Student centric skill building to improve core skills for the AEC industry

In the Age of Information, the internet has revolutionized how students gain exposure to iconic built forms, transforming their aspirations and approaches in architectural design. This exposure enables them to engage with global architectural masterpieces, broaden their perspectives, and redefine their ambitions. The digital landscape provides students unprecedented access to resources, and inspiration for exploring parametric forms.

The charm of non-standard geometries and parametric architecture lies in their innovation, complexity, and the creative possibilities they offer. These designs often challenge conventional norms, inspiring students with their ability to combine aesthetics, functionality, and technology.

Architectural students often encounter significant challenges when attempting to translate parametric designs they admire on platforms like Pinterest or Instagram into tangible projects. These challenges stem from the complexity of the design process, a lack of technical expertise, and limited resources. This leads to misalignment between vision and feasibility, lack of contextual and structural understanding and a vast difference between aspired and realized form causing frustration amongst students.

We as an institute have responded to increasing interests of students to be inspired by parametric forms. The aim was to foster enthusiasm and creativity in students while preparing them for modern industry demands.

Strategies used by the institute to Overcome Challenges

1. **Skill Development**:

- Introduce parametric design tools into the curriculum with structured learning pathway.
- Offer workshops on 3d modelling ,coding basics and computational design.

2. **Hands-On Practice**:

- Create studio projects briefs that focus on computational process for form making, prototyping, digital fabrication, and model-making.
- Use tools like 3D printers and laser cutters to translate designs into physical forms.

3. **Realistic Expectations**:

- Teach students to analyze case studies critically, understanding the constraints and processes involved in iconic designs.
- Highlight the iterative nature of design, emphasizing problem-solving over perfection.

4. **Resource Accessibility**:

- Provide access to licensed software, tutorials, and online resources within the institution.

5. **Focus on Fundamentals**:

- Strengthen foundational knowledge in geometry, materials, and structural systems to complement computational tools.

The intent was to empower students to move beyond imitation and toward innovation, transforming parametric aspirations into viable, contextually relevant designs.

Over the period of three years starting from A Y 2022-2023 three studios allowed students to test the principles of parametric architectural design

Sr No	Academic year & Semester	Subject	Title of brief	Duration of capacity building workshop and name	No of students enrolled in program
1	AY 22_23, Sem V	AD IV	Urban Sports Hybrid	Rhinoceros 7 and Grasshopper workshop,16 weeks long	15
2	AY 22_23, Sem V	AD V	Horticulture Expo pavilion	Rhinoceros 7 and Grasshopper workshop,2days workshop	12
3	AY 23_24, Sem V	AD IV	Visitor centre in Western Ghats	Rhinoceros 8 and Grasshopper workshop,12 weeks continuous capacity building sessions	40

The first of the capacity building was in the form of an experimental studio in the year 2022. This was a choice-based studio wherein 15 students elected to use the capacity building sessions to navigate their architectural design project. This batch for AY 2022_2023 had come after a lockdown period of 1&1/2 years and were intimidated by the complexity of the medium. The students found the algorithmic computational mediums complex and time taking since this was their first offline interaction in the institute after lockdown

Based on the feedback received the second experimental skilling was again in the choice based wherein students were given a choice of participating in the skilling workshop. Students were exposed to easier mediums like Rhinoceros 7.0 incrementally about 20 students started using the 3d modelling mediums to navigate their major problem .after seeing the acceptability of the medium a workshop of two days of algorithmic skilling was conducted .12 students opted for it and were introduced the skill via a 2 day workshop on form finding and used the medium to navigate their minor design problem.

Later a team of 4 digital architects proficient in computational mediums teamed up for conducting a choice based studio of 16 weeks for Sem V as a special parametric studio.The aim was to foster enthusiasm and creativity in students while preparing them for modern industry demands.

The following steps were followed

1. **Showcasing Iconic Projects**
   The faculty showed relevant case studies of renowned architects and parametric projects to illustrate the potential of these techniques and inspire students.
2. **Development of Referent models**

   The faculty made referent models (algorithmic)that connected the geometrical aspirations with form finding. student were given these referent models that were devoid of computational complexity and allowed them to experiment.
3. **Curriculum Integration**
   The faculty Introduced courses specifically on computational design, parametric tools (Rhino and Grasshopper), and non-standard geometry concepts that were incrementally conducted in tandem with the design studio and its set milestones
4. **Integration with Emerging Technologies**
   The studio was later integrated with emerging fields like AI, and 3D printing to show its relevance to modern architectural practice and to simplify rendering of the digital design that improved workflow integration and took less post processing time

Planned Outcome for Students

- Enhanced creativity and problem-solving abilities.
- Mastery of cutting-edge tools and methodologies.

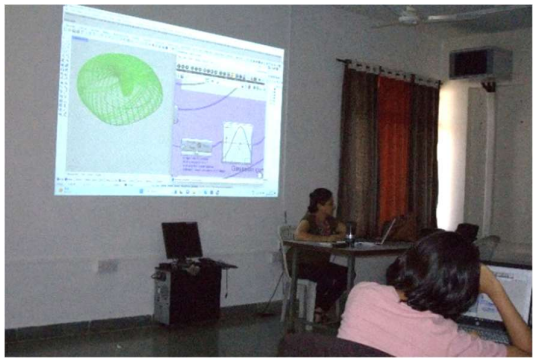
- Exposure to innovative industry trends, preparing them for competitive roles.
- A stronger connection to global architectural movements.

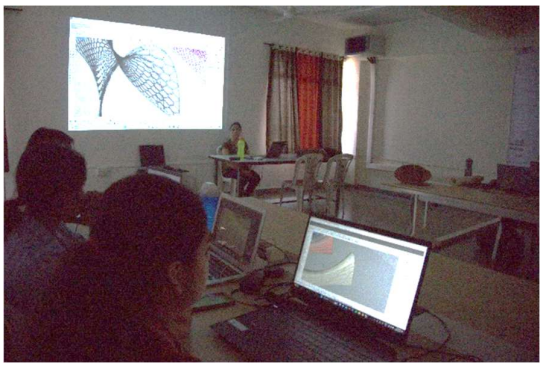
This allowed the institute to create an ecosystem that fosters curiosity, exploration, and practical application, theses three attempts show the way in which we as an institute want to harness the allure of parametric geometries to inspire and empower our students.

Images of workshop

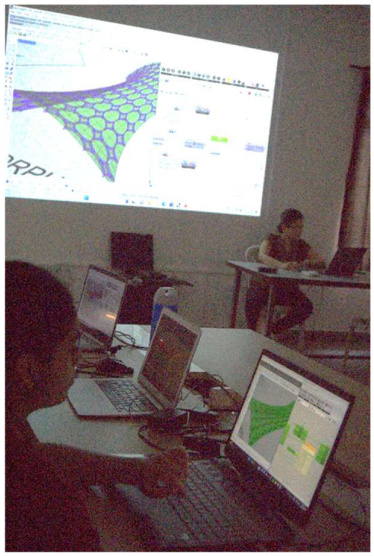

The tutor conducting the workshop with Participants on Day 1

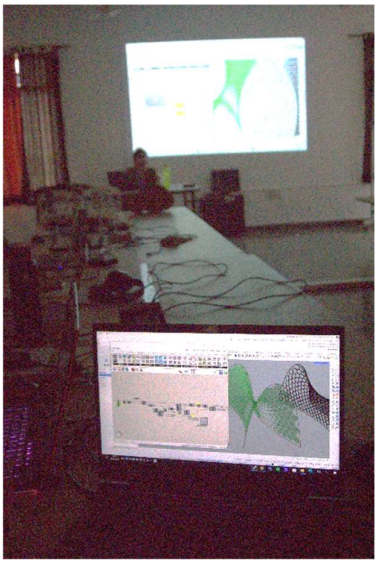

Problem solving and students attending to the tutorial instructions





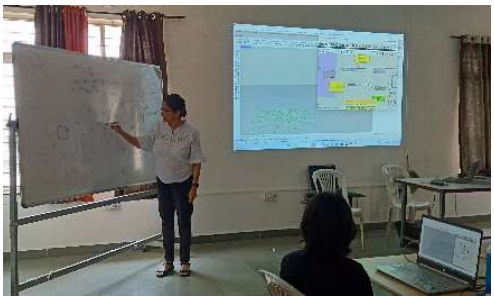
Various grasshopper scripts being introduced on Day 1



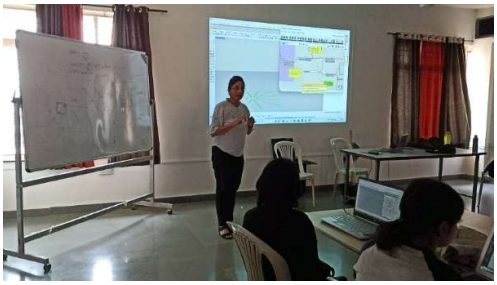


Students emulating the code as it is being taught

Day 2

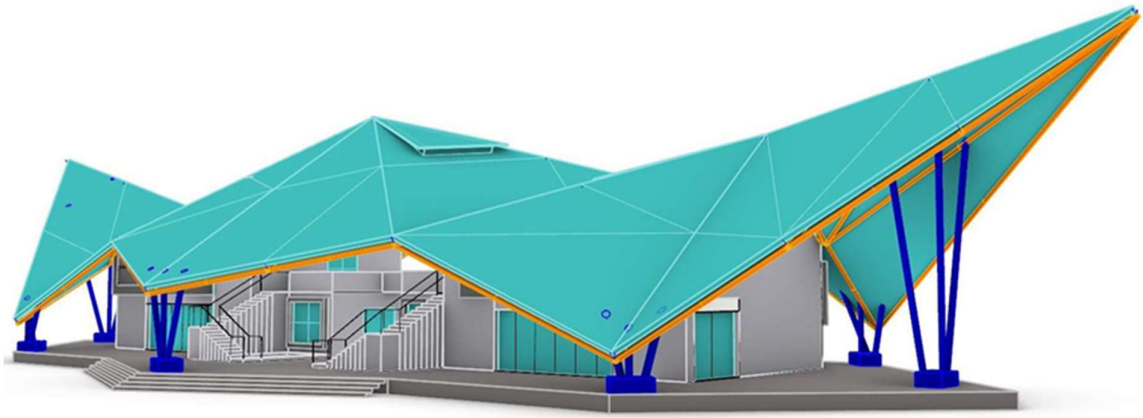


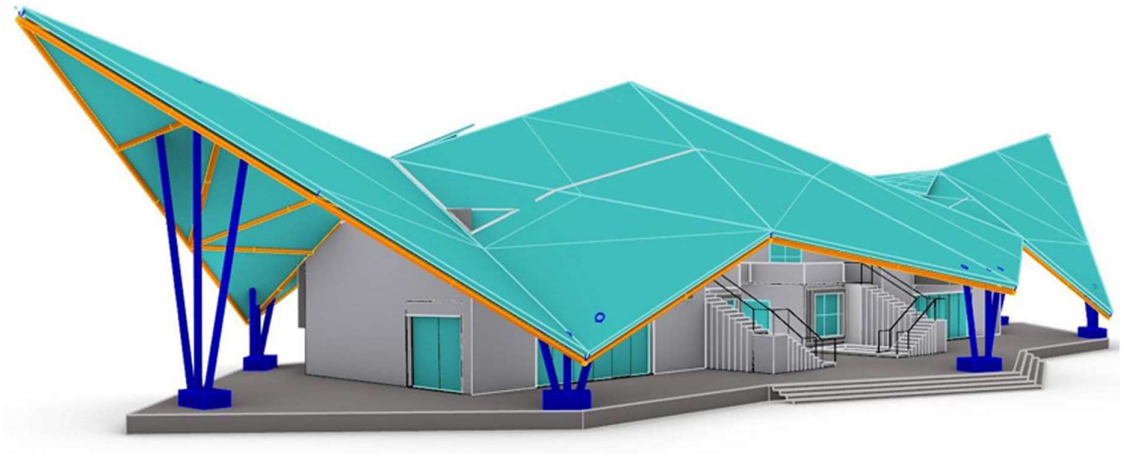
The geometrical logic of the grasshopper script being explained by the tutor, students I attendance on Day2




The tutor explaining a computtaional concept on board and the students emulating the coded script


The tutor trouble shooting query board and the students emulating the coded script





Student work Rashi Jambhale TY BNCA Studio Blue AY_2024

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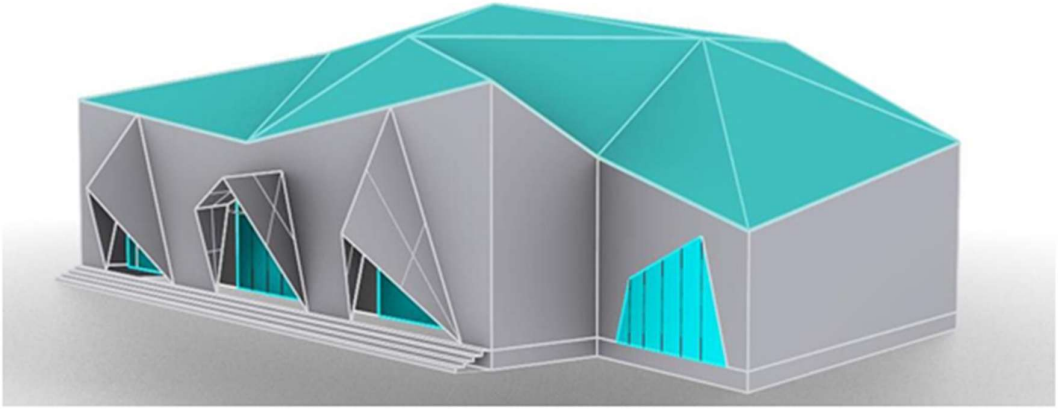

Student work Rashi Jambhale TY BNCA Studio Blue AY_2024

RENDERED VIEWS

Student work Rashi Jambhale TY BNCA Studio Blue AY_2024

Final renders of a project by student Shreya Dhumal AY 2022_23

Instructions to students

- *Take out a print of the workbook on A4 size paper and complete the questions on the workbook itself.*
- *Draw neat sketches use ink, pencil colours, water colour or other medium of your choice to make the workbook presentable*
- *Write your name and roll number on the cover page of the workbook*
- *Submit the workbook for assessment as instructed by your teacher*
- *Once you complete the workbook before submitting scan the workbook (Microsoft office lens app recommended) and submit on LMS*

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WORKBOOK 1

UNIT I

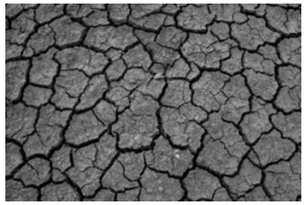
STUDY OF SOIL- SOIL MECHANICS

NAME: .....

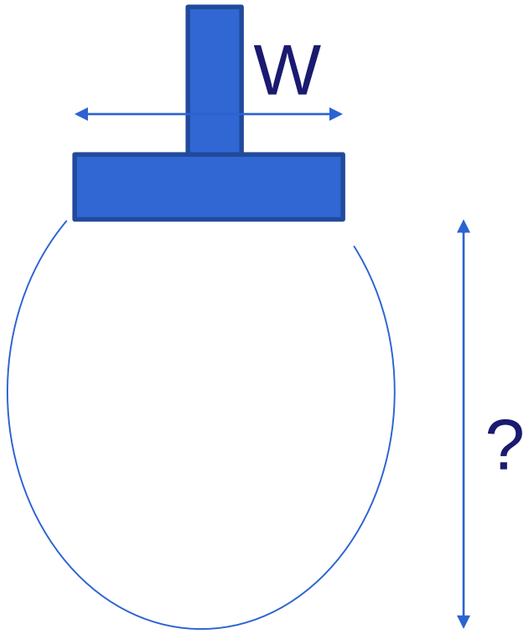
CLASS/ DIV: .....

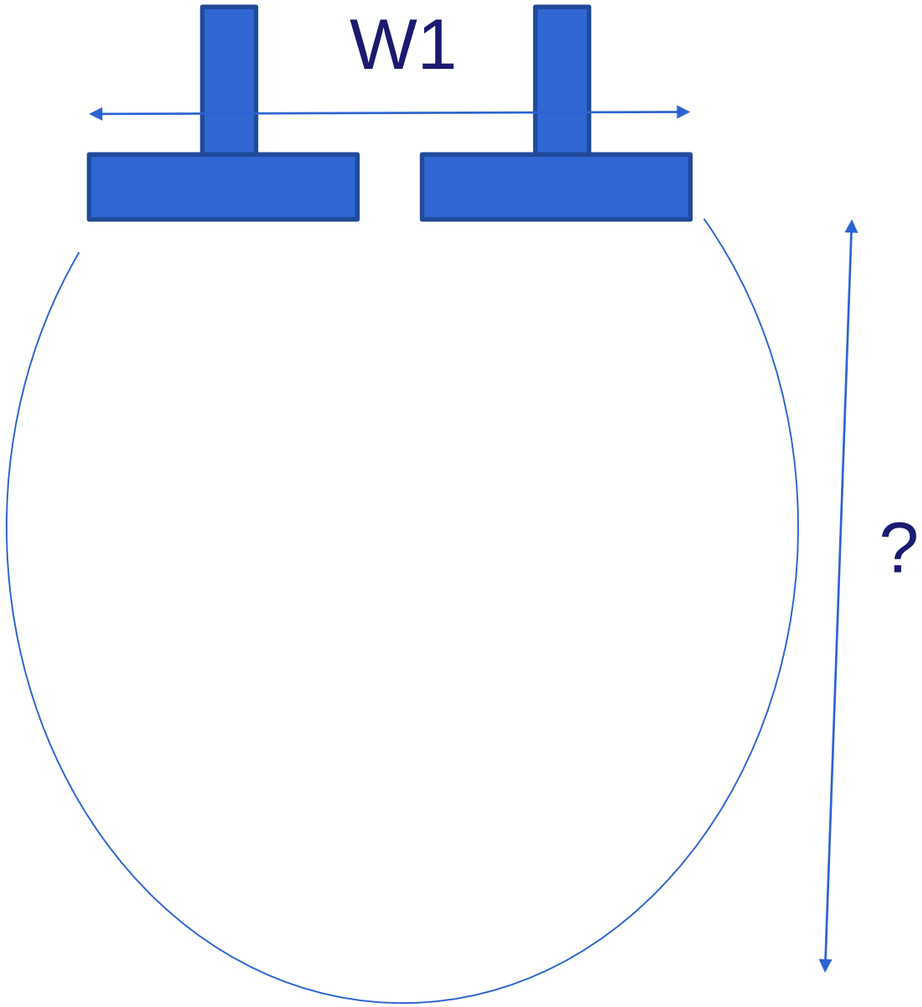
ROLL NO: .....

1. Identify the type of soil seen in the pictures

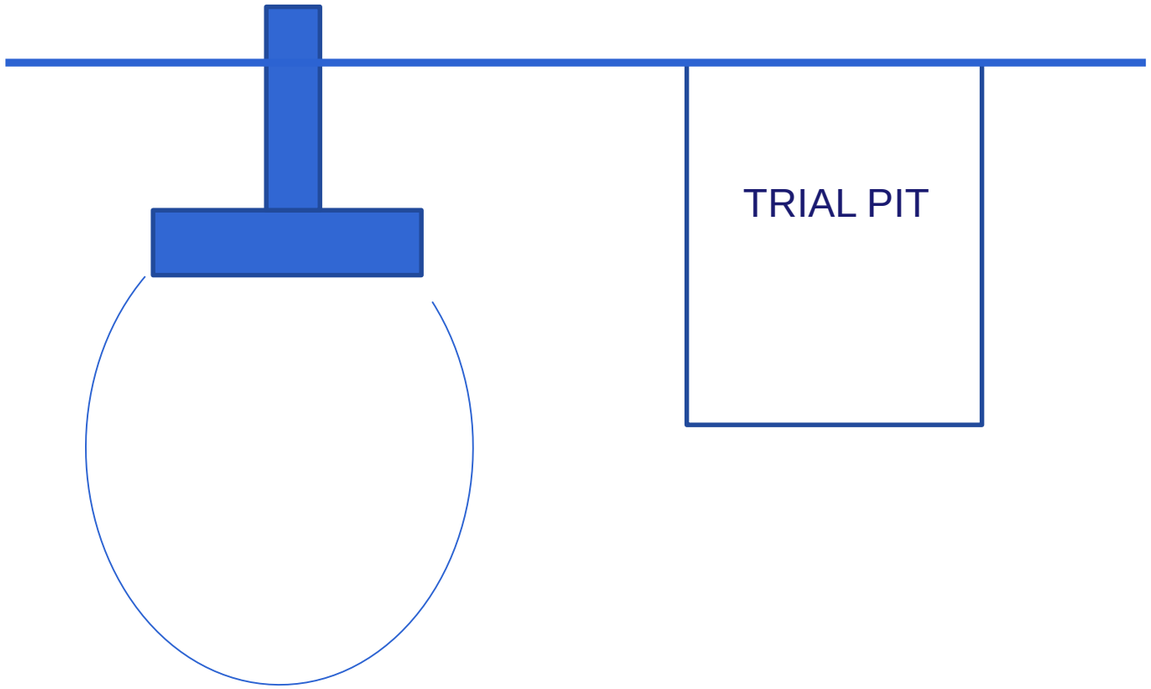


2. What does the parabolic line indicate? Write the missing information as indicated by '?'

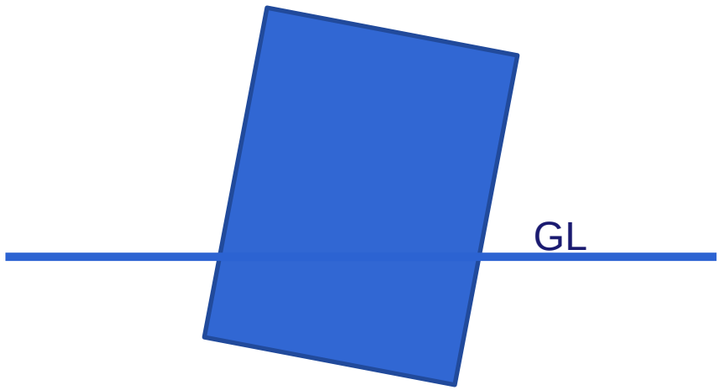




3. Explain what is wrong in this sketch and draw correct sketch



3. Give title to both sketches and explain in your own words what is happening here?



4. The ultimate bearing capacity of the soil is 40 tons /sq.m.. The foundations are carrying 40 tons/sq.m. load. What does this statement tell you? Explain in your own words what should be done in this case.

5. A building has been constructed on black cotton soil. After a few years cracks have developed in the walls, the flooring in some rooms has sunk. The steps leading to the plinth have separated from the main structure. You have been called as an Architect to find out the reasons for these phenomena. Write in your own words what could be the reasons for this.

6. What is meant by ‘Permeable’ and ‘Non-permeable’ soil? Explain these terms and write about how they are important for foundation design/soil mechanics

Innovative Techniques in Teaching Methodology

Faculty Name: - Ar. Mandar Athavale

Assistant Professor, BNCA

Innovative Techniques in Teaching Methodology.

Subject: - Quantity Surveying and Specification Writing I and II

QS SPW -I and II is a 4th Year subject from Bachelor of Architecture. To enhance attendance and attention among students while providing better preparation for exams, **surprise tutorials** were introduced for QS SPW I and II. These sessions were designed as interactive, impromptu learning experiences, focusing on core concepts and practical applications. The element of surprise helped in breaking monotony, keeping students engaged, and encouraging regular attendance. Additionally, these tutorials addressed common exam challenges, providing targeted guidance and equipping students with effective writing strategies for their answers. The initiative proved valuable in fostering better understanding, active participation, and overall academic improvement.

Test 01_QS SPW-I conducted on 24/07/2024			
Name of Student:	ID No.	Division	Marks Obtained
Tejal Khaire	A21084	Fourth Year B	10
Dhariya Renu	A21034	Fourth Year B	9
Khushi Mantri	A21126	Fourth Year B	9
Rageshri Rajendra More	A21127	Fourth Year B	10
Patne Niddhi	A21014	Fourth Year B	8
Gadekar Sharayu	a21001	Fourth Year B	9
Kale Anushka	A21175	Fourth Year B	10
Gandhi Snehal	A21096	Fourth Year B	9
Joshi Rutuja	A21047	Fourth Year B	10
Urunkar Praniti	a21043	Fourth Year B	10
Mule Mrunal	A20150	Fourth Year B	9
Sarda Sejal	A21042	Fourth Year B	9
Askhedkar Aarushi	A21053	Fourth Year B	9
Joshi Ananya	A21091	Fourth Year B	8
Revti Nagarkar	A21019	Fourth Year B	9
Vaishnavi Sondge	A21103	Fourth Year B	10
Chaudhari Isha	A21150	Fourth Year B	7
Narawade Avantika	A21156	Fourth Year B	5
Firodiya Samiksha	A21143	Fourth Year B	9
Parakh Khushi	A21137	Fourth Year B	10

Jaju Sakshi	A21015	Fourth Year B	8
Thorave Nikita	A21172	Fourth Year B	8
Pore Sakshi	A21120	Fourth Year B	7
Kela Dhanashri	A21080	Fourth Year B	8
Janhavi Karnavar	A21039	Fourth Year B	9
Chondhe Shrutika	A21076	Fourth Year B	7
Pawar Prerana	A21106	Fourth Year B	5
Thombal Aditi	A21041	Fourth Year B	8
Abhonkar Isha	A21022	Fourth Year B	9
Lihade Tejaswini	a21161	Fourth Year B	8
Chopdha Vidisha	A21021	Fourth Year B	8
Shinde Rutuja	A20155	Fourth Year B	6
Bardia Garima	A1138	Fourth Year B	10
Nahar Riddhi	A21117	Fourth Year B	7

Subject: - Electives: Affordable Housing

Electives course on Affordable Housing was conducted for 3rd year, 4th Year and 5th Year Bachelor of Architecture students. G**amification** was used as a tool to enhance learning and engagement. By incorporating game-based elements, complex topics more accessible and fostered a collaborative environment where participants could creatively solve real-world housing challenges. By incorporating elements such as competition, rewards, challenges, and interactive design, gamification aims to make tasks more enjoyable, interactive, and compelling.