key aspects of metaverse technology. Users can seamlessly create their digital replicas while entering a metaverse platform and control their 3D avatars to access & experience the technology to the fullest. Not just their replicas, but the users can also create an avatar of their own preference! The digital 3D avatar enables the users to commit actions like run, dance, sway, and a lot more. In an idealistic metaverse, the users can completely control these avatars with the help of AR/VR metaverse technologies.

Completely Immersive User-Experience: Metaverse creates a truly immersive user experience for the users where they can seamlessly engage using all the senses like sight, hearing, touch, taste, and smell. It is so because AR and VR metaverse technology involves elements like multi-definition sounds and surround images that enable a user to have a real-like experience. Metaverse can also require the use of technologies like omnidirectional treadmills and haptic body suits that help the users experience & navigate a virtual environment.

Real-time 3D Spaces: In the metaverse, users can participate and experience real-time 3D spaces and locations. These virtual spaces can either be a whole new location or even the exact digital replica of any existing physical location. An easy example is the Roblox metaverse which is enabled by the gaming platform and has its own currency, the Robux. Users operating in the Roblox metaverse can purchase Robux and spend it on virtual avatar accessories, virtual items, the experience, and a lot more. However, a developed metaverse will also have a fully functioning economy where users could participate in diverse activities.

Metaverse

Customizability: The different 3D virtual worlds or spaces in the metaverse are highly customizable. In the virtual environment, users can personalize or design a venue as per their preference and include diverse features to create an immersive experience. Ever since the Metaverse has come into prevalence, many brands and users have built a customized virtual environment to host diverse events. Explore the most prominent customized metaverse events here.

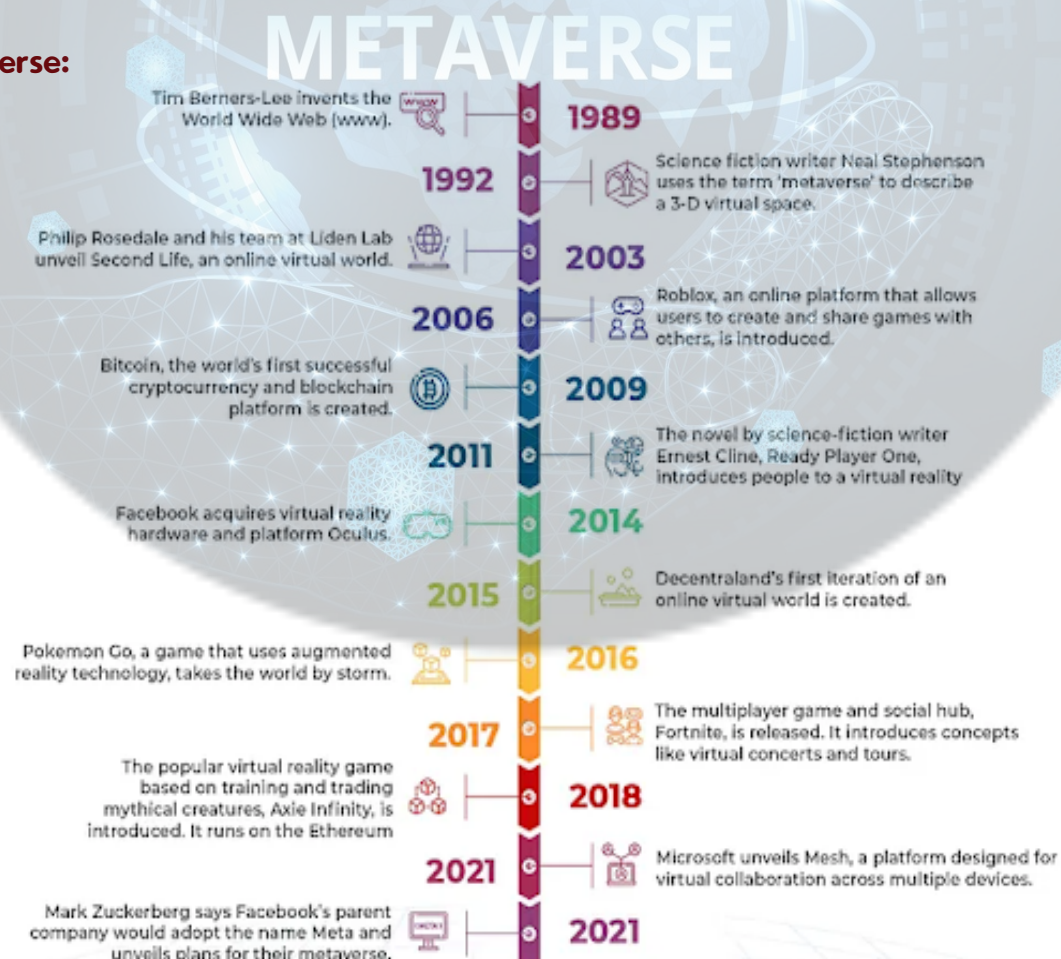
Interoperable Network: Metaverse is built with a connected series of networks that allows the user to carry or have the same virtual items or assets across different metaverse experiences. In simpler terms, a user can experience the cross-platform capability in the metaverse where they can purchase & use the same virtual item across different metaverse platforms, spaces, events, etc. Similarly, the technology will become more and more advanced in terms of different virtual activities enabling the creation of a virtual economy.

Interactivity & Synchronicity: Another efficient feature of the technology is that the users can have real-time interaction & engagement. With AR & VR metaverse technology, users can seamlessly connect with other users in the virtual venue through the functionality of digital avatars. Not just this, but users can also react to each other and the digital environment just like they do in the real world. Interactivity in the metaverse can be thought of as an enhanced version of a virtual event. Users present over different remote locations share the experience of being at the event together and interacting through multiple tools. However, metaverse brings users the opportunity to have an absolutely immersive interactivity experience.

Multi-Device Functionality: Another characteristic of the metaverse is that a user can access, operate, and experience it from any device. However, to operate and have a completely immersive experience, users need to use metaverse AR & VR tools like goggles and gloves, which are not supported on devices like phones or tablets. Therefore, this feature of the metaverse comes with a limitation for the users as they could only operate the lighter versions of the metaverse from devices like phones or tablets. It is so because the simpler metaverse events can easily be accessible over traditional devices, without requiring technologies like metaverse AR or VR.

Persistence: The virtual worlds in the metaverse will exist irrespective of time and place. It is going to be real-time persistent in the long run where the digital world and activities never come on hold, just like the real world. In simpler terms, the technology will continue to exist and function even after the users leave the virtual spaces, platforms, or venues.

History of Metaverse:



Metaverse Market Analysis

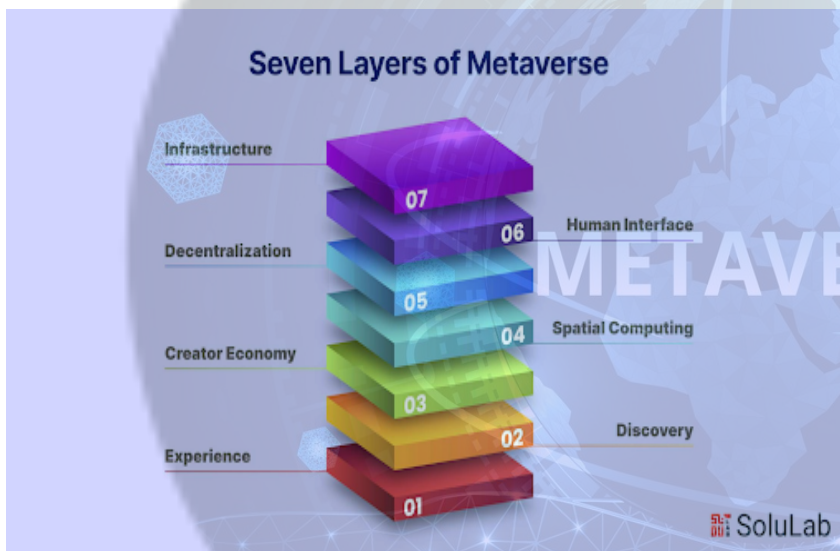
Metaverse Market Data



As per the report of Prescient & Strategic Intelligence, the global metaverse market generated revenue of USD 90.6 billion in 2023, and it is projected to reach USD 1,157.8 billion by 2030, growing at a CAGR of 44.0% during the forecast period. The growing focus on integrating the physical and virtual worlds, rising adoption of advanced VR devices, and accelerating demand for XR devices are the major factors driving the growth of the market. Several industries are adopting these environments, such as healthcare, aerospace and defense, education, and retail. Moreover, it is attracting several social network leaders and online game makers to take strides in this space. The growing demand for virtual events, increasing number of visitors, and rising consumer spending on virtual concerts aid the market growth.

Seven Layers of Metaverse

The Seven Layers of the Metaverse is a framework that outlines the different components and technologies that collectively form the metaverse. These layers help to understand the complex ecosystem of the metaverse and how various elements interact to create immersive virtual experiences. Here are the seven layers:



Infrastructure: This foundational layer includes the hardware and connectivity required to support the metaverse, such as 5G networks, cloud computing, and advanced processors. It ensures that the necessary bandwidth, computing power, and data storage are available.

Human Interface: This layer focuses on the devices and technologies that allow users to access and interact with the metaverse, including VR headsets, AR glasses, haptic devices, and brain-computer interfaces. It encompasses everything that bridges the physical and digital worlds.

Decentralization: This involves the use of blockchain technology and decentralized networks to ensure that no single entity controls the metaverse. It includes decentralized finance (DeFi), non-fungible tokens (NFTs), and distributed computing, which provide transparency, security, and user ownership.

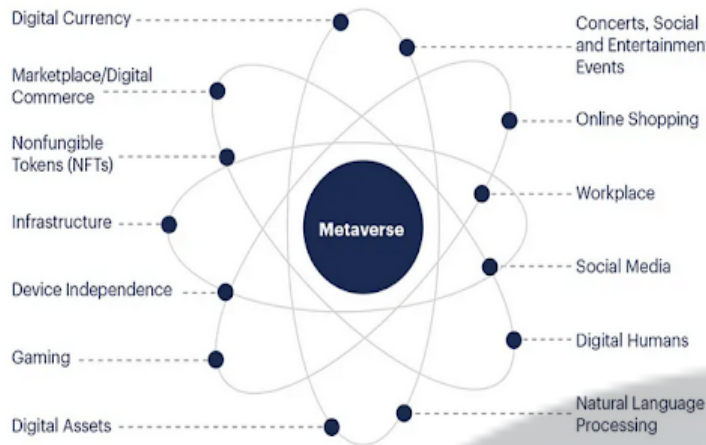
Spatial Computing: This layer includes the software and algorithms that create and manage 3D environments, spatial mapping, and augmented reality. It involves technologies like 3D engines, geospatial data, and real-time simulation to render immersive and interactive virtual spaces.

Creator Economy: This layer empowers users to create, share, and monetize content within the metaverse. It includes tools and platforms for digital content creation, marketplaces for trading virtual goods, and economic systems that reward user contributions and creativity.

Discovery: This involves the methods and platforms that help users find experiences, content, and each other within the metaverse. It includes search engines, social networks, marketplaces, and recommendation systems that facilitate navigation and exploration of the virtual world.

Experience: The top layer encompasses the actual user experiences and activities within the metaverse, such as social interactions, gaming, virtual events, education, and work. This layer is the culmination of all the underlying technologies, providing users with diverse and immersive experiences.

Elements of a Metaverse



Some of the key elements of the metaverse:

Term	Description
Avatar	An avatar is a digital character that represents you in a computer-generated world.
HMD Devices	A head-mounted display (HMD) is a display device, worn on the head or as part of a helmet that has a small display optic in front of one or each eye.
Digital assets	A digital asset is anything that is stored digitally and is uniquely identifiable that organizations can use to realize value.
Virtual spaces	Virtual platforms build digital versions of the physical world and allow the user to create their own virtual world as well. These spaces can be accessed through mixed reality devices, browsers, or mobile apps. Many market participants refer to these as metaverse: examples include Decentraland, Sandbox, Meta Horizon World, and Microsoft Altspace / Mesh.
NFTs	Virtual tokens that serves as ownership of physical or virtual assets such as digital arts. These can be traded on NFT exchanges or marketplaces such as Opensea or Rarible.
Web 3.0	Web 3.0 is an idea for a new iteration of the World Wide Web based on blockchain technology.

Metaverse Human Interface

HMD Devices: VR headsets, smart glasses, and haptic technology allow users to immerse themselves in the metaverse as avatars. Here are some notable headsets for experiencing metaverse content:

Microsoft HoloLens 2: A premium mixed reality headset by Microsoft, known for advanced user interactions through its spatial computing engine.

Meta Quest 2: A cost-effective VR headset by Meta, offering enhanced performance with a Snapdragon XR2 SoC and 6GB of RAM.

HP Reverb G2: A groundbreaking VR headset with eye and face tracking, heart rate sensor, advanced lenses, Valve speakers, and the Omnicept engine for machine learning and cognitive insights.

Lenovo Think Reality A3: Lightweight, cost-efficient smart glasses that run all Android smartphone apps in augmented reality.



Haptic Devices: Haptic technology creates touch experiences through forces, motions, or vibrations, enhancing interactions and making the metaverse more authentic.

Haptx Glove — HaptX Gloves combine industrial standard haptics and natural interaction with the VR apps. Its DK2 SDK provides a realistic touch sensation, unlike any other device. It is built with patented microfluidic technology.

SenseGlove Nova — SenseGlove Nova has a futuristic design that is designed like a glove which can be worn in just five seconds. It can simulate the feeling of shapes, textures, stiffness, impact, and resistance using force feedback, vibrotactile feedback, and motion tracking technologies.

VRgluv — VRgluv haptic gloves gives you full control of your hands in VR, unlocking a wide variety of new interactions, experiences and gestures with the help of Force Feedback technology.



Metaverse: Uses Cases and Applications



Online Gaming: Gaming companies are investing heavily in the metaverse to create immersive experiences. Play-to-earn games are becoming popular, allowing players to trade in-game collectibles and NFTs. Brands also benefit from unobtrusive ads in these virtual environments.

Travel and Tourism: Virtual reality (VR) and augmented reality (AR) enable immersive digital travel experiences, simulating first-person views of destinations. VR tourism is gaining traction with 360-degree video content on platforms like YouTube.

Blockchain Use Cases: The metaverse leverages blockchain for decentralization, supporting cryptocurrencies, DApps, and NFTs. This enhances NFT trading platforms and blockchain games, allowing users to interact and trade collectibles.

Social Media Platforms: Metaverse social media offers immersive, realistic experiences through AR and VR, enhancing user presence and interaction. This evolution will expand the capabilities of current social media platforms.

Real Estate: Virtual tours in the metaverse allow buyers to explore properties remotely, customizing their experiences. AR popups provide additional information, making virtual real estate visits more informative.

Immersive Commerce: Brands will open virtual shops where customers can take 3D tours and try products before buying, mirroring real-world shopping experiences but entirely online.

Virtual Office & E-Learning: The metaverse enhances remote work and education, creating virtual offices and classrooms that feel like shared spaces. VR improves learning with live experiments and removes language barriers.

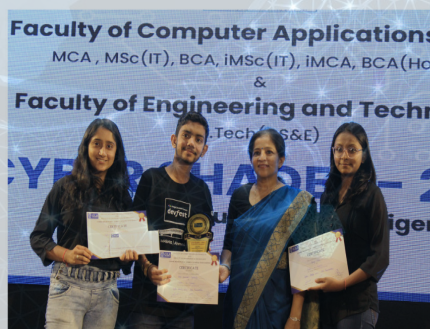
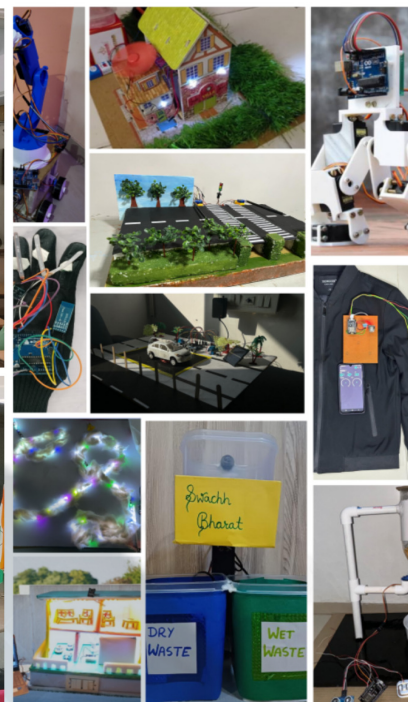
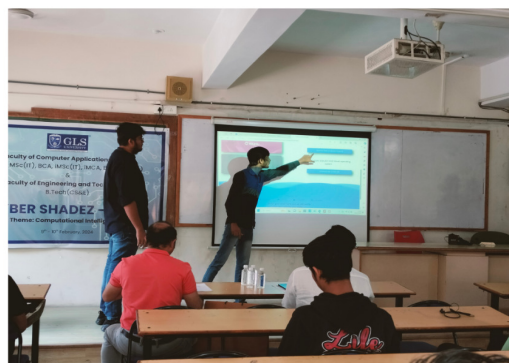
Healthcare: The metaverse supports telemedicine, offering virtual 3D clinics and therapy sessions. Digital workouts, exercises, and digital twin technology for patient simulations are emerging applications in healthcare.

Cyber Shadez-2024

Cyber Shadez 2024, organized by the Faculty of Computer Applications and Information Technology and the Faculty of Engineering and Technology at GLS University, proved to be a resounding success, showcasing the pinnacle of technological innovation and expertise. The events, held on February 9 - 10, 2024, were themed around computational intelligence, aiming to explore the intersection of technology and human intelligence. More than 1300+ participants from 30+ institutes and states across India participated in the event in hybrid mode. More than 21 technical events were organized over a period of two days. It was featured as Track 1, Track 2 and Track 3. Each track comprised various competitions organized for different UG and PG courses of FCAIT and FET.

The spectrum of competitions such as Techathon, IT Extempore, IT Quiz, Squash the Bug, Idea presentation - IoT Models, IT Treasure Hunt, Python Charmer, Code Jigsaw, Brain Digger and Logo Designing, commenced during the two days. The keynote address by Mr. Indrajeet Mitra, Joint Managing Director of Gateway Group of Companies, provided valuable insights into technology transformation and the future of computational intelligence. The ceremony concluded with a heartfelt vote of thanks by Dr. Tripti Dodiya, Dean of UG Programmes at FCAIT, expressing gratitude to all those who contributed to the success of Cyber Shadez 2024. Overall, the inauguration ceremony set the stage for an exciting and enriching event, celebrating intellect, creativity, and the limitless possibilities of technology.

Cybershadez for the school category is a gateway to ignite the curiosity and passion for technology among young minds, organized annually by FCAIT. This year it was organized on 3rd February 2024 where the students from various schools attended a seminar on Emerging Technologies in IT by Dr. Purna Tanna and Prof. Riddhi Kundal and also participated enthusiastically in the events like Idea Presentation, IT Rangoli, IT Quiz, Programming and IT Elocution.



Tech Talk

The institute provides a dynamic and collaborative learning environment by encouraging student-organized TechTalks. Such TechTalks empower students to take ownership of their learning journey, develop essential skills, and contribute to the growth of a vibrant tech community within the academic institution. Organizing Tech Talk by students holds significant importance in an academic setting and can contribute to the overall growth and development of the student community. By taking the initiative to organize and participate in Tech Talk, students contribute to creating a culture of continuous learning. This can have a positive impact on the overall academic environment, promoting curiosity and a thirst for knowledge. Theme of Tech Talk organized in the current academic year is:

“Unveiling the Web”, the talk explored the different types of webs and discussed its pros and cons. The students took help of a case study to emphasize on how the dark web is dangerous in real life and how to save ourselves from the dark web.



Series of Seminars and Workshops

The institute is dedicated to fostering a holistic approach to education, blending technical expertise with interdisciplinary knowledge. To achieve this goal, FCAIT has established a dynamic committee tasked with organizing a series of seminars and workshops covering a diverse range of technical and interdisciplinary topics. Through these seminars and workshops, FCAIT boosts technical skills while promoting exploration of how technology intersects with other fields.

Name of Activity	Date	Resource Person
Seminar on Blockchain	16- 01-2024	Neha Samsir, Asst. Prof. FCAIT , GLS University
Seminar on Vedic Mathematics and Communication Skill	06-02-2024	Chandramauli Bhatt CEO of Renaissance Education
Seminar on Future after BCA	15-02-2024	Umang Zaveri, Arham Education
Seminar on Game Design	22-02-2024	Sunil Limbachia, gameboxx.in
Workshop on Weebly	24-04-2024 & 25-04-2024	Anjali Jain, Asst. Prof. FCAIT , GLS University
Workshop on Google Scripts	29-04-2024 & 30-04-2024	Nasrin Aasofwala, Asst. Prof. FCAIT , GLS University
Workshop on Figma	01-05-2024 & 02-05-2024	Payal Dhanesha, Asst. Prof. FCAIT , GLS University
Workshop on ReactJS	08-05-2024 & 09-05-2024	Neha Samsir, Asst. Prof. FCAIT , GLS University
Workshop on Matlab	10-05-2024 & 11-05-2024	Shaily Jain, Asst. Prof. FCAIT , GLS University
Workshop on .NET Core	13-05-2024 & 14-05-2024	Deep Mavawala, Asst. Prof. FCAIT , GLS University
Workshop on Scala	20-05-2024 & 21-05-2024	Nirav Suthar, Asst. Prof. FCAIT , GLS University



Extra-Curricular Activities

Educational Visit-CEE



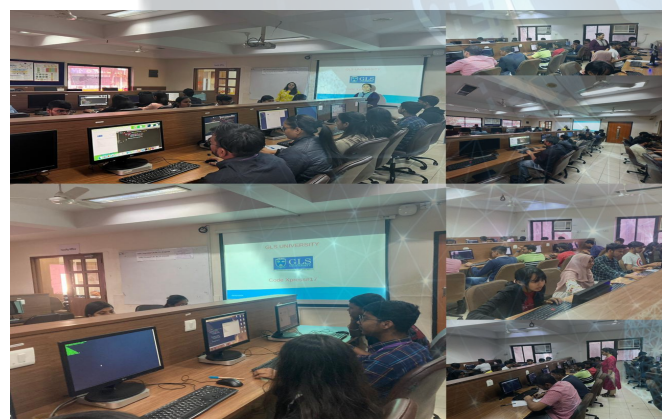
On January 25th, 2024, students of FCAIT visited the Center for Environmental Education (CEE) in Ahmedabad. The visit aimed to enhance their understanding of environmental issues and sustainable practices. During the visit, the students engaged in various activities, including guided tours of renewable energy installations, waste management systems, and water conservation projects. They participated in interactive sessions on climate change, biodiversity, and sustainable development goals, and took part in hands-on activities such as DIY recycling projects and urban gardening. A panel discussion with environmental experts highlighted the role of green technologies and youth in environmental sustainability. The visit concluded with a Q&A session and feedback, leaving students inspired to incorporate environmental awareness into their academic and professional lives.

Visit to Narendra Modi Stadium

On January 25, 2024, a group of students from the Faculty of Computer Applications and Information Technology (FCAIT) had the opportunity to visit the Narendra Modi Stadium in Ahmedabad, Gujarat. Renowned as the largest cricket stadium globally, the venue boasts an impressive seating capacity and state-of-the-art facilities. The visit provided the students with a unique chance to explore the stadium's modern architecture and infrastructure, which includes advanced player amenities, a cutting-edge media center, and spacious spectator areas.



The tour also included insights into the stadium's history, its role in hosting major international cricket events, and the technological advancements that enhance the viewing experience. This educational excursion not only enriched the students' knowledge of sports infrastructure but also inspired them with the stadium's blend of technology and tradition.



Code Express #17

The Code-xpress#17 was held on 5th February, 2024. It was a successful event that brought together 80 students. The questions were designed to test their ability to solve complex problems under time constraints. The language to be used was "C programming" and "Java Programming". Winners were awarded with certificates for their outstanding performance and dedication throughout the competition.

CWDC

FCAIT Collegiate Women's Development Committee organized two significant seminars in early 2024. On January 30, Dr. Khyati Parikh from the Universal Institute Ahmedabad conducted an inspiring seminar titled "Discover Yourself," focusing on personal growth and self-awareness. On February 6, Ms. Ruchika Kakkar, a Gujarat High Court advocate, led an insightful session on "Cyber Crime," highlighting online security and legal protections. Both events were well-received, enhancing participants' knowledge and empowerment. The CWDC continues to support the personal and professional development of the FCAIT community.



Extra Curricular Activities

Theater Club

On February 13th, 2024, the Theatre Club at FCAIT hosted an enriching event aimed at enhancing stage performance skills. The highlight of the evening was a session led by an expert in theatrical arts, who shared valuable insights and techniques to elevate performances on stage. The students were treated to a diverse array of acts ranging from comedy sketches to poignant dramas and impressive mime performances. The event provided a platform for budding actors to showcase their talent and creativity, while also fostering a deeper appreciation for the art of theatre among the audience. Through this immersive experience, participants not only honed their acting skills but also forged connections and memories that will resonate long after the curtains close.



I M Nanavati Sports Week Celebration-2023-24

Every year GLS students of various departments participate with great enthusiasm in the 'I M Nanavati Intercollege Sports Celebration'. This year it was organized from 17th - 23rd January, 2024, wherein students participated and also won prizes. They participated in various indoor-outdoor sports events such as football, Kabaddi, Volleyball, Badminton (Singles/Doubles), Cricket, Chess and Carrom. Students also participate in Athletics like Running races, Shot put, Javelin throw, Discus throw, Long jump, Triple jump and Relay races.

FCAIT Sports teams' Achievements:

- The bronze medal in Javeline Throw won by Mr. Krishna Sharma.
- The bronze medal in Long Jump won by Ms. Geetanjali Tumblam.



SHADEZ-2024

Every year, the Shadez- Cultural Festival, brims with vibrancy, celebrating diversity, talent, and creativity. With each passing year, Shadez continues to evolve, enriching the campus community with its tapestry of cultures, leaving indelible memories and fostering lifelong connections. This year the annual cultural festival, Shadez, took place on January 2nd and 3rd, 2024, showcasing a vibrant array of events that celebrated literature, art, music, and dance. The festival was a grand success, drawing participants and spectators from various departments and creating an atmosphere of creativity and camaraderie. Shadez 2024 was not just a festival but a celebration of culture, talent, and artistic expression.

It provided a platform for students to showcase their abilities, learn from each other, and revel in the joy of performing arts. The festival concluded with a grand closing ceremony, where winners were awarded for their exceptional performances, and everyone came together to celebrate the spirit of Shadez.



DAYS CELEBRATION

From January 2nd to 6th, 2024, FCAIT organized a vibrant Days Celebration, with each day dedicated to a unique theme. The event aimed to foster unity, creativity, and enjoyment among students and staff, making it a memorable start to the new year. The celebration kicked off with Bollywood Day, where students and faculty embraced the glitz and glamour of the Indian film industry. Green Day emphasized the importance of environmental sustainability and eco-friendliness. Fun Fair Day transformed the campus into a lively fairground, complete with stalls, games, and delicious food. Traditional Day celebrated the rich cultural heritage of India, with students and faculty donning traditional attire from various regions. The final day, Group Day, focused on team spirit and collaboration. Students and staff formed groups based on shared interests or themes and participated in a range of group activities. Signature Day was an opportunity for everyone to leave their mark on the event. Participants wore white T-shirts and collected signatures, messages, and doodles from friends and faculty, creating a keepsake of the celebration. The Days Celebration from January 2nd to 6th, 2024, was a grand success, filled with joy, creativity, and a strong sense of community. Each themed day brought unique experiences and learning opportunities, making it a cherished event for all participants.