

Design Project Module – IV - AR 0405

**APPLICATION OF UNDERSTANDING OF MATERIAL &  
TECHNOLOGY TO EXPLORE NEW SPATIAL FORMS  
AND ARTICULATION OF ELEMENTS**

REFERENCE BOOKS

1. Allen Edward and Joseph Iano 1 – Fundamentals of building construction
  2. Allen Edward – Architectural detailing, function constructibility aesthetics. New York, 1993
  3. The construction of Buildings – R. Barry
  4. Structures or Why things don't fall down – J. E. Gordon
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# What is Architecture?

## firmness, commodity and delight

*Vitruvius (1<sup>st</sup> century BC)*

*Firmness refers to structural integrity and durability;*

*Commodity refers to spatial functionality or in other words, “serving its purpose” and fulfilling the function for which the building was constructed;*

*Delight means that the building is not only aesthetically and visually pleasing, but also lifts the spirits and stimulates the senses.*

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# architecture is frozen music

*Goethe (18<sup>th</sup> century)*

*You employ stone, wood and concrete, and with these materials you build houses and palaces.*

*That is construction. Ingenuity is at work.*

*But suddenly you touch my heart, you do me good, I am happy and I say: “This is beautiful”.*

*That is Architecture. Art enters in.*

*Le Corbusier (1923)*

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what are some of the issues to be considered to create meaningful and responsive architecture?

**program**

function, purpose, areas, government rules, typology etc

**people**

culture, society, religion, age group, gender group, income group, psychology, sociology, aesthetics etc.

**place**

site, site physical characteristics, climate, topography, “place-making”

**project**

client, finances, time, space, quality

**process**

structure, materials, construction, industrial process, technology

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**the intent of the material studio is to**

understand how material plays an important role in architectural expression

understand how material can be used in different ways  
to achieve a specific architectural purpose

understand the pros and cons of different materials

understand the appropriateness of different materials in certain contexts

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**material as texture**

material as structural expression

material as craftsmanship

material as form generator

material as sustainable choice

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material as texture

**material as structural expression**

material as craftsmanship

material as form generator

material as sustainable choice

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material as texture

material as structural expression

**material as craftsmanship**

material as form generator

material as sustainable choice



material as texture

material as structural expression

material as craftsmanship

**material as form generator**

material as sustainable choice



material as texture

material as structural expression

material as craftsmanship

material as form generator

**material as sustainable choice**





*ROOFING*

**Nonconventional**



Rammed Earth



"Green"

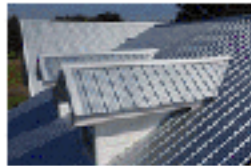


Thatched

**Conventional**



Tar/Asphalt



Metal Sheeting

*WALLS*

**Nonconventional**



Bamboo



Fiber-Reinforced Mortar



Recycled Plastic

**Conventional**



Wood



Steel



Concrete

*INSULATION*

**Nonconventional**



Straw Bale



Adobe



Recycled Cotton

**Conventional**



Fiberglass



Polyurethane Foam

## COURSE OBJECTIVE

Understand materials and processes and explore new spatial possibilities and their design articulations for the material the student has selected. They will adapt the same for design of a small institute.

## LEARNING OUTCOME

Student will begin to think of design as making - as harmonious coordination between their hands, eyes and minds. They will design with materials and technology. They will make working prototypes with details in drawings and virtual model.

## STUDIO INTENT

Architectural design is governed by many forces. It is extremely difficult to identify and enlist all the forces that play a critical part in architectural design, but we can broadly classify them in five **P's**: **people**, **program**, **place**, **project**, **process**. These five categories broadly categorize all the plethora of issues that an architect has to take into consideration while designing an architectural project.

Among these many issues, material is one of the most important ones. This studio looks at the role of material in the design of an architectural project. The intent of this studio is:

To understand how material plays an important role in architectural expression

To understand how material can be used in different ways to achieve a specific architectural purpose

To understand the pros and cons of different materials

To understand the appropriateness of different materials in certain contexts

To see the impact of material on formal expression, spatial expression, structural expression etc.

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## **'MAKING'**

At every stage, the stress is on making active models representing actual behavior. These are our primary design tools, be it understanding the form, structural behavior or spatial character.

The behavior of the designed system is analyzed at the scale of a 'unit' or 'module' through methodical testing. This informs the design in terms of material distribution and section sizing, for a material efficient design.

We work through models in various scales depending on the task at hand. (e.g., working models complete with scale appropriate member sizes and novel joineries @ 1:20, detail specific conditions at 1:10). Throughout the studio the technique of model making is modified to add complexity or exaggerate the effect of forces, if need be, to develop an accurate understanding of the developed system.

The design exploration is done in 2 stages; beginning with purely the interaction between materials to further refining it to respond to material distribution w.r.t. spatial volumes and applying it to an architectural scenario.

### **STAGE 1: MATERIAL-FOCUSED FORM-MAKING AND SPACE-MAKING**

Students explore and experiment with different forms and spaces to arrive at a design scheme that not only responds to the material, but also responds to the climate, place, program and other design issues. The intent is for student to really challenge the limits to which a material can be used and arrive at a responsive formal and spatial expression using that material.

Materials to be explored - list attached here.

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## **SITE: SABARMATI RIVERFRONT, AHMEDABAD.**

Computer models or physical models of different explorations to be prepared by each student. The intention is to understand the strength and weakness of the elements in terms of push, pull and rotate and a method to respond to the demonstrated behavior to ultimately attempt to develop a spanning system. In the next stage, the complexity of program and site are introduced to develop this model further into a system using a combination of mass and linear-assembly based elements. The students will further develop variations of the system keeping its core principles, to suit the architectural program.

### *Ideas discussed:*

An understanding of material cross-section, orientation, as well as the mass distribution of the supporting and supported is expected.

Response to uni-axial and lateral forces for system generation

Design strategies to respond to climate

The relationship between heavy(massive) and light material - thick and thin

## **Stage 2: DESIGN DEVELOPMENT BASED ON SPECIFIC MATERIALS + SPATIAL PROGRAM**

Work towards refining the idea, in response to architectural needs, expression of the structural system and resolution of details and joineries.

### *Ideas discussed:*

Material cross-section, orientation, as well as the mass distribution of the supporting and supported

Spanning and bearing conditions and bay sizes appropriate to the material,

Expression of the materials, structural system & forces

Types of joinery - pin v/s rigid and its implication on the system

Climate and Enclosure

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## **PROGRAM:**

### ***MULTI-PURPOSE PUBLIC SPACE***

*Responding to the riverfront location of site, Multi-purpose Public space is to be designed to be a flexible space that can be used as an exhibition area, performance area, public gathering space, informal shopping area, among others. It will also have a café and public amenities to support the above functions.*

#### ***Multi-purpose public space - 300 sqmts***

*This space can be an enclosed multi-functional space that may act as an exhibition area, performance area, temporary shelter for patients or an informal shopping area. Toilets to be provided as required. At least 20% of this space should be at first floor or mezzanine level. Additionally, an ancillary office space with a pantry and a general store to be provided to support the multipurpose public space.*

#### ***Café - 30 sqmts***

*This can be an enclosed or semi-open space with informal seating for about 20-30 patrons. Kitchen and wash area to be provided as required.*

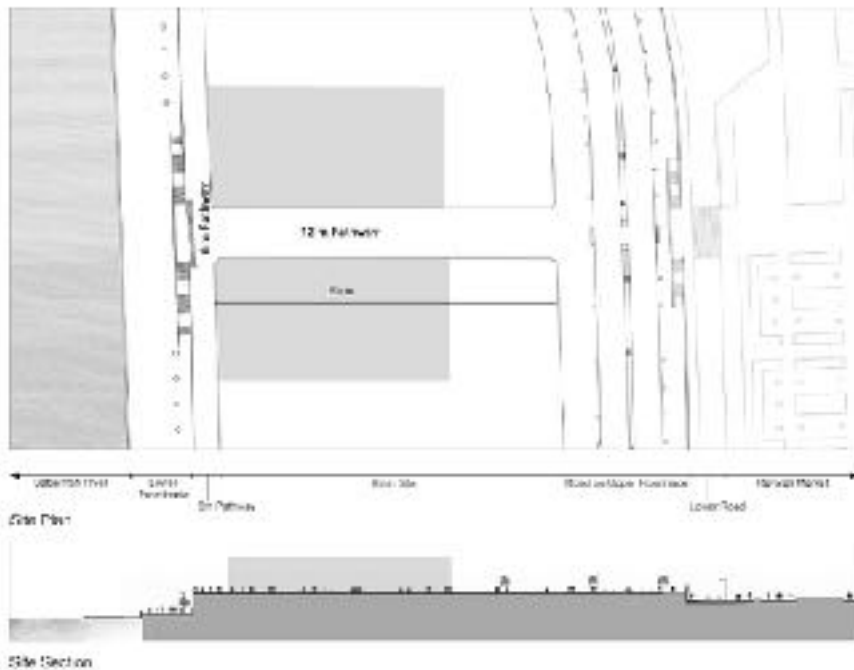
#### ***Public gathering space - 100 sqmts.***

*This space can be a semi-open or open space that invites the surrounding community to gather here and interact with each other.*

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There are three interconnected spaces with three different functions. The ambition is to have a dynamic environment which attracts different kinds of people to engage in various kinds of activities. As much as the exhibits should be displayed with a good amount of natural light, it is possible that a part of the exhibition space flows through the café without disturbing either function. The gallery and the performance area are as much a platform to promote artists and local talent as they are a part of the cafe. Students are free to interpret the program and decide for themselves a hierarchy within these 3 functions.

The exhibition space typically displays paintings or small artifacts of local importance and the performance area is a platform for local artists (contemporary and traditional) to perform and experiment. Students are free to interpret its use and purpose but be specific



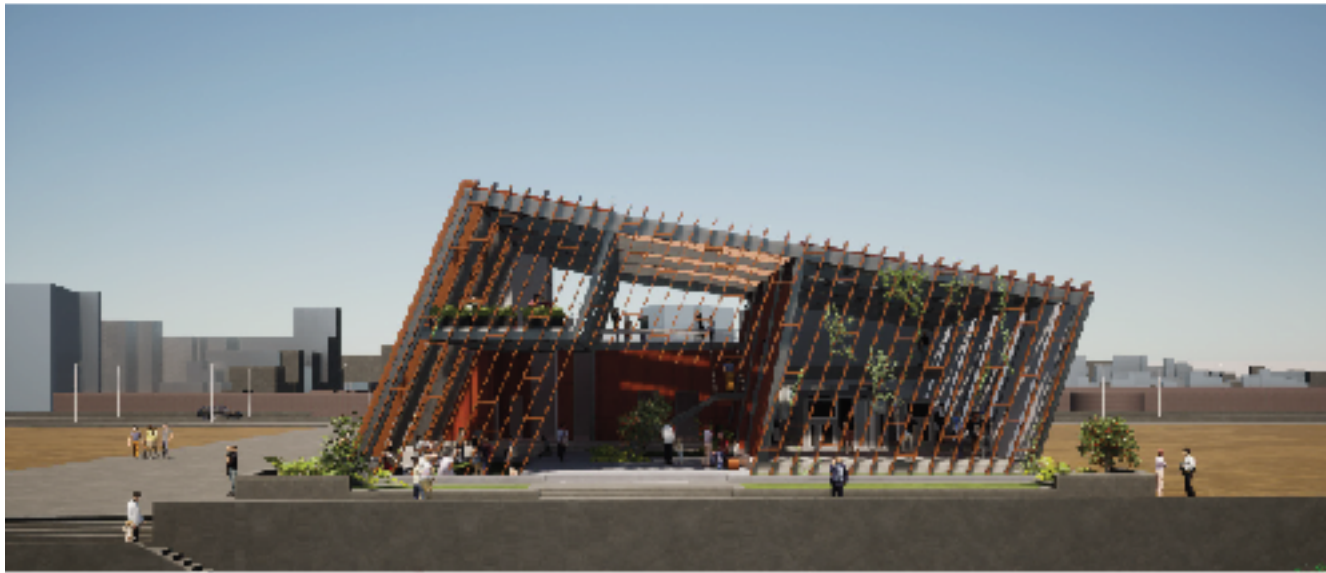
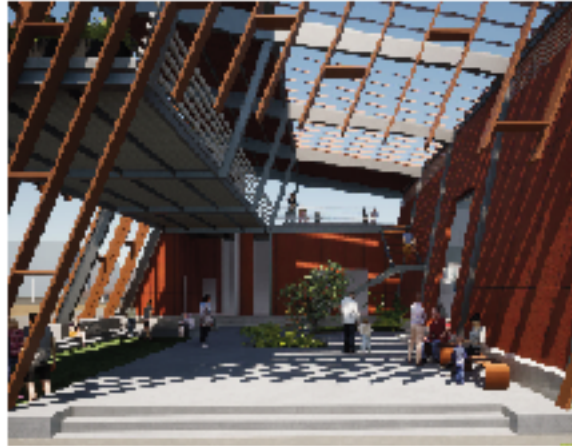
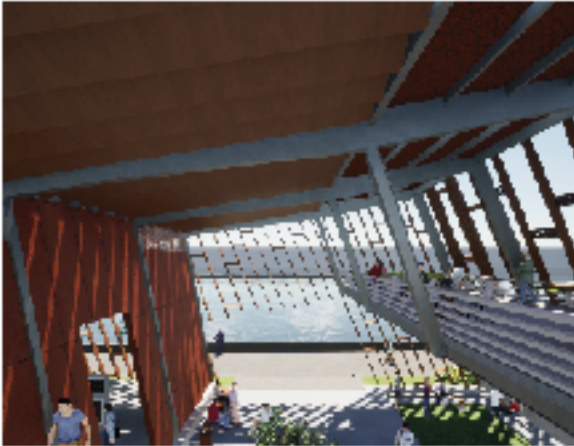
- Site will share its edge with Sabarmati River Pathway and a courtyard adjacent to riverfront
- Site Area - 575 sq.m to 625 sq.m
- Site proportion - 1:1, 1:1.5, 1:2, 1:4
- Bulkup Area - 300 to 400 sqm with atleast 40% bulkup on 1st floor



## STUDENTS WORK



## STUDENTS WORK





## STUDENTS WORK



## STUDENTS WORK



## STUDENTS WORK

