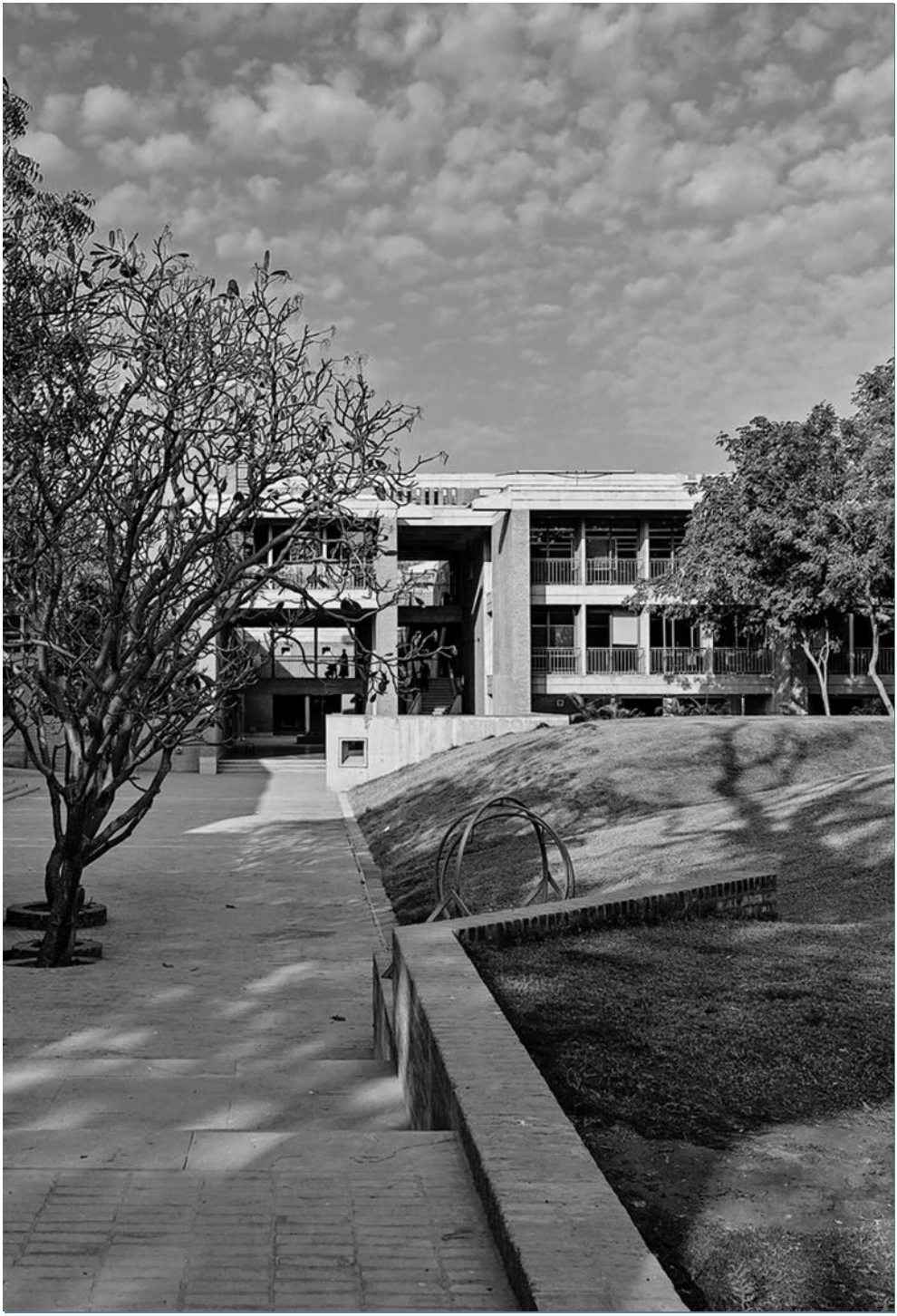
CEPT UNIVERSITY

FACULTY OF TECHNOLOGY

PROGRAM BROCHURE

MASTER'S IN GEOMATICS

FACULTY OF TECHNOLOGY



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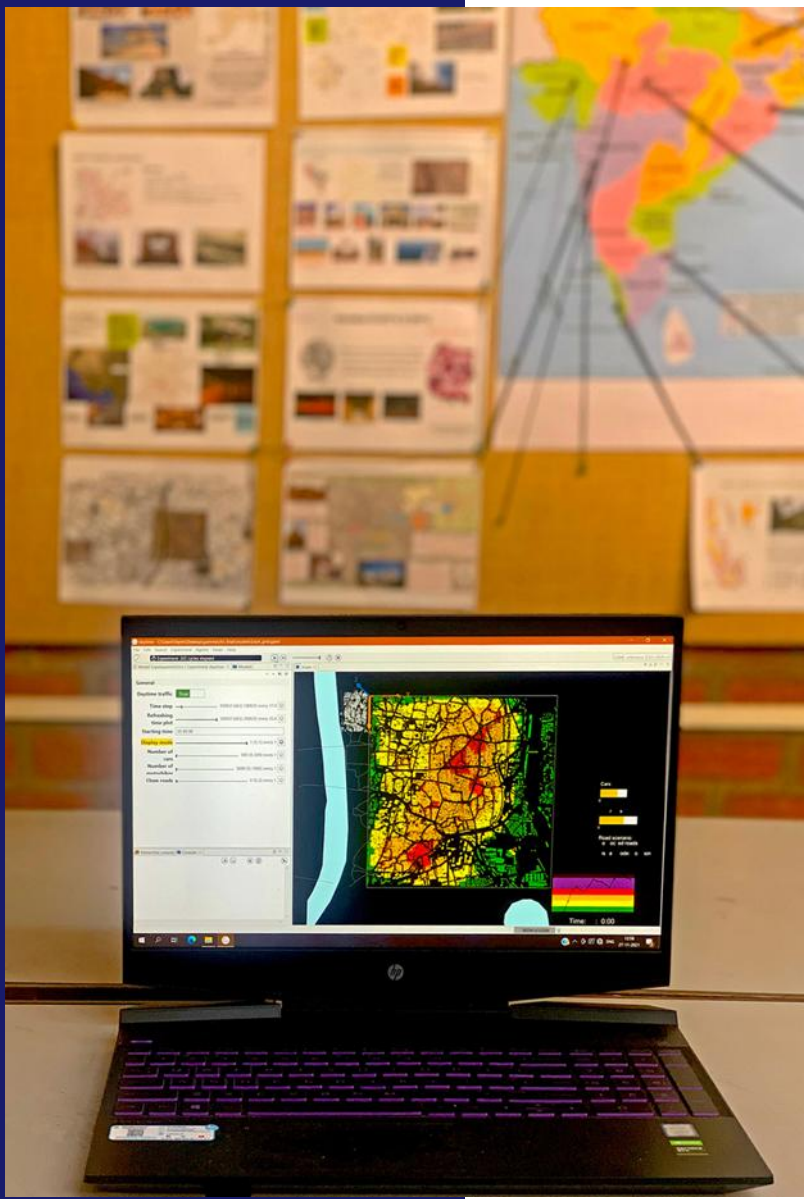


About CEPT University

CEPT University, established in 1962, is focussed on understanding, designing, planning, constructing, and managing human habitat. Its teaching programs are designed to build thoughtful professionals and its research programs aim to deepen the understanding of human habitat. CEPT University also undertakes advisory projects human habitat.

CEPT University has been recognized as a Centre of Excellence by the Government of Gujarat. CEPT's alumni are leaders in their respective fields in private practice, consulting firms, government organizations, multilateral institutions, and academic institutions across the world.

The University comprises of five faculties-

Faculty of Architecture (FA)
Faculty of Planning (FP)
Faculty of Technology (FT)
Faculty of Design (FD)
Faculty of Management (FM)

About Faculty of Technology at CEPT Univeristy

With the Indian construction industry rapidly expanding multifold, there is an increasing need for efficient and qualified professionals to sustain this growth. Our courses lay the foundation for students to engage in the dynamics of the industry and understand the construction and design process. With a strong foot-hold on fundamentals and well- rounded exposure, students step out well-equipped to plan, design and construct human habitats.

CEPT established the School of Building Science and Technology (SBST) in 1982 that focuses on issues concerning Planning, Design, Construction & Management of Human Habitats. SBST has now been renamed as Faculty of Technology (FT).

FT offers total of 5 programs:

Bachelor's in Civil Engineering (Honors) - (BCE)
Master's in Building Energy Performance - (MBEP)
Master's in Construction Engineering & Management - (MCEM)
Master's in Geomatics - (MGeo)
Master's in Structural Engineering Design - (MSED)

What is unique about Programmes at FT?

Studio Based Pedagogy:
o Teacher Student Ratio 1:8
o Creative Problem Solvers
o Innovative Engineers

Pre-Admission Scholarships

Earning while Learning

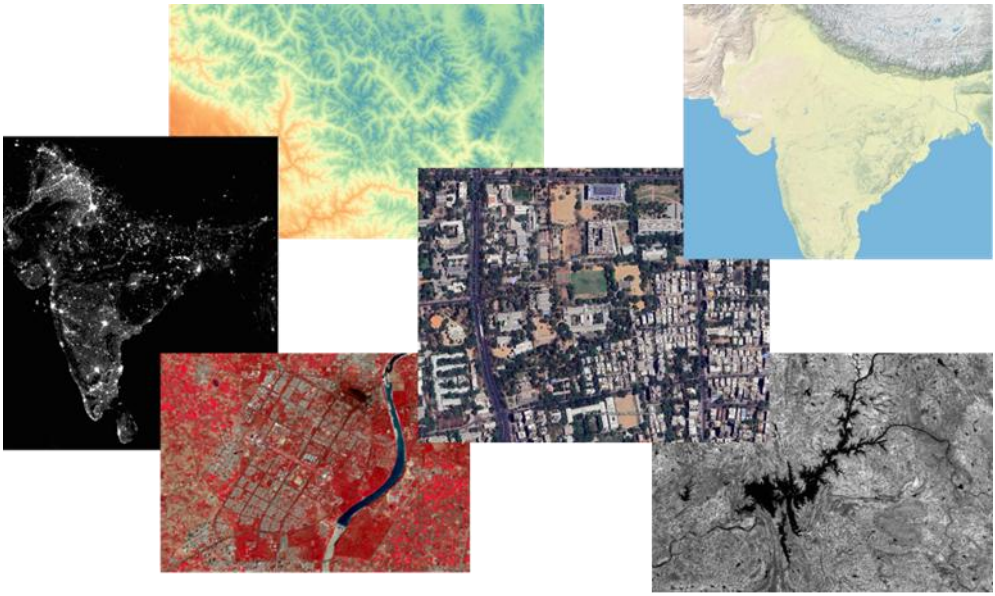
Study abroad
o Polimi University, Italy

Practical Training

Cutting edge Library and workshops NABL accredited laboratory
o Surveying & Levelling

Computer lab
o ArcGIS
o ENVI
o ERDAS

Master's in Geomatics



Mapping the world around us

"Are you interested in studying the impact of climate change on natural resources/ agriculture/ air quality or identifying the pockets of Urban Heat Islands?"

"Are you interested in impact assessment of natural disasters?"

"Are you interested in urban data analytics?"

Geomatics is for all!

Master’s in Geomatics

MGeo is a multidisciplinary course that attracts people from diverse academic backgrounds and integrates the acquisition, management, analysis, modeling and visualization of Geo-spatial information. The program is intended to be application- based, with a strong focus on urban environments.

With the growing importance and adaptation of Geospatial technology, the program offers courses on recent technological advancements in the field and strives to become one of the country's leading Geomatics program. Students develop skills in solving problems using big data, monitoring and managing changing environments by means of GIS and remote sensing. Support in creating computer-aided data visualization, communication and geospatial information, and conducting web processing and analysis through open-source spatial data to name a few. Moreover, the faculty members are drawn from both industry and academia and bring a lot of expertise and problem-solving experience to the class room environment.

Over the last two decades, the program has evolved with a new pedagogy and curriculum, making it a unique futuristic course that aims to prepare professionals that meet the industry demands. The graduates of the Geomatics program are not only learning logical and analytical skills but are also well-versed in data visualization, presentation and other soft skills. They excel in research, academia, and the corporate world due to their varied skill sets. The strength and reputation of CEPT's Geomatics program encourages industry involvement, and students benefit from the opportunity to connect with the private sector and communicate with future employers.

200+ Alumni making impact in the industry - leaders in their respective fields in private practice, consulting firms, government organizations, multilateral institutions and academic institutions across the world.


Development o
This is how Dubai ha
CEPT
Google

Dean's Message

Dr. Aanal Shah
Dean
Faculty of Technology

"CEPT University offers teaching programs, aimed to build thoughtful professionals, where the students are engaged with studios offering well-designed life-like problems.

Faculty of Technology is one of the five faculties of CEPT University offering a Postgraduate Program in Geomatics. The Master's in Geomatics (MGeo) program is a technologically enriched course imparting multiple skills to the students from a multi-disciplinary background to cater smart and sustainable decision making in various applications of built habitats.

With learning from a unique blend of subjects like remote sensing, Geographic Information System, spatial data analysis, programming languages, machine learning and photogrammetry, our students are able to contribute to multidisciplinary fields of Engineering, Information Technology, Architecture, Construction, Infrastructure, Utilities, Environment, Planning, Management, and Governance. Students of this program are also exposed to exchange programs, national and international seminars, workshops and summer schools pertaining to the Geo-spatial industry. We take pride in seeing the Graduates from this program getting successfully placed nationally and internationally. Many of them have also been successful in starting and establishing a consultancy firm providing Geo-spatial solutions to the challenges of the society. I am sure these dynamic students of the Geomatics program will be an asset in any organization as they are trained to face the professional challenges and solve the larger issues of the society."

Program Coordinator's Message

Manushi Bhatt

Program Coordinator | Geomatics

The MGeo Program at CEPT University is one of its kind and stands out for its unique studio-based pedagogy. Studios offer a creative space where students are allowed to come up with their own project ideas. They identify real-world issues and try to address them by hands-on application of geospatial tools. They learn various theoretical concepts of Remote Sensing, GIS, Spatial statistics and Data Science and simultaneously the same is applied in their studio projects – an integrated learning experience. It's an iterative process where constant refinement is done by the students in their work based on the feedback they receive. Peer-learning and working in form of groups are also important takeaways that prepare them for their professional life.

Guest lectures, site visits, workshops and conferences at the campus give the students an exposure to the current practices in academia as well as industry. This course makes the students industry-ready.

Student from disciplines like geology, geography, geosciences, physics and chemistry can chose to work beyond earth in planetary sciences using this knowledge while students from statistics, computer science, data science, mathematics and similar subjects can advance their career path to becoming Spatial Analysts, GIS Engineers and GIS Developers. Students from planning, architecture, engineering, environment sciences and similar disciplines can add on Geomatics knowledge and work as GIS Engineers, GIS Analysts, GIS Developers, Data Analysts, Project Associates and Project Coordinators. Students can advance their career in research and academia as research associates, professors and scientists. Geomatics has something to offer to everyone whether you wish to continue in the same discipline or plan to change your career trajectory.

Course Pedagogy

Geomatics refers to the science and technology to study geo-spatial information. earlier trend of Geo-spatial technology, which was mostly focused on mapping, is now being pushed to include industrial processes, transparency, productivity, safety, and project management.

MGeo offers a unique and comprehensive professional course encompassing machine learning, remote sensing, GIS, and visualization across various disciplines. Through subjects such as Photogrammetry, GPS, Big Data Analytics, Web and Mobile GIS, Programming, and Database Management, students delve into diverse topics. This program presents a distinctive opportunity to explore the extensive applications in multidisciplinary fields including engineering, IT, architecture, construction, agriculture, infrastructure, utilities, environment, planning, management, and governance.

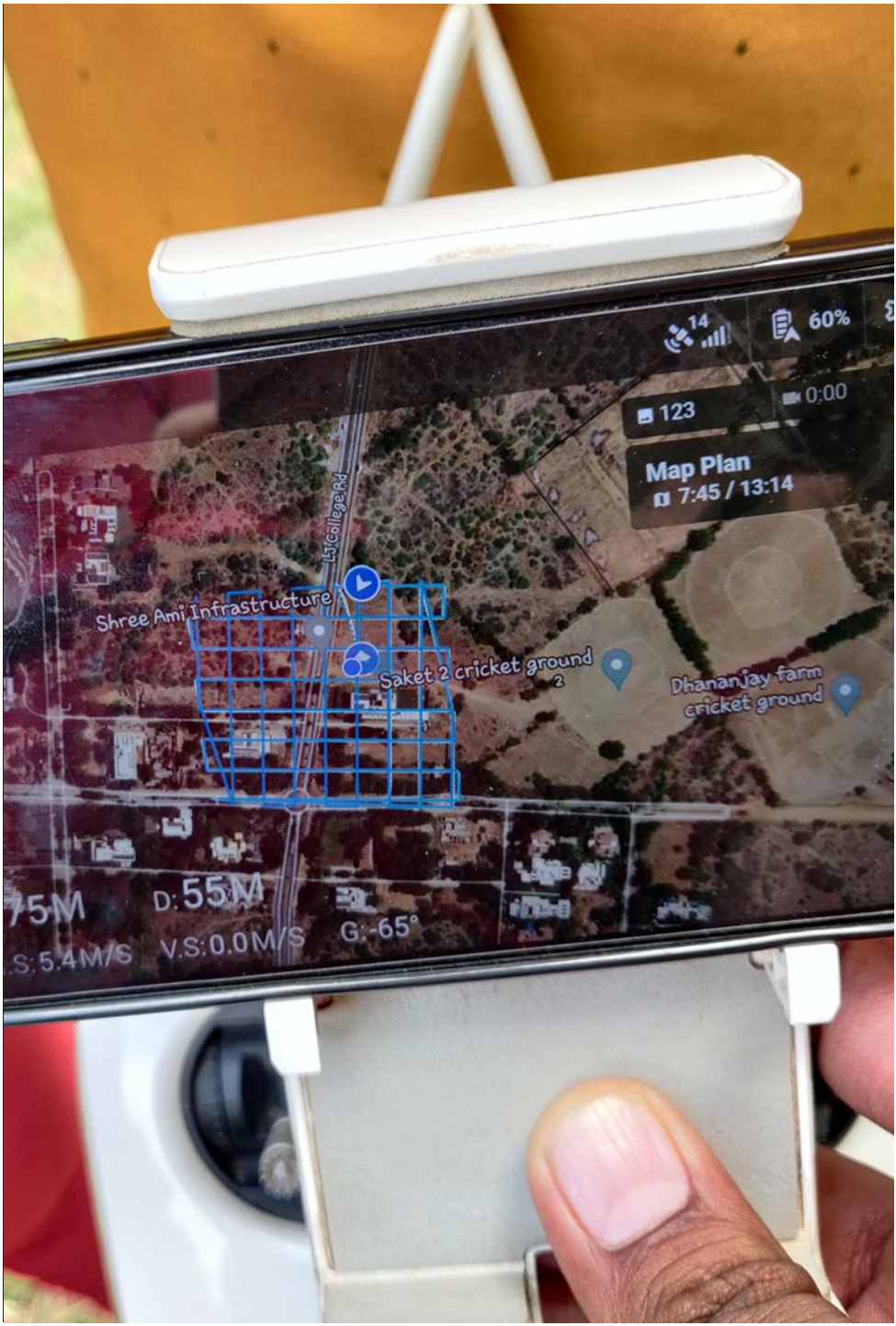
The program emphasizes on theory, practical applications through hands-on exercises, studio (real-time case studies) and dissertation. Faculty members are drawn from scientific and academic institutions, experienced professionals with in-depth theoretical and practical knowledge who brings applied knowledge to the classroom. A wide exposure and encouragement to be a part of rich knowledge exchange programs such as national and international seminars, workshops and summer schools pertaining to the Geo-spatial industry, have remained a key strength of the program over the years, since its inception at CEPT University in 1987.

Core Competencies

The Master's program in Geomatics allows students to broaden and deepen their expertise in Geo-spatial data acquisition, data analysis and visualization. Along with theoretical learning, studios, lab work, and elective/SWS courses expose students to cutting-edge research and advanced methodologies, as well as real-world problems and case studies, which promote key transferable skills such as teamwork, problem solving, critical thinking and communication.

At the end of the two years of the program, students develop the following core competencies, in order to meet the changing demands of the industry and excel in their workplace:

1. Geographic Information System (GIS)
2. Optical, Hyper-spectral and Microwave
3. Global Navigation Satellite System (GNSS)
4. Photogrammetry & Unmanned Aerial Vehicle (UAV)
5. Geospatial Programming and Web-GIS
6. Database Management System (DBMS)
7. Artificial Intelligence and Machine Learning (AI & ML)
8. Geo-spatial Analysis and Modelling
9. Spatial/Urban Data Science
10. Applied Statistics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Shree Ami Infrastructure
Saket 2 cricket ground
Dhananjay farm cricket ground
75M
D:55M
S:5.4M/S
V.S:0.0M/S
G:-65°

Course Curriculum

Semester – I

Geospatial Technologies: Fundamentals Studio

This studio introduces the students with the basics of GIS, spatial databases, spatial thinking, and map-making. They will learn data creation and digitization, accessing open data, processing various kinds of data and conduct geospatial analysis to address problems/issues/challenges. As a part of the studio, to facilitate the student's ability to develop thematic geo-visualization skills using GIS software a modular component on Introduction to GIS and cartography shall be covered. As a part of the studio, several interactions with experts and planners will be carried out to understand and solve problems using geospatial technology. Towards the end, the students would be able to solve or propose probable spatial solutions.

Earth Observation Systems

This course provides the fundamentals of remote sensing and satellite image processing. The remote sensing data acquisition principles along with satellite image processing techniques would be covered. Specifically, several image enhancement techniques and classification algorithms will be covered with suitable examples.

Effective Communication

The course presents new paradigms of leadership communications in the form of maneuvers that can act as game changers in complex scenarios that require critical thinking, comprehending ever-evolving mutable market scenarios and interlacing changes in organizational structures, crucial decision making, and persuasive merits in interacting with internal and external stakeholders. The course presents new strategic frameworks of communication both theoretical and practical demonstrating their applications in diverse domestic and international corporate cases.

Geospatial Programming Methodology

This course deals with programming skills and database development in the field of geospatial technology. The programming languages like html and java would be covered. Apart from the programming skills, the spatial database development component would be taught with hands on sessions.

Course Curriculum

Semester – II

Geospatial Technologies: Predictive Modelling and Analysis Studio
This studio aims to equip students with analytical and modelling skills essential for addressing real-world challenges. The students will use GIS along with statistical and machine learning methods to predict future events or trends based on spatial patterns and relationships. Forecasting various phenomena like urban growth, urban heat island, pollution, etc. will be the thematic areas for which the students will performing model. Validation and testing will be done to ensure the model's accuracy and reliability. Geospatial predictive modeling is invaluable in fields like urban planning, environmental management, public health, and disaster response, providing critical insights that help decision-makers plan and mitigate future challenges effectively.

Python Programming for Geoprocessing
This subject emphasizes learning programming centered around geospatial applications. The students will be taught logic and sequence, the models and designs useful to write a program applied to geospatial data. Learning programming, their structure, and flow in Python and getting acquainted with libraries curated for dealing with geospatial data, would enable learners to see solutions to real-time world problems through powerful capabilities offered by Python libraries.

Hyperspectral, Microwave and Thermal Remote Sensing
This course provides the theoretical foundation of Microwave and Hyper-spectral remote sensing. The Synthetic-aperture radar (SAR) polarimetry and interferometry techniques will be covered along with the hyper-spectral data processing and analysis.

Geospatial Analysis
The course provides different methods and techniques for analysing spatial data. Several thematic areas such as watershed analysis, multi-criteria decision analysis (MCDA), nearest and neighborhood, network analysis, spatial interpolation point pattern analysis, spatial regression, and hot spot analysis will be taught with several case studies.

Course Curriculum

Semester – III

3D Modelling and Application Studio

In the studio, students will explore different methods, techniques, and technologies to build a 3D model and work with different 3D data structures, tools, and algorithms to handle the third-dimensional aspect of the real world. All the data collection, creation, and application pertaining to 3D will be carried out in an urban environment to address real-world problems. Also, students will be working with open-source software/tools to interact with the 3D objects and customize the model as per the given application. The application and importance of the 3D model will be further explored in thematic areas in the GIS environment.

Applications of Spatial Big Data & Analytics

This course shall cover the fundamental concepts of Machine Learning, Artificial Intelligence, and Deep Learning with special emphasis on Geospatial applications and spatial and Nonspatial. From forecasting to estimations to classification techniques. The tools themselves can assist in analyzing as well as predicting key parameters within themes for various applications like traffic estimation, weather forecasting, error detection, material identification, etc.

Digital Photogrammetry and Terrain Analysis

This subject covers the principles of Photogrammetry with conventional and modern approaches. The emerging UAV technologies and their application will be covered towards 3D spatial object reconstruction. Also, the latest developments in scanning and LIDAR technology will be covered with suitable examples. Through this course, students will be able to Understand the theoretical basics of photogrammetry and Extract 3D models using photogrammetric approach.

Web GIS and Server Architecture

The course will teach students to set up web services for creating maps, web services for managing spatial data, and webservices for processing spatial data. This course will challenge students to exercise critical thinking and technical knowledge needed to evaluate and develop successful Web GIS projects.

Semester – IV - DRP

Total Credits = 80

Studios Credits = 12 Each,

Mandatary Course Credits = 2 Each | DRP Credits = 14 | Other

(Elective + SWS) = 12

Note: Curriculum is subject to change to cater the challenging problems of the industry and society

Elective & Summer Winter School

CEPT University cherishes the individual interests and abilities of its students. Students get a chance to chart their learning paths by completing a portion of their credits by choosing from a wide range of elective courses offered at any of the five faculties at the University. It gives them a greater exposure to a wide range of disciplines related to the built- environment and an opportunity to collaborate on a multi-disciplinary campus. The Summer Winter School (SWS) programs differ from the regular semesters in terms of structure, approach, and content. The keywords that capture the spirit of SWS are experiment, variety, and innovation. They explore emerging areas, provide space to test new ideas and methods, facilitate in situ experience, help understand critical sites and situations, and create opportunities to learn by making. The courses in SWS are intense and are for short durations of between two to four weeks. Following is an indicative list of electives and SWS courses offered to students:

ELECTIVES:

- Machine Learning and Artificial Intelligence for Spatial Analysis
- Tackling Urban Climate Change Using Systems Thinking
- GIS for Engineers
- GIS for Cities
- GIS for Public Health
- Spatial Hydrology
- Applied Statistics with Python and Excel
- Data Science and Machine Learning with Python
- Graph Theory
- Geospatial Technology for Analyzing urban climate change

SWS COURSES:

- Urban Data Science
- Location Intelligence
- Image Processing and its applications with Python
- Python for Beginners
- Google Earth Engine for Beginners

Teaching Team

Manushi Bhatt
Assistant Professor & Program Coordinator - MGEO

Shiv Mohan (PhD)
Project Director ISRO (retd.)

Santosh Gaikwad
Director Geo Solution
Nascent Info Technologies

Pratik Mehta
Principal Consultant
Amnex Infotechnologies Pvt. Ltd

Mayank Singh Sakla
Founder of AccionLAND

Manish Patil
Founder of Byte Prophecy

Aditya Saraswat
GIS Business Analyst at Nascent Info Technologies

Lectures & Webinars

The University invites some of the brightest minds from around the world to speak to students on cutting-edge developments in construction, architecture, planning, design, urban habitat development, and other global issues. Following is an indicative list of webinars hosted at Faculty of Technology in the past few years:

2022

• A lecture on **Radar Polarimetry methods for the diagnosis of Geo / Environmental Hazards** by Dr. Gulab Singh, Professor from IIT-B

• A lecture on **GNSS Remote Sensing & its applications** by Dharmendra Kumar Pandey, Scientist from SAC, ISRO

2023

• A lecture on **Scope and Capabilities of smart cities** by Manthan Soni, Associate director from PwC, India

• A lecture on **Rajkot: A Smart City** by Heema Patel, Senior Consultant from PwC, India

• A lecture on **Geospatial in smart city- improving standard of living** by Vinay babu adimulam, National Head - BD, Strategic Account from Hexagon

• A lecture on **Essential Geospatial Skills for students and Researchers** by Ujjaval Gandhi, Founder from Spatial thoughts

• A lecture on **Application of Geospatial Technologies for Smart Cities** by AGI

• A lecture on **Mangalyaan: India's First Mars Orbiter Mission (MOM)** by Sampa Roy, Scientist from SAC,ISRO

• A lecture on **Remote Sensing: Earth and Beyond** by Nilesh Desai, Director from SAC,ISRO

• A lecture on **GeoBIM: Current and Future Trend**s by Satej Panditrao, Technical manager from AGI |Chandrashekhar Sayankar, Vice President from Ceinsys |Roma Malik, Senior Presales Engineer from ESRI India |Ramana Reddy, Senior Vice President from Avineon

• A lecture on **Introduction to Google Earth Engine** by Aakash Malik, Program Associate - Urban Water Resilience from World Resources Institute

Lectures & Webinars

2024

• A lecture on **How GIS played a role in transformation of Gujarat International Finance Tech-City (GIFT City)** by Sunit Surati, Head of Business Operations, Locusview, India

• A lecture on **Hyperspectral Remote Sensing: Indian and Global Perspective** by Dr. Bimal Bhattacharya, Group Director, EPSA, SAC-ISRO, Ahmedabad

• A lecture on **Applications of UAV (Unmanned Aerial Vehicle) for energy studies** by Tej Chavda, Senior Research Associate, CARBSE

• A lecture on **Differential Global Positioning System (DGPS)** by Prof Komal Parikh, Assistant professor, Faculty of Technology, CEPT University

• A lecture on **Applications and Experiences on working in the Geospatial Industry** by Shailesh Gaur, Former Adjunct Professor, NIAS

• A lecture on **3D Modelling in Urban Area and its Applications** by Gaurav Jain, Head UGAD, SAC-ISRO, Ahmedabad

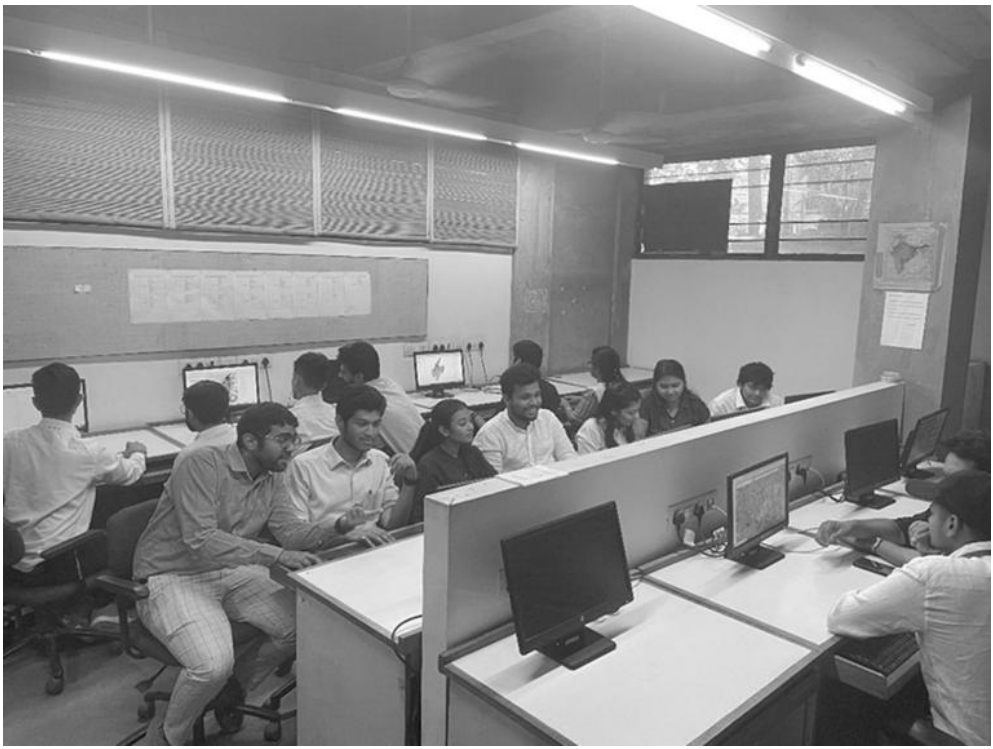
• A lecture on **Fundamentals of GNSS remote sensing and its applications** by Dharmendra Pandey, Scientist/Engineer – SF, SAC-ISRO, Ahmedabad

Learning Environment & Campus Life

The atmosphere on CEPT campus is lively and conducive to free thinking. Interdisciplinary learning is encouraged and students get to collaborate with other built-environment professionals within the ecosystem of CEPT University.

The state-of-the-art library has a wide variety of books, foreign journals, and other resources available to all students making CEPT University one of the best for built-environment resources in the country. Students have access to various labs and several GIS and image processing softwares (ArcGIS, ERDAS, ENVI, LPS, ContextCapture) for processing Geo-spatial data.

There are in-house IT support, premium printing and stationery facilities, student service office, university press and other services are some additional facilities that enhance the learning environment at the university.



Student Activities

CEPT University boasts of a multifaceted culture on and off-campus, reinforcing its image as an institute that inculcates all-round development of its students. The diverse community comes together to celebrate traditional and regional festivals on-campus throughout the year. Sports competitions such as the Amity Cricket Cup, Volleyball Tournament, Box Cricket League and others fosters a positive environment, giving ample opportunities to participate.

Our students also actively participate in national scholarship programs, conferences, and technical competitions. The Faculty of Technology also collaborates with premier institutions (from industry and academia) to celebrates Engineer's Day, GIS day, and Remote Sensing day with active students' participation. During Engineer's Day each year, students work around a topic to create awareness through role-play activities, lecture from eminent personalities, quiz contests etc.

Collaboration

The Faculty of Technology (FT) is keen to develop collaborations with renowned industries under the umbrella of MOU and EOI on a willingness to undertake activities related to research and development in the construction sector. The 3 major domains of collaborations are within the industry (DRP, placements, and/or Internships), international universities for exchange programs, and students' chapters with professional associations.

(A) Industry MOUs

1.Association of Geospatial Industries (AGI)
2.NeoGeo Technologies Private Ltd.
3.ESRI India
4.Indian Space and Research Organization

The following are with CRDF - MGEO Academic Collaborations:

1.Indian Institute of Public Health (IIPH)
2.Pixxel Pvt. Ltd.

(B) FT International Universities - Exchange Programs

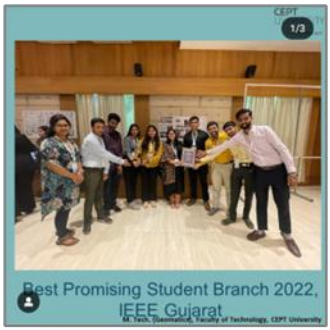
1.Polimi University - Italy

(C) Student chapters initiated by The Faculty of Technology

1.IEEE GRSS - Geoscience and Remote Sensing Society - Established in October 2022

Achievements

Excellence in GIS Education awarded by ESRI



Most promising student branch of IEEE Gujarat

A student won prestigious ESRI Scholarship of 1 Lakh

An asteroid on alum's name for her research

1st prize for GIS Day Celebration 2022 by ESRI India

1st position (2023)

2nd position (2023)

2nd position (2021)

2nd position (2020)

Winners of digital competition held by URISA (Urban & Regional Information Systems Association) to promote GIS Profession

Past Recruiters

Alumni Testimonials

Shravya Attri | Engineer
ESRI Technologies Pvt. Ltd

Being part of CEPT's Master's in Geomatics program has enriched my professional experience by honing both technical and soft skills. The studio-based learning approach ensured a thorough understanding of core concepts, applicable to real-life scenarios. Interactions with industry professionals, engagement in events like workshops, and collaboration with peers from diverse backgrounds have enhanced my problem-solving perspective. The supportive environment created by the Faculty of Technology and respected faculty members has brought out the best in my two-year journey.

Vikhyat Gupta
WebGIS Developer
WWF - India

Studying at CEPT has been an amazing experience, with a curriculum ensuring comprehensive coverage of GIS & Remote Sensing topics. The program also exposes students to relevant industry technologies. The studio-based learning provides a unique platform to solve real-world problems, applying classroom knowledge to understand how GIS technology can benefit society. Supportive faculties and mentors offer constant feedback for improving the quality of studio work. Each semester includes an exhaustive list of elective courses, spanning disciplines like planning and architecture, broadening perspectives on how Geomatics can be integrated across various sectors for meaningful insights.

Dr. Pooja Shah
PostDoc, University of Tasmania, Australia

During my two years (2016-2018) in the Master's in Geomatics Program, I have worked on many research projects, studios, international summer school and have been acknowledged at international level for my work. It has been the most rewarding experience of my life and I am always glad to share that I received my Master's in Geomatics from CEPT, where I was taught by highly experienced faculty members. The program combines academic knowledge and professional skills that one can immediately transfer and apply into their work environments.

Shraddha Kulkarni
Research Associate
CRDF

CEPT University provides a wonderful learning atmosphere in which you can enjoy the studies and learning process. The Master's program in Geomatics assisted me in gaining in-depth knowledge of remote sensing, machine learning, GIS technology, and other similar topics. Studio learning allows students to apply what they've learned in the classroom to real-world situations. My classmates were a big support during online group studies. Having peers from varied background, from geography to engineering has really broadened my horizon. The all-time support and motivation of faculty member has enlightened me throughout this wonderful journey.

Gaurang M. Patel
MD, SmartX City India

Studying Geomatics at CEPT University has been a very fulfilling experience. The program offers both hands on practical experience and theoretical understanding on concepts. The mentors at CEPT University helped me enhance my academic and interpersonal skills. My two years have been a wonderful experience of learning with a prolific exposure to the industry.

Aakash Malik
Senior Consultant,
Alluvium Consulting
India

Pursuing Master's from the Geomatics program of CEPT university was one of the best decisions I have made till date. It has shaped my future in a very exquisite manner. Studying in the course has given me major insights on how GIS and remote sensing can intersect with different programs and create value whether it is architecture, urban planning or construction management. I believe one cannot get so much of cross cutting interdisciplinary experience in any other university which is much needed when you are studying in the field of Geomatics.

UNIVERSITY DETAILS

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Scan for further details about MGeo

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Submit you application on
https://admissions.cept.ac.in/cept-adm-login.php