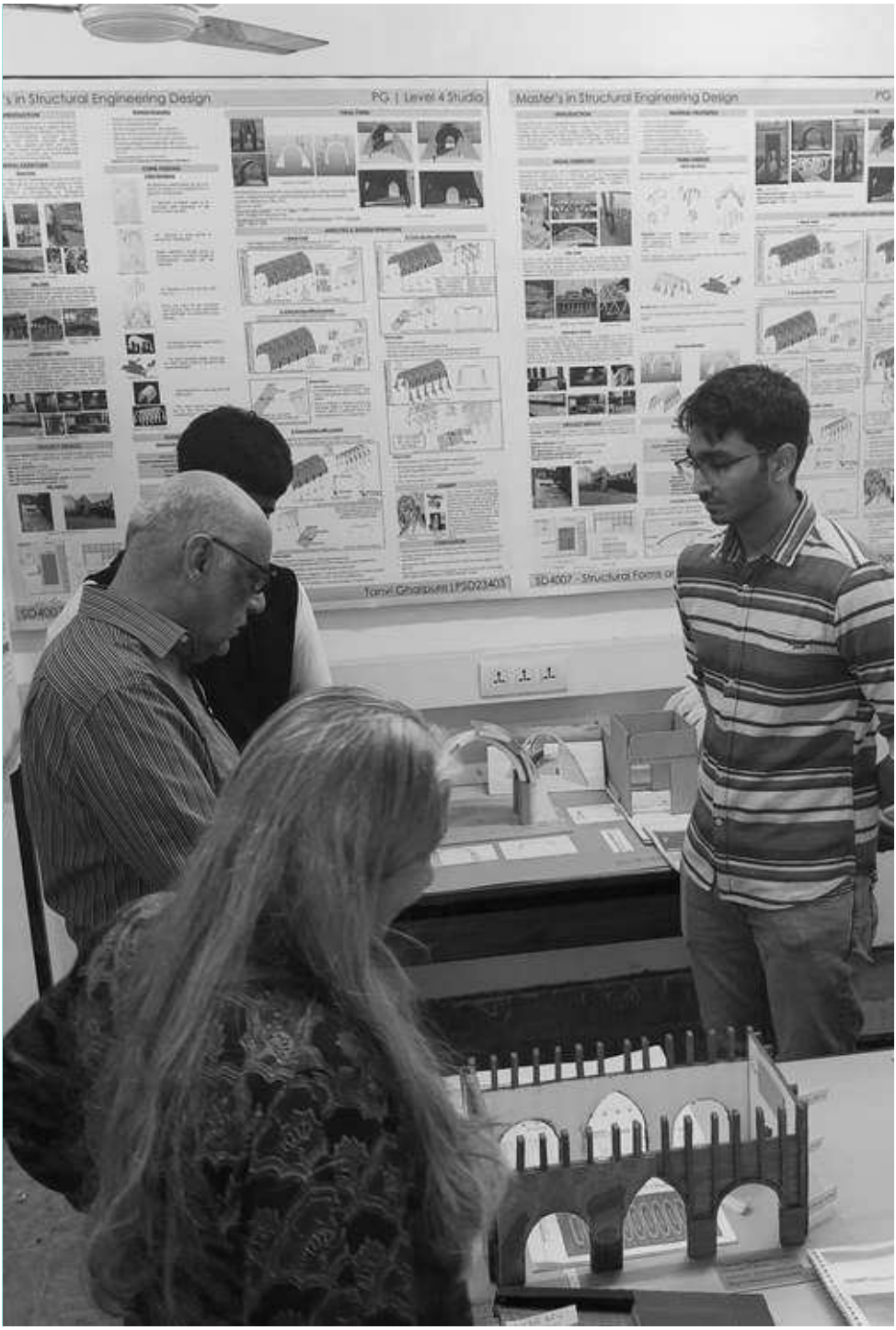
PROGRAM BROCHURE

M.TECH STRUCTURAL ENGINEERING DESIGN

FACULTY OF TECHNOLOGY

CEPT UNIVERSITY

FACULTY OF TECHNOLOGY


Master's in Structural Engineering Design
PG. | Level 4 Studio
Master's in Structural Engineering Design
PG

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FT
Faculty
of Technology

About CEPT University

CEPT University, established in 1962, focuses on understanding, designing, planning, constructing and managing human habitats. Its teaching programs aim to build thoughtful professionals and its research programs deepen understanding of human settlements. CEPT University also undertakes advisory projects to further the goal of making habitats more liveable. Through its education, research and advisory activities, CEPT strives to improve the impact of habitat professions in enriching the lives of people in India's villages, towns and cities.

CEPT University takes its name from the 'Centre for Environmental Planning and Technology'. CEPT and the various schools that it comprises were established by the Ahmedabad Education Society with the support of the Government of Gujarat and the Government of India. The Government of Gujarat incorporated CEPT as a university in 2005. In 2007 the University Grants Commission recognized CEPT University under section 2(f) of the UGC Act, 1956. The Department of Scientific and Industrial Research (DSIR) of the Government of India recognizes the University as a Scientific and Industrial Research Organization (SIRO).

The University comprises Six faculties,

Faculty of Architecture (FA)
Faculty of Planning (FP)
Faculty of Technology (FT)
Faculty of Design (FD)
Faculty of Management (FM)
CEPT Foundation Program (CFP)

About Faculty of Technology at CEPT University

With the Indian construction industry rapidly expanding multifold, there is an increasing need for efficient and qualified professionals to sustain this growth. Our course lays 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 (Honours) - (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**
  - Teacher Student Ratio 1:8
  - Creative Problem Solvers
  - Innovative Engineers

- **Pre-Admission Scholarships**

- **Earning while Learning**

- **Study Abroad**

- **Practical Training**

- **Cutting edge Library and Workshops**

- **NABL Accredited Laboratory**
  - Engineering Materials
  - Earthquake Engineering
  - Fluid Mechanics
  - Geotechnical Engineering
  - Concrete Technology
  - Non-Destructive Testing
  - Surveying & Levelling
  - Building Energy Efficiency
  - Environmental Engineering
  - Conservation Lab

- **Computer Lab**
  - Auto Desk Products
  - Bentley Education Suite
  - DIANA FEA
  - ETABS

Lectures & Webinars

Engineering graduates and postgraduates are expected to possess diverse skills and specialized knowledge for effective planning, design, implementation, and management of tasks. To bridge the gap between academia and industry, FT has established student chapters with professional organizations. These chapters connect students to professionals, offering exposure to real-world practices in civil engineering. Activities include expert talks, panel discussions, competitions, educational tours, and symposiums, fostering technical, professional, and interpersonal growth.

Collaboration

The Faculty of Technology (FT) is keen to develop collaborations within the industry, international universities for exchange programs, and student's chapters with professional associations.

FT International Universities - Exchange Programs

1. University of Melbourne - Australia
2. Polis University - Albania
3. HFT Stuttgurt University - Germany
4. Instituto Politécnico de Castelo Branco(IPCB) - Portugal
5. Polimi University – Italy

Currently, FT is hosting the following student chapters:

- Indian Association of Structural Engineers (IAStructE), Gujarat Chapter
- IC - American Concrete Institute

Master's in Structural Engineering Design (MSED)

CEPT University offers a two-year full-time post-graduate program leading to Master of Technology (M. Tech) in Structural Engineering Design (MSED). The program thrives to cultivate engineering proficiency in the students and working professionals in the field of Structural Engineering, in line with the ever-changing demands of the profession.

In the recent era, a wide gamut of ambitious structures is being designed across the world challenging the structural engineers to connect the demands of geometry, materials, and forces for these structures. With a unique blend of theory and practice, this program offers unparalleled excellence through the rich array of courses delivered by core faculty members and practicing professionals.

The program equips the engineers & architects with conceptual understanding and advanced knowledge of the materials and areas related to earthquake engineering; Bridges, Silos, Chimneys, Marine structures, Heavy-duty industrial structures; Foundation engineering, Structural analysis and computation; Repairs and restoration of structures.

It is a pioneering program that follows the studio pedagogy wherein live projects designed, and detailed by students under the guidance of faculty members. The Studios and courses of the program elicit the critical thinking in the engineers & architects to face the challenges, to develop solutions of a given problem with innovative as well as integrative technologies in structural engineering and construction.

Students do have an opportunity to go out of the country for summer winter schools and exchange studies with reputed organizations and universities in India.

The only structural engineering program in India where architects can also join, is developed with an objective to develop competent structural engineers who are industry ready to work in the profession. Graduates of the MSED program have a wide array of choice of career in field of industries, marine structures, bridges, institutional buildings, conservation and academics. They do get engaged in independent research or undertake doctoral study at some of the best academies and research organizations across the world.

Dean & Program Chair's Message

Dr. Aanal Shah
Dean
Faculty of Technology

Program Chair
Structural Engineering
Design

As Dean...

"CEPT University offers teaching programs, aimed to build thoughtful professionals, where the students are engaged with studios offering well-designed life-like problems. This objective is realized by collaborative work of eminent practicing professionals and faculty members at the university. It provides a nurturing environment to the students to learn new skills and gain practical experience giving access to latest software and workshops along with multi-disciplinary learning opportunities.

The program equips students with the advanced knowledge and conceptual understanding of the core areas such as concrete, steel, masonry, timber and composite structures; dynamic impact and earthquake engineering; special structures – bridges, silos, chimneys, marine structures, industrial structures and heavy duty structures; foundation engineering, structural analysis and computation; repairs and restoration of structures.

The program sharpens the research skills of the students to provide a competitive edge while embarking their career. The program also has excellent links with industry which enhances professional skills and improves employability chances of the students."

As Program Chair...

"The MSED program was conceived with an aim of providing students with sound principles of structures and their application in real world design problems. With a unique blend of theory, practice and studio based learning, it offers unparalleled excellence through the rich array of courses designed by core faculty members and practicing professionals. Starting from elemental level design to system level design along with detailing of structures, our students are exposed to this rigorous journey through models, discussions and problem-solving approaches incorporating national and international standards.

With a combination of sound analytical background and practical approach, every student of this program is well equipped with the required professional skills and can be the finest choice for any organization."

The graduates from this program have embarked upon the professional journey as entrepreneurs, design engineers and academicians. I am sure these dynamic students of the MSED program will be an asset in any organization as they are trained to face the professional challenges along with solving the larger issues of the society.

Course Pedagogy

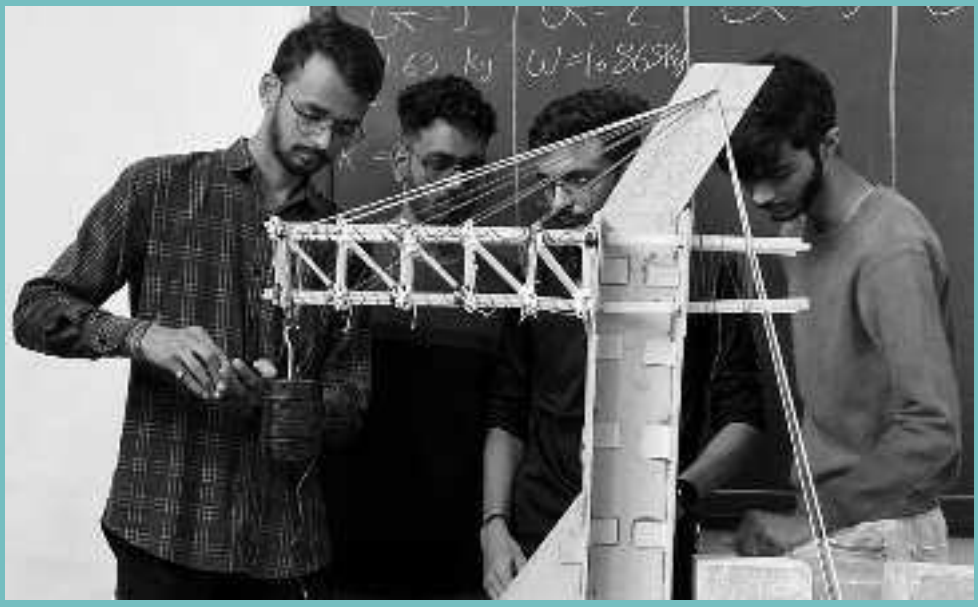
The MSED program at CEPT is centered on Studio-based teaching and learning pedagogy. Engineers & Architects are assigned live building projects straight from the architect's office and they work as professional structural designers from the first day of the course. The complexity is introduced at the later semesters with studios offered in the areas of heavy duty industrial Structures, bridge design and structural strengthening and Retrofitting. Studios comprise of 75% of the credit requirement and hence they demand much rigor and depth throughout the tenure of the course. Studio pedagogy ensures that each student is doing individual analysis, design and detailing of the given projects for each semester. Faculty and Teaching Assistant to student's ratio is 1:8 for all the studios, which ensure personalized guidance to each student. Apart from the full-time faculty members practicing professionals from the industry are invited to teach studios and courses, bringing practical experience to classroom.

Core Competencies

The MSED program thrives to cultivate engineering proficiency of the engineers & architects in line with the ever-changing demands of the profession. The Studios and mandatory courses of the program elicit the critical thinking of the students to face the challenges, seek opportunities and solutions for a given problem with innovative as well as integrative technologies in structural engineering and construction.

The role of structural engineers in the construction industry is changing to meet the demands of the future. The learning pedagogy of the MSED program is designed to provide professionals with transferable skills such as problem-solving, innovation, communication, and collaboration, as well as the technical and domain knowledge they will need to address the sector's problems and changing dynamics.

The graduates of this program can develop the optimized structural systems, analyze, design and detail the structures at a professional level. They are trained to visualize the flow of the forces and arrive at the solution keeping in mind the safety and serviceability of any structure. Through the strong mathematical calculations and reasoning capability, they can justify the final proposed design of a structure.



Course Structure

The two-year program leading to award of Master of Technology in Structural Engineering Design is designed to enhance skills & knowledge of structural design for the students and working professionals in the construction and civil engineering sector.

The program aims to train engineers & architects in practical art and philosophy of structural design. It also gives the insight into investigation, assessment and strengthening of the damaged structures. The program also engages the students into the design of ongoing important industrial structures such as power plant structures, chimneys, silos, water tanks, bridges and ports.

The MSED program focuses on building professional capacities and therefore, they are concentrated on 'studios'. The studio-based courses wherein all students work on live projects and develop structural systems, analysis and design. The eminent professionals from design offices are invited to teach the students and share their experiences.

Total 80 credits	**SEM 1** 18 mandatory Credits	**SEM 2** 18 mandatory Credits	**SEM 3** 18 mandatory Credits	**SEM 4** 14 mandatory Credits	**Electives & SWS** 12 credits during the entire program
STUDIO 12 credits	Structural Forms and Materials	Design of Reinforced Concrete Structures	Design of Steel Structures	**STUDIO** Design of Bridges OR Design of Long Span Complex Structures OR Structural Strengthening & Rehabilitation	Lateral load resisting system Non-destructive testing for everybody Designing with Timber Prestressed Concrete Design of Masonry Structure Plates and Shells: Theory and Computer Aided Analysis Design of Marine Structure Finite Element Methods Design of Ultra High-rise structures and many more from other faculties
MANDATORY COURSES 2 credits (each)	Advanced Structural Analysis Advanced Geo-Technical Engineering Effective Communication	Earthquake Engineering Wind Engineering Evaluation of Failures, Repair & Rehabilitation of Structures	Design of Chimneys Design of Silos Design of Liquid Retaining Structures		

*The courses/titles may change as a part of regular updating and course related discussions with industry experts.

Course Curriculum

Semester –I

Structural Forms and Materials (12 credits)

The studio explores the intersection of nature, design, and engineering. Students analyze material applicability, flow of forces, and constraints while studying bio-inspired engineering. Through laboratory experiments and model making exercises, they understand structural theories, bridging traditional and modern principles to create resilient structures and innovative building materials inspired by nature's design.

Mandatory Course: Advanced Structural Analysis (2 credits)

The course focuses on understanding framed structures' behavior using advanced matrix analysis. It begins with manual analysis of simple systems, progressing to complex structures with computer applications, emphasizing behavior, analysis methods, and interpretation of results.

Mandatory Course: Advanced Geo-Technical Engineering (2 credits)

The course focuses on geotechnical investigations, covering soil classification, field and laboratory techniques, and experimental tests. Topics include shallow and deep foundation design, bearing capacity, settlement calculations, and ground improvement methods, emphasizing practical applications based on site conditions.

Mandatory Course: Effective Communication (2 credits)

The Writing and Communication course equips master's students with research and writing skills. Through intensive practice, students explore diverse writing forms, field-based data use, and presentation techniques, enabling effective communication of ideas, processes, and analysis to varied audiences.





Course Curriculum

Semester –II

Design of Reinforced Cement Concrete Structures (12 credits)

The studio focuses on reinforced concrete structure design. Students develop structural systems for gravity loads, test models on a shake table for lateral force effects, and develop the structural system for lateral load with optimized design. Final outputs include detailed structural drawings, software files, and a comprehensive report.

Mandatory Course: Earthquake Engineering (2 credits)

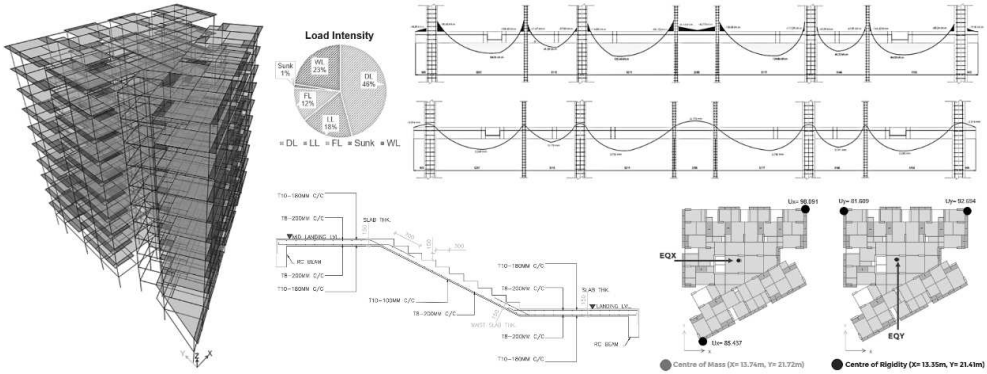
The course links seismology, seismic forces, and structural response. It covers seismology basics, quantification of seismic effects through dynamics, and relationships between forces, mass, stiffness, and damping along with codal regulations.

Mandatory Course: Wind Engineering (2 credits)

The course aims to develop knowledge about static and dynamic wind analysis of structures as per IS875 (part-3)-2015. Wind pressure calculation for RC and steel structures with examples along with its practical application in structural analysis using STAAD software will be covered.

Mandatory Course: Evaluation of Failures, Repair, and Rehabilitation of Structures (2 credits)

The course addresses early-stage structural distress and potential collapse, emphasizing investigation methods. It explores repair, rehabilitation, and strengthening techniques to restore functionality, enhance performance, and extend the service life of distressed structures.



Course Curriculum

Semester –III

Design of Steel Structures (12 credits)

The studio focuses to develop professional competencies of students to analyse and design heavy duty industrial and commercial steel structures. The students will be designing live projects and the outputs will be presented in form of design reports and detailed drawings.

Mandatory Course: Design of Chimneys (2 credits)

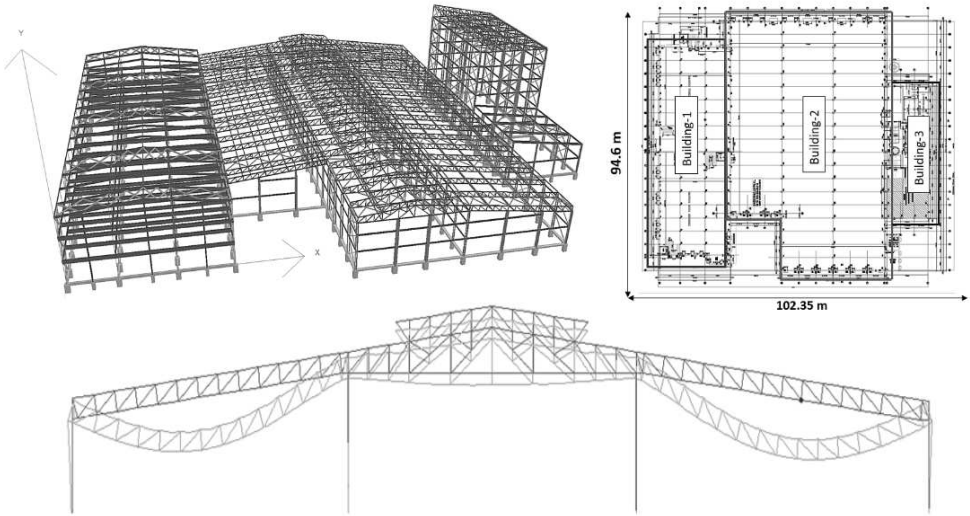
The course focuses on the analysis, design, and detailing of chimneys as per the IS 4998:2015. It covers chimney dimensioning, design factors, self-weight and wind-induced stresses, and temperature difference effects on the chimney shaft.

Mandatory Course: Design of Silos (2 credits)

The course aims to appraise students regarding the analysis, design and detailing of Silos as per IS 4995:1974. The course will also cover independent projects for special silos such as concentric, compartment, battery, etc.

Mandatory Course: Design of Liquid Retaining Structures (2 credits)

The course covers the analysis and design of liquid-retaining structures as per IS: 3370-2021, including seismic forces and detailing. It also discusses the history, behavior, and performance of these structures under various parameters and conditions.



Course Curriculum

Semester –IV

Design of Bridges (14 credits)

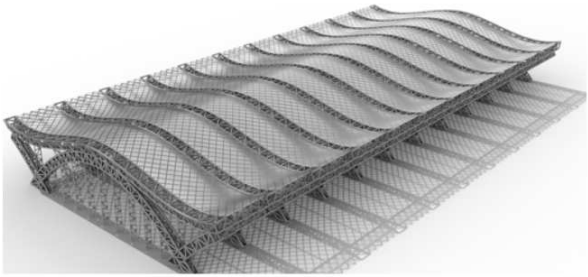
The studio aims to develop structural engineers with a strong understanding of bridge design theory and applications. Students will explore various bridge types, site selection factors, material, span, and systems. They will design and analyze individual bridge components, gaining proficiency in bridge design using Indian standards

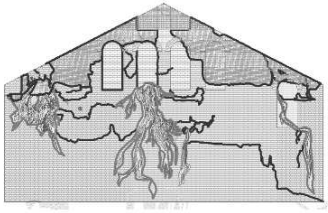
Design of Long Span Complex Structures (14 credits)

This studio emphasizes collaborative design for large-span structures using computational and parametric tools. Students will develop complex forms, analyze them with Karamba or software like STAAD/ETABS, and design complete structures, including pedestrian bridges, stadiums, and airports focusing on different construction materials and detailing of the whole structure.

Structural Strengthening and Rehabilitation (14 credits)

This studio provides comprehensive training in structural strengthening and rehabilitation, focusing on sustainable techniques for diverse materials. Students will learn damage diagnosis, nonlinear analysis, and fitness-for-safety analysis through case studies, perform parametric failure analysis, and explore optimization and feasibility, gaining valuable insights into addressing structural challenges at multiple levels.





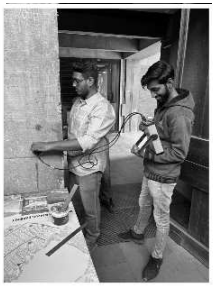
Electives & Summer Winter School (SWS)

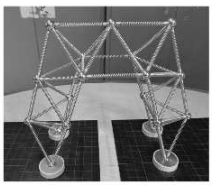
These programs offer a distinct approach, structure, and content compared to regular semesters. Students can choose electives from FT or other CEPT faculties and explore SWS courses for unique learning opportunities. These programs foster interdisciplinary learning, interaction with diverse professionals, and showcase CEPT's academic excellence.

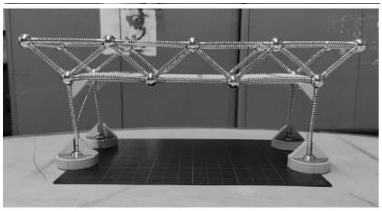
Summer Internships

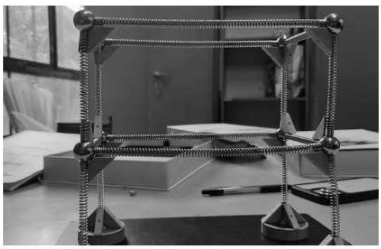
Students have done internships at various structural consultancy firms to obtain the necessary knowledge and experience in the field of structural engineering and design. It enables them to understand the concepts and apply them during the semester tutoring, also giving them exposure to operations of the workplace.

Some the consultancy firms, include Ami Engineers, Sterling Engineering,Sai Consultants, S3M,NK Shah Consulting Engineers LLP, Parvati Techno Consultant,StructArt, Setu Infrastrucre, Eckersley O'Callaghan, EPICONS Consultants Pvt Ltd, Vinod Shah Consulting Engineers Pvt Ltd., Pedanekar and Associates, L.N. Malviya Infra Projects Pvt Ltd., Aries Consulting Engineers, Silicon Engineering Consultants Pvt. Ltd., etc.









Teaching Team

Aanal Shah (PhD)

Dhara Shah (PhD)

Kanisha Vora

Minoli Shah

Pratik Gajjar (PhD)

Aashlesh Gandhi

Bhairav Patel

Devang Patel

Dhruvin Parekh

Hiten Shah

Krunal Metha

Meet Shah

Mehul Shah

Mihir Vora

Rakesh Shah

Roshan Prajapati

Rupal Shah

Samir Mehta

Shashin Patel

Site Visits

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 Eco-system of CEPT University.

Students have access to labs that facilitates various testing and mapping related to Engineering Materials, Fluid Mechanics, Geotechnical Engineering, Concrete Technology, Non Destructive Testing, Surveying and Leveling, Remote Sensing, GIS and Building Energy Efficiency, and Environmental Studies. The labs also provide the earthquake shake table for shaking structural models or building components, to assess their seismic performance. The FT-BIM Advancement Lab, in collaboration with Bentley BIM Institute, houses more than 50 licensed softwares including STAAD connect edition (whole Bentley package), CSI – ETABS and SAP, AutoCAD and Microsoft Office.

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. The state-of-the-art library has a wide variety of books, journals, and other resources available to all students making CEPT University, one of the best for built-environment resources in the country.

Student Activities

CEPT University boasts of its multifarious and multifaceted culture on and off-campus, reinforcing its image of an institute that inculcates an all-round development of its students. The multicultural aspect of CEPT University makes it possible for students to celebrate traditional and regional festivals on campus with zest. Sports competitions such as the Amity Cricket Cup, Volleyball Tournament, Box Cricket League, and others, fosters a positive environment, giving ample opportunities to participate.

Why hire us?

1.Beyond Four Walls

The teaching pedagogy of CEPT emphasizes on the practical application of knowledge. The theory involved in designing a project is supplemented with real-life examples in the studio. Further, exposure to live projects in the studios and in the form of internships and expert lectures, provide limitless learning to the students, extending far beyond the four walls of the classroom.

2.Future Ready

The MSED program ensures that the students possess the necessary software skills that are required in the industry. The knowledge of theory coupled with technical skills helps the students to adapt faster in the practice, making them competent in finding the perfect blend between design and engineering.

3.Guided by the Best

The students in the MSED program are not only guided by excellent academia, but also by industry leaders associated with reputed organizations. The review, evaluation, critique, and guidance of the best from the field help mold these young minds and provides a blueprint for the institution and the students to evolve in academic prospects.

4.Balancing Act

CEPT University perseveres to produce students with a holistic personality. Presentations form an integral part of the curriculum, equipping the students with the much-needed soft skills along with the technical know-how. The comprehensive development inculcates a sense of conceptual clarity, and leadership ability, also training the students to structure their ideas logically.

5.A Class of its Own

The culture at MSED helps the graduates become complete professionals with proficiencies ranging from technical understanding to practical application.

6.We Adapt

CEPT University aims to create engineers who do not stop due to obstacles and effortlessly adapt to changes. This fundamental outlook has helped the management and students work through situations of uncertainty, without any impact on the quality of work.

Past Recruiters

Testimonials from Recruiters

Mr. Rakesh Shah (Managing Partner at S3M Design Consultants LLP)

"CEPT students of MSED are well versed with design of industrial structures and special structures. They add value to the structural engineering department of S3M."

Mr. Anal Shah (Owner N. K. Shah Consulting Engineers LLP)

"Our office has quite a few CEPT MSED students working since many years now. We have found that the students from the Program are well versed in structural lot of high quality of education they have acquired has aided them in becoming successful professionals while working in the domain. CEPT has instilled in them a strong work, Ethic, and the high quality of education they have acquired has aided them in becoming successful professionals."

Alumni & Student Testimonials

Jigar Lalwani | MSED (2022-2024)

CEPT University's Structural Engineering Master's program honed my expertise through a comprehensive curriculum, hands-on projects, and expert guidance. Practical experience and interdisciplinary collaboration equipped me to tackle real-world challenges with confidence, laying a strong foundation for my professional journey.

Shruti Pindoriya | MSED (2022-2024)

CEPT University's Structural Engineering Master's program enhanced my skills with a robust curriculum, expert mentorship, and hands-on projects. Interdisciplinary collaboration and advanced resources prepared me to tackle complex challenges, laying a strong foundation for professional growth.

Malav Solanki | MSED (2023-2025)

CEPT University's Structural Engineering Design Master's program masterfully blends theory with practice, offering a transformative learning journey. Its hands-on approach, real-world case studies, and passionate faculty inspire deeper understanding and innovation. Each project challenged me to grow, think boldly, and excel.

Tanvi Gharpure | MSED (2023-2025)

Being an Architect with a Master's in Structural Engineering from CEPT University, I advanced my expertise in structural analysis, seismic design, and software skills. The program offered hands-on project experience and mentorship from industry experts, refining my ability to design efficient, resilient systems.

UNIVERSITY DETAILS

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