Innovations by the Faculty in Teaching and Learning

INNOVATIONS IN DELIVERY METHODS

1. Project-Based Learning

Semester wise micro projects helps students to understand the concepts clearly. Project presentations and model making are conducted for this. Conducted hands-on model-making session, Beyond Blue Prints and Bridge the Gap, as part of project-based learning. Students are Building on this visual foundation, the department integrates Project-Based Learning (PBL)

Department of Civil Engineering

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Maximum Shear Strain Energy Theorem

(MECHANICS OF SOLIDS)

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Simple bending

Summary Table

Theory	Basis	Best For	Accuracy (Ductile)	Conservativeness
Maximum Principal Stress	Normal stress	Brittle materials	❌ Poor	High
Maximum Shear Stress	Max shear stress	Ductile materials	✅ Good	Higher
von Mises Stress	Distortion energy	Ductile materials	✅✅ Very Good	Moderate

Key Takeaway

- For **ductile materials**, the **von Mises theory** is the most **accurate and widely used** in mechanical design (e.g., automotive, aerospace, pressure vessels).
- For **brittle materials**, use the **maximum principal stress theory**.
- If simplicity and conservative design are priorities, use **Tresca**.

Report on Simple Bending - Group 7

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The topic of our study is Simple Bending, also known as Pure Bending. It refers to the bending of a beam under a constant bending moment and is an essential concept in structural engineering. Understanding simple bending allows us to analyze how beams behave under various loads, and to calculate important parameters such as stress, strain, and deflection.

In simple bending, the bending stress varies linearly across the cross-section of the beam. It is zero at the neutral axis-which passes through the centroid of the beam's cross-section and increases towards the outermost fibers. The fibers below the neutral axis experience tensile stress (stretching), while those above it are under compressive stress (squeezing). The neutral axis itself remains free from stress.

Beyond the Blueprints - Civil Engineering Model Exhibition

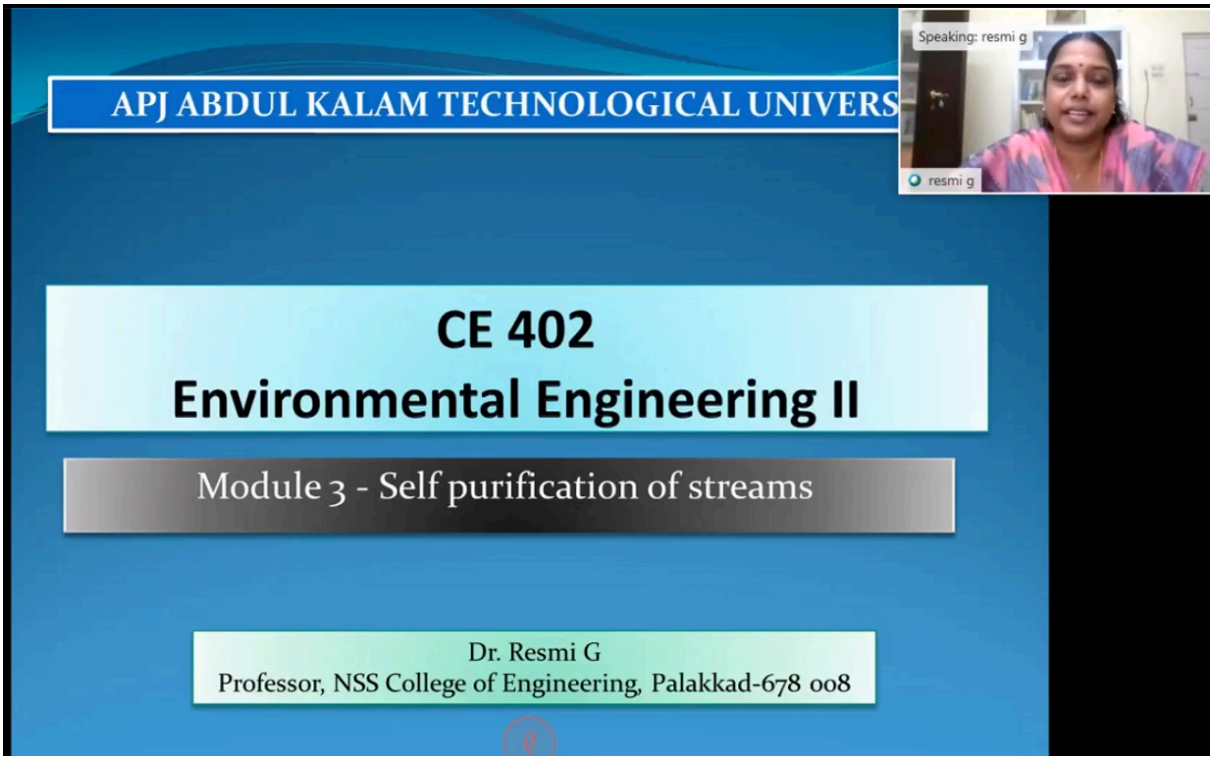
Models of structures from model making session

2. Experiential Learning through Industrial Visits and Hands on Training

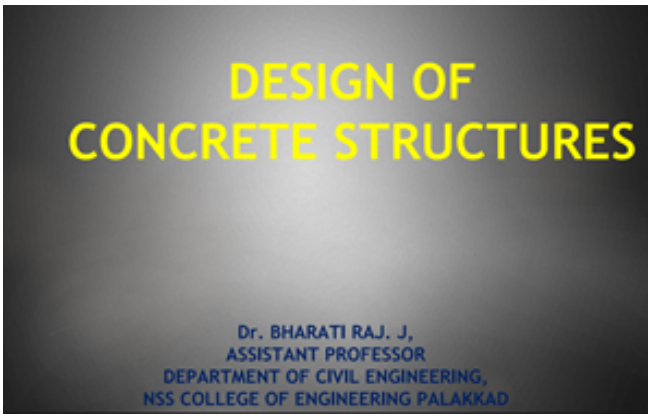
To widen professional horizons, the department orchestrates structured industrial visits and sessions from Industry experts. Recent one was a technical visit to Trusteel PEB Pvt. Ltd, Kanjikode, Visit to Ashtech cement industry, Noida, UP during the 10 days Industrial Visit and Field visit to MDTTI Southern Railway. Another one was a session on modern engineering skills and a technical workshop by Jasim Anamangadan.

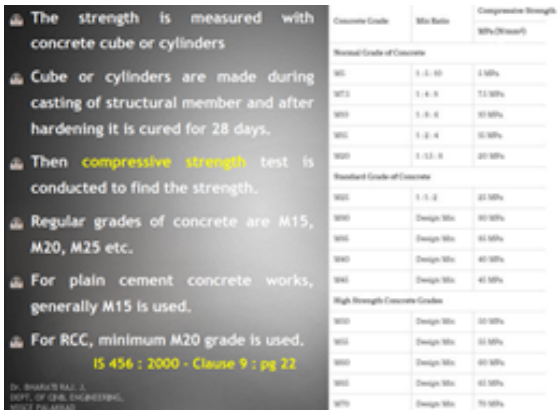
3. Innovative teaching materials developed by faculty

Dr Resmi G, Professor, Department of Civil Engineering has developed video lectures for Additional Skill Acquisition Programme Kerala, (ASAP) Environmental Engineering course for S8 Civil Engineering students.https://share.google/V4rAdZTvnuIvLCM8z (Link)



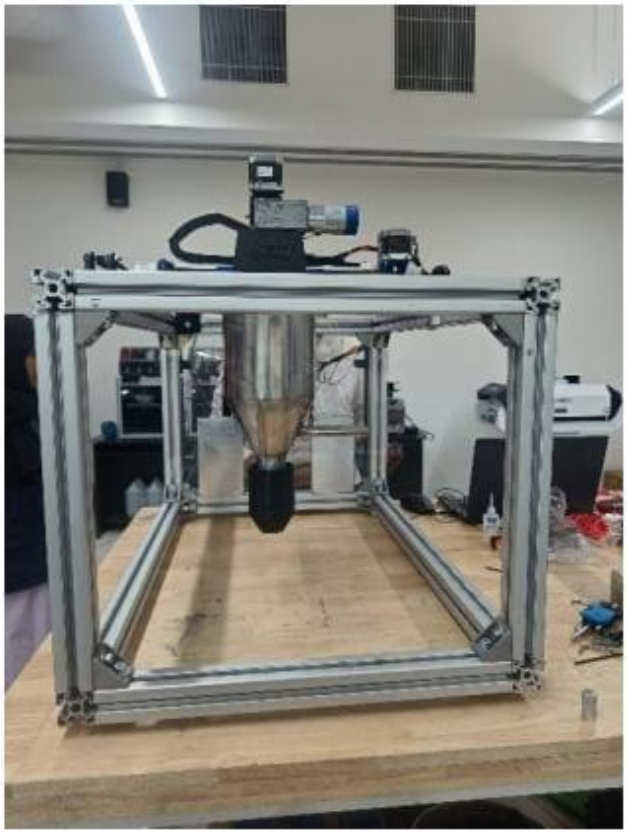
Faculty members prepare PowerPoint presentations for their respective courses to enhance classroom delivery and student engagement. This forms part of the adoption of innovative pedagogical teaching tools, which also include activity-based learning, case studies, group discussions, and the use of multimedia resources.





4. Research integrated learning pedagogy

Two batches of B.Tech students have associated in research-oriented project works under the guidance of Dr. Keerthy M Simon, Assistant Professor in Civil Engineering and developed a Concrete 3D Printer



Research projects titled, “Assessment of influence of rib angle and cross sectional geometry of rebar on concrete- rebar bond strength characteristics” and “Characterization and performance evaluation of Pozzolanic Cements (PC) and PC concretes” under Dr. Nisha A S and Dr. Praseeda K I respectively, provide ample opportunities for students to work on Concrete technology-related project areas.

5. ICT-Led Classrooms

NSSCE’s Civil Engineering classrooms leverage ICT-enabled delivery to enhance learning. Faculty complement traditional chalk-and-talk methods with digital boards, PowerPoint presentations, high-resolution animations, and short video demonstrations, all displayed through LCD projectors. Students have seamless access to these materials—such as PPTs, PDF handouts, and curated video clips—via the Institute’s Learning Management Software Portal (ETLlab).