

# CEPT: Future-Proofing Planning Education with GIS & AI



CEPT University is strengthening future-ready education by embedding GIS, spatial analytics, and emerging AI applications into its academic and professional programs. By combining hands-on lab work, real-world projects, and interdisciplinary learning, the university ensures graduates are prepared to work with large-scale geospatial datasets and AI-driven decision systems. **Prof. Manushi Bhatt, Assistant Professor, Faculty of Technology, CEPT University, Gujarat,** shares how they are achieving this.

## What core GIS and geospatial skills are considered essential for urban planning graduates today?

In the past few years, cities in India have gradually recognized the importance of GIS mapping and are increasingly turning to geospatial technologies for urban planning and management. Especially after the implementation of the Smart Cities Mission and AMRUT (Atal Mission for Rejuvenation and Urban Transformation) program, numerous cities have adopted GIS-based field surveys, data creation, and mapping. As practicing urban planners, fresh graduates are often required to know the basics of mapping and analysis using GIS tools. This includes the ability to create, clean, process, and manage spatial data. It is fundamental for planners to be able to interpret maps, aerial images, and satellite images.

Beyond the basics, the trend these days is to also process remote sensing data to extract urban growth patterns that can be utilized for urban growth prediction modelling, which in turn can be a key input for future land use zoning and master plan proposals. Site suitability analysis is another technique that helps planners in identifying potential sites for proposing parks, schools, hospitals, landfills, treatment

plants, etc., by analysing various factors - again helpful for future master plan and other urban interventions. **Skills in thematic analysis of satellite data, including Land Surface Temperature (LST) Mapping, Urban Heat Island (UHI) Effect, and Blue-Green Infrastructure Mapping, can give planning graduates a valuable edge.**

In the present times, cities are progressively leveraging Artificial Intelligence (AI) and Machine Learning (ML), Internet of Things (IoT), and Big Data Analytics to build smarter urban solutions - skills that future urban planning graduates are likely to be expected to apply in their careers. Lastly, urban planning graduates should also have the ability to make interactive maps and dashboards to engage the public and effectively convey their proposals.

## Over the years, have you observed a mindset change in students toward learning technologies like GIS? Why do you think these changes are occurring?

There has been a noticeable shift in the way students perceive GIS, and this is mainly driven by the change in professional practice. **Unlike earlier times, even the smallest of companies and startups in any sector look forward to hiring a graduate with a basic GIS skillset these days.** This has eventually given rise to the interest of students from various disciplines to learn GIS and apply it in their work. Especially in the urban sector, governments have started putting in the requirement of GIS-based mapping in many projects. This is a very strong motive due to which the students are interested in learning it. At the same time, even professionals are interested in gaining GIS Certification as it has become an essential skill.

There are prospective students who look forward to GIS beyond a mere tool to conduct their mapping tasks and intend to pursue a Master's degree in GIS and Remote Sensing. This is due to the growth in the geospatial industry with strong career opportunities, data-driven decision-making,

interdisciplinary applications, and emerging technologies using UAVs, AI, ML, IoT, Big Data Analytics, etc. The geospatial industry is witnessing significant development, slowly becoming an integral part of planning, governance, and data-driven development.

## At CEPT, what steps are taken to align GIS training with evolving career roles in urban planning and governance?

At the university, we have a studio-based learning pedagogy which is a combination of classroom-learning, peer-learning, hands-on learning, and industry engagement. Students identify real-world issues in the study areas, conduct analysis using various tools and techniques, including geospatial tools, and come up with final proposals to address the issues. Input from the industry is in the form of expert sessions conducted throughout the process by practitioners.

**Studios themed 'GIS for smart cities' and 'Urban Digital Twins', alongside the other planning-oriented studios, offer an opportunity for the students to understand the applicability of GIS in urban planning and governance.** Students closely observe the challenges in urban governance and try to address them using GIS-based solutions, including Apps and Dashboards. For 3D Modelling, different interfaces like City Engine, ArcGIS Pro 3D, and Revit are explored, post which 3D-based solutions for particular study areas are developed. The curriculum of the Master's programs at the university is designed and updated continuously to reflect emerging industry trends and professional practices, enabling students to graduate as industry-ready professionals.

## How do you think the use of emerging technologies like AI, digital Twins, IoT, etc., is changing decision-making in urban planning and management? Is CEPT working towards developing relevant skills in its students? Please give a few examples.

The National Geospatial Policy enlists an important milestone - to develop digital twins of major cities in India. Many city authorities have already started working on it as well because **Urban Digital Twins are dynamic representations/ virtual replicas of the entire city, and they can be immensely helpful in planning and governance.** IoT sensors act as an important element in making these dynamic replicas, as they will fetch real-time data. AI and ML can help make sense of that data, like object detection, accident hotspot detection, predict faults in water pipelines, predict pollution levels based on past trends, etc. So, numerous scenarios can be tested with the entire framework, enabling better decision-making.

Since the geospatial industry is rapidly growing, new developments are emerging every day. CEPT focuses on keeping the students updated on these through expert input sessions, hands-on workshops, and more. Students pursuing the Master's in Geomatics course at the University learn Python, Google Earth Engine, Web GIS, and AI/ML, which help them in their academic projects.

The integration of artificial intelligence and geospatial technologies (GeoAI) has a lot to offer. The GeoAI tools offered on Esri's ArcGIS Living Atlas of the World were very helpful during our 'Geospatial Technologies: Predictive Modelling & Analysis' studio, conducted in the second semester of the Master's in Geomatics course in Spring 2025. A prediction of PM2.5 for Mumbai was achieved using Random Forest and LSTM models, trained on hourly data from 2021 to 2024. Another student forecasted Urban Heat Island (UHI) in winter and summer seasons for Pune by training monthly LST data using LSTM and Res-CNN models. Timeseries AI tool in the GeoAI toolbox in ArcGIS Pro was used in both these projects. In another studio on 3D Modelling, the deep learning package - Building Footprint Extraction available on Esri's ArcGIS Living Atlas of the World was very helpful to prepare the Level of Detail (LOD) 1 Model of multiple neighborhoods across Ahmedabad.

**Thus, at CEPT, we are adopting new GeoAI tools that can minimize manual digitization by automating data extraction, enhancing the scalability of our workflows, and enabling predictive analysis without the need for extensive coding or scripting.**