TECHNICAL CAMPUS AT BHIWANDI

By

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A REPORT

Submitted in partial fulfillment of the requirements for the degree of

Bachelor of Architecture.

University of Mumbai

2017

AIKTC
SCHOOL OF ARCHITECTURE

CERTIFICATE

This is to certify that the Design Dissertation titled TECHNICAL COLLEGE AT BHIWANDI is the bonafide work of the student MOMIN MD.AKHTAR ATA-UR-REHMAN from Final Year B. Arch of AIKTC School of Architecture and was carried out in college under my guidance.

Sign of the guide:

Name of the guide: PRAJAKTA M. WADWALKAR

Sign of the Dean:

Date:

DECLARATION

I hereby declare that this written submission entitled "TECHNICAL CAMPUS AT BHIWANDI"

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This work, or any part of it, has not been previously submitted by me or any other person for assessment on this or any other course of study.

_____

Signature of the Student:

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ACKNOWLEDGEMENT

I would like to express my gratitude to my **Parents** who have always been supporting me through 4 years of my course. Special thanks to my best friend **Navreen Sayyed**. I am deeply indebted to my mentor Prof**. Prajakta** for her valuable guidance, assistance and moral support throughout the Project. I am honored and grateful to her for her advice and explanations during the research which I have gained plenty of valuable knowledge hope that will not be the end of it.

I would also like to thank all the officials from the various institutions, Ahmedabad that I visited for my case studies for their active help and co-operation. I owe a very special debt to my friends Mushfique, Ebad , and Nida for being there for me, whenever I needed them. I would like to thank my friends who stood by me all the time and who contributed their invaluable time and effort towards the completion of my thesis.

My relatives and their prayers for me were the main source of inspiration, motivation and encouragement to accomplish this research work. Again to my **Father** this work is dedicated to you.

1.ABSTRACT

ABOUT THE TOPIC:

- The thesis topic basically emphasizes on campus designing the trends and innovation leading in campus designing today.
- The topic aims at understanding the complexities In campus designing and the factors that affect campus designing.
- The topic aims at throwing light on the problems off planning a smoothly functional educational campus and means to achieve the same.
- It is important to understand how a property designed campus results in a successful functioning university.
- Topic aims to elaborate the procedure for success in campus development and to set out details and validities in campus design and development.

REASON FOR SELECTING THIS TOPIC:

- Now a day's BHIWANDI is a developing city. Today BHIWANDI is known for its textile industry. The current (2017) population of BHIWANDI is around **8,14,084** as per the growth rate according to 2001-2011 (+1.7%/year).
- BHIWANDI has education like pre-primary, primary, secondary, higher secondary, graduation, post-graduation, MBA, MMS, B.Ed, D.Ed etc.
- But there is no technical and medical education.
- What BHIWANDI needs is a sound & efficient technical education campus.
- Due to not available of technical and medical education. The people / students of BHIWANDI had to face various problems.
- The location of the site for the project is at the outer area of the city approx 4kms, which has a direct connectivity from Kalyan at 4kms towards east, Thane at 20kms towards south and Padhga at 12 kms & Shahpur at 40 kms towards north, on an average of 30min to 1 hours from each city.
- For education they had to go MUMBAI, PUNE, NASHIK, or somewhere else.
- In BHIWANDI there is no proper transport facility available.
- Due to this, they did not get sufficient time for studies.

- Students do not get hostel facility due to less accommodation. So they had to travel and during traveling they didn't get the time to study.
- Most of the family is also facing financial problem and they could not efforts so much expense. The atmosphere created should be conclusive to study of technical education. It should bring out the better out of everyone studying there.
- Hence I have chosed this topic to study, analyses & there by create a good design solution.
- To scale down the topic I had selected EDUCATIONAL ENGINEERING AND ARCHITECTRE CAMPUS.
- Total literacy rate in Bhiwandi is 79.48 % , of which male and female literacy was 82.04% and 75.71% respectively.

Table 1 : Literacy Rate of Bhiwandi

Bhiwandi City	Total	Male	Female
City Population	709,665	415,339	294,326
Litrates	491,071	301,986	189,085
Children (0-6)	91,825	47,235	44,590
Average Litracy %	79.48%	82.04%	75.71%

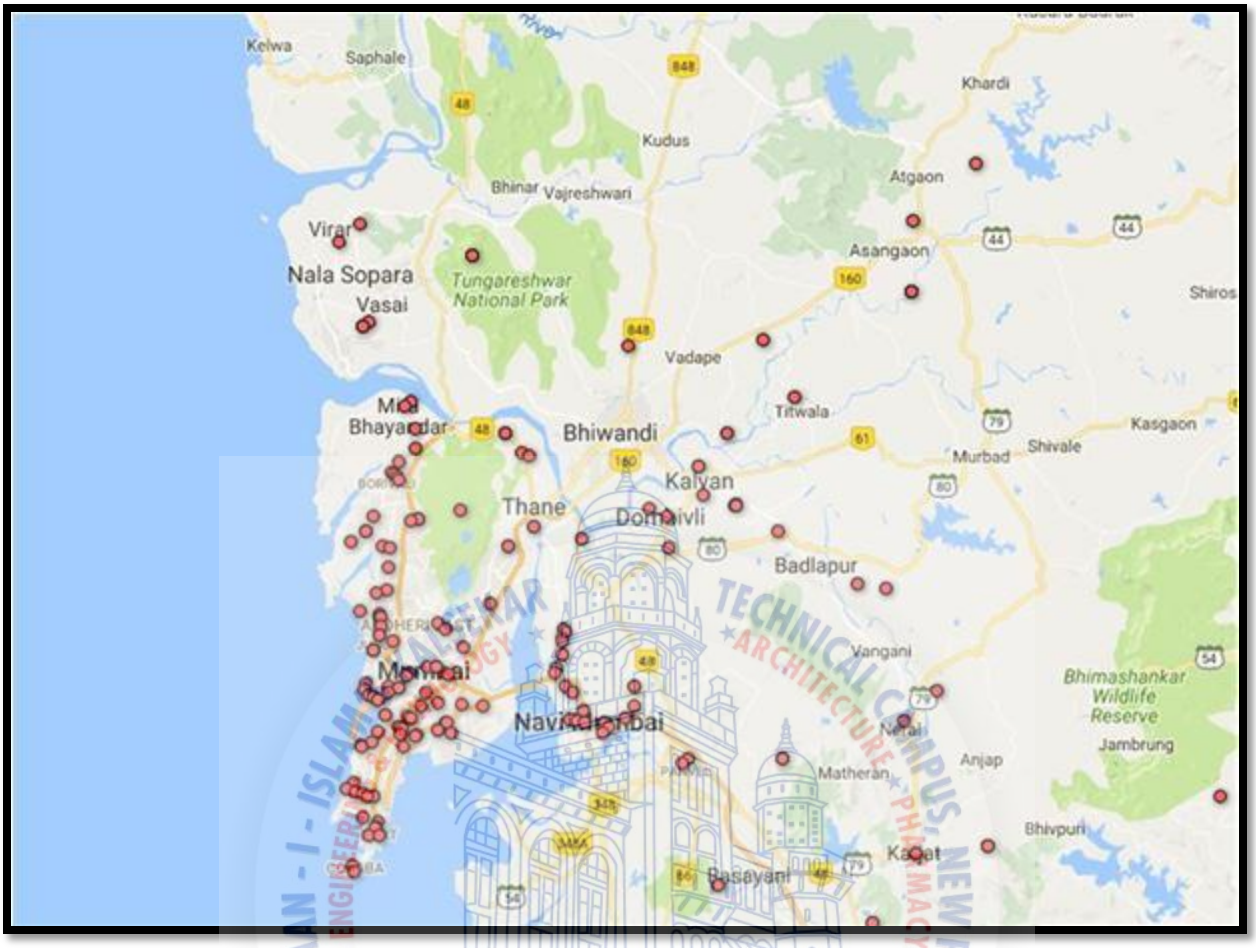


Figure 1 Map showing colleges around Bhiwandi

The above map shows the location of technical education colleges in Mumbai region and around Bhiwandi City.

According to population and litracy rate of the city, there is must requirement of **Technical Campus In Bhiwandi.**

BELOW IS THE DATA FROM BHIWANDI DEVELOPMENT PLAN BOOK

- **5.3 Educational Facilities :**

The number of literate persons in Bhiwandi-Nizampur Council area as per 1991 census are 199573 of which 137000 are males and 62273 are females. The City is having educational facilities of following different levels:

1) Primary schools 2) Secondaryschools and

3) Colleges 4) Industrial and Vocational Training Schools.

- **5.3.1 Primary Schools:**

There are in all 98 Primary Schools in the city located at different villages included in the Municipal area of at different villages included in the Municipal area of which 73 Primary Schools are run by Municipal Council and 25Primary Schools are run by Private Institutions. The details of the Primary Schools are given in Table No.10

It is seen from the table that group of schools are located in one building and have very inadequate or for some even a lack of space for playground. Out of 98 schools, 37 schools are of Urdu medium, 30 are of Marathi medium, 11 are Telgu and remaining are Hindi and English medium schools. Generally, it is seen that more than 60% primary schools are located on old municipal limits and remaining 40% primary schools are located in extended limits. The existing schools are not well equipped in terms of infrastructure and services.

- **5.3.2 Secondary Schools**

There are 19 Secondary schools in Council area out of which 9 High Schools are having playground facility. The necessary details of 19 existing Secondary schools are given in Table No.11, 4 High schools are of Marathi's Medium, 7 are of English medium, 1 High school is Hindi medium and remaining 7 are Urdu medium.

- **5.3.3 Colleges**

There are three colleges in Council area out of which one is owned and run by Bhiwandi-Nizampur Municipal Council. Another is for girls only and third is D.Ed. college which is of Urdu medium.

- **5.3.4 Technical Education**

There is only one Technical school and two Technical Institutes in Municipal Council area viz., TakiyanAmanshah Technical Center and Kohinoor Technical Institute. Considering the growth of the powerloom industries and industries growing up in surrounding area. There is prime need of I.T.I. and Engineering College in Council area.

SURVEY OF STUDENTS OF BHIWANDI

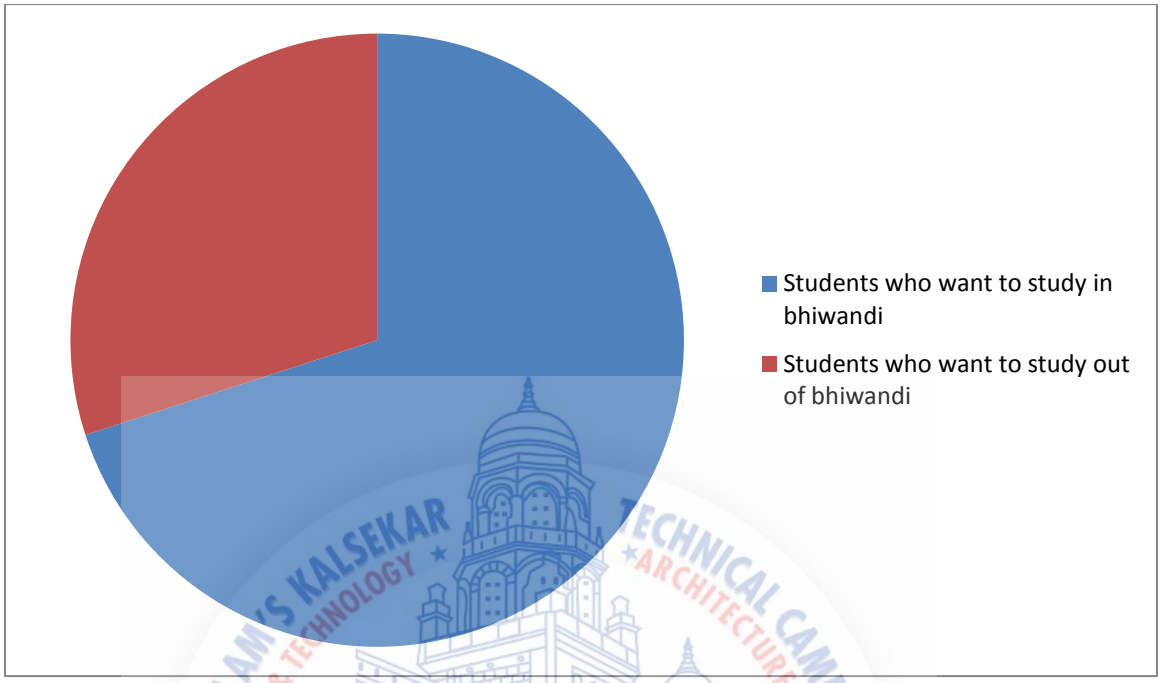


Figure 2 : Survey of students for further studies

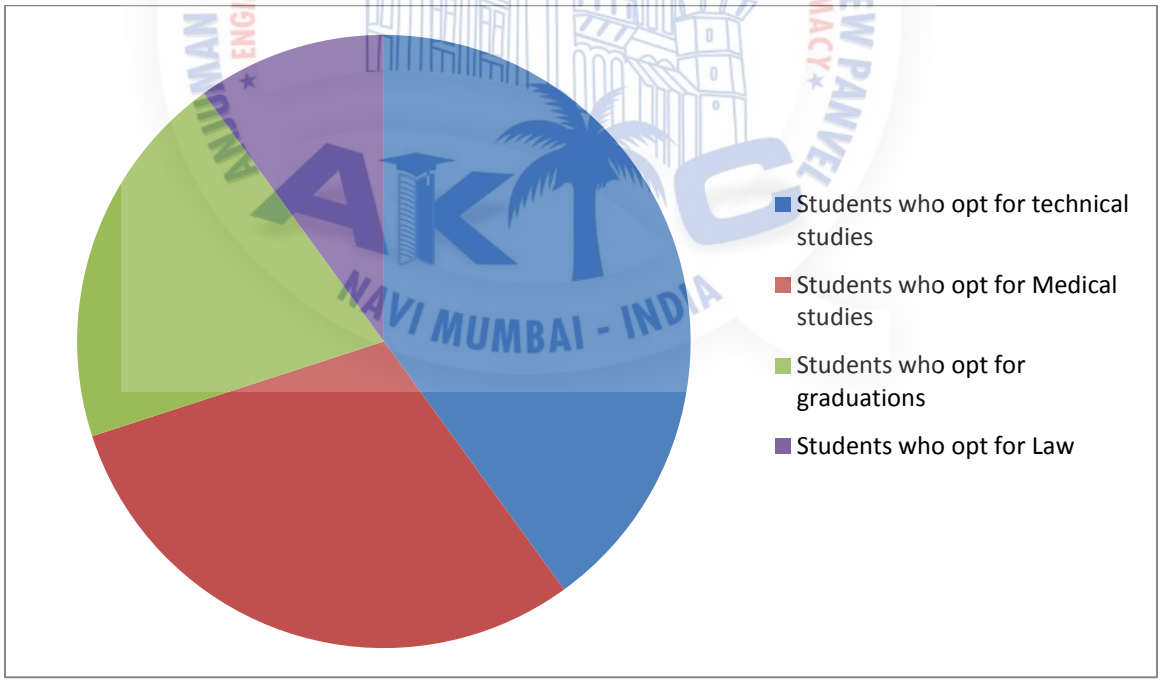


Figure 3 : Survey of students opted for different fields

2.1 INTRODUCTION

2.1.1 AIM:

- The aim is to design the institute which will serve educational needs of students of engineering. Making a closely knit, unified cluster of buildings with intimate pedestrian open spaces providing a unique environment for living and studying.
- Creating a king of physical environment that will inspire Community Spirit, Attitude and Action.
- In area like BHIWANDI there is no ENGINEERING CAMPUS, so the students have to go outside for their education purpose that is good but the area need some campus like this. So I want to design ENGINEERING CAMPUS over there in future.

2.1.2 OBJECTIVES:

- The main objective is to create various types of interactive spaces at different levels connecting the academic, residential and amenity areas. The need of interactive spaces particularly in engineering stream is much more important for the exchange of ideas and to express the thoughts.
- This can be achieved by creating elements like corridors, staircases, courtyards, spillover spaces and other informal spaces as they are the need of an educational campus which becomes the interacting spaces.
- Creating spaces in between individual buildings which will provide areas where students may interact informally between classes for discussions where they can gather in large number for any physical activity

2.1.3 SCOPE:

- Classrooms, Seminar Room and Amphitheatres or Outdoor seating areas. A large playground amidst the hostel and academic complex host's variety of sports viz. Cricket, Football, Volley ball etc.
- The campus remains lively during evening and night with the presence of over 100 residential students on campus. The campus provides all the necessary support services such as bank ATM, stationary store, laundry services and coffee shop. Also the campus will have administration areas, hostels, staff residential buildings, areas like clubs and swimming pool, etc. There will be conference halls, meeting rooms, library and auditorium.

2.1.4 All India Council for Technical Education

Approval Process Handbook (2017 – 2018)

Description of Title on Global & Indian level.

Collaboration and Twinning Programme between Indian and Foreign University/ Institution in the field of Technical Education, Research and Training.

1 Objectives

- To facilitate collaboration and Twinning Programme between Indian and Foreign Universities/Institutions in the field of Technical education, Research and Training
- To safeguard the interest of student community in India and ensure uniform maintenance of Norms and Standards as prescribed by various Statutory Bodies.
- To ensure accountability for all such educational activities by Foreign Universities/ Institutions in India.
- To safeguard against entry of non-accredited Institutions in the Country of origin to impart technical education in India.
- To safeguard the nation's interest and take punitive measures, wherever necessary, against the erring Institutions.

2 Eligibility

- Foreign Universities/ Institutions interested in imparting Technical Education in collaboration or through a Twinning Programme in India leading to award of Diploma/ Post Diploma/ Degrees including Post Graduate/ Doctoral Programmes.
- An Indian University Department or Institution which is already in existence and is duly approved by the Council, interested in imparting technical education leading to award of Diploma/ Post Diploma/ Degree/ Post Graduate Degree/ Post Graduate Diploma/ Doctoral Programmes of a Foreign University/ Institution through collaborative/ Twinning arrangements, provided there is "Zero Deficiency".
- An Indian University Department or Institution should have a valid NBA accreditation for one year beyond 10th April, 2017 in the Programme/ Course for which Twinning is sought.

- Any other educational activity carried out in India, in any manner by the Foreign Universities/ Institutions.

3 Conditions for Approval

- No Foreign Universities/ Institutions shall establish/ operate its educational activity in India leading to award of Diploma/ Post Diploma/ Degree/ Post Graduate Degree/ Post Graduate Diploma/ Doctoral level Programmes without specific approval of the Council.
- Accreditation by the authorized agency in parent Country shall be the pre-requisite condition for any Foreign University or Institution to start its operation for imparting technical education in India.
- The educational Programmes to be conducted in India by Foreign Universities or Institutions leading to award of Degree or Post Graduate Degree, Diploma, Post Graduate Diploma and Post Diploma Level, shall have the same nomenclature as it exists in their parent Country. There shall not be any distinction in the academic curriculum, mode of delivery, pattern of examination, etc. and such Degree or Post Graduate Degree, Diploma, Post Graduate Diploma and Post Diplomas must be fully recognized in their parent Country.
- Any Course or Programme which jeopardizes the National interest shall not be allowed to be offered in India.
- The Council shall prescribe any other condition for registration, expedient to do so in the overall interest of the technical education system in the Country.

Norms for Intake and Number of Courses/ Divisions in the Technical Institutions

Under Graduate Level

Table 2 : Under graduate Intake

Sr.no	Programme	Intake per Division	Maximum number of UG courses and/ or divisions allowed in the new Institutions (Single shift working)	
			Divisions	Intake
1	Engineering and Technology	60	5	300
2	Architecture	40	2	80

Post Graduate Level

Table 3 : Post Graduate Intake

Sr.no	Programme	Intake per division without collaboration and Twinning programme	PG divisions (Specialization) without collaboration and Twinning programme	Total without collaboration and Twinning programme	Intake per division without collaboration and Twinning programme
1	Engineering and Technology	30	1	30	30
2	Architecture	20	3	60	20

Norms for Land requirement and Built-up Area for Technical Institution

Land Requirements for Technical Institutions :-

Table 4 : Norms For Land Requirements

`	Land Area requirement in Acres		
	Under Graduate Programmes		
	Mega and Metro *	Urban	Rural
Engineering & Technology	1.5 $	2.5 #	7.5
Architecture	1.0	1.0	1.0

*… Mega and Metro Cities: Greater Mumbai (UA), Delhi (UA) and Kolkata (UA), Chennai (UA) Bangalore (UA), Hyderabad (UA), Ahmedabad (UA), Pune (UA), Surat (UA) as per the Census of India 2011.

Competent Authority has to certify that the place is located in Mega and Metro, Urban and Rural areas.

$ The land area required in the Mega and Metro cities shall be calculated on the basis of the requirements as per AICTE norms for carpet area and the Municipal Corporation byelaws, subject to a minimum of 1.5 acres. However, the total built-up area is to be calculated for the entire duration of the Course with mandatory prior sanctions and approvals from Competent Authority for the entire proposal.

Land area required in Urban shall be 2.5 acres which can be in a maximum of TWO plots. The academic, instructional, administrative and amenities area shall be in one plot not less than 1.5 acres. The distance between the plots shall not exceed 2.0 km. The remaining land shall only be utilized for sporting infrastructure/ Hostel/ Staff accommodation and related educational activities of the Institution.

Minimum Built-up Area Requirements

Although the Institution shall be applying for the first year, the proposal for the Building(s) and the plans are required to be submitted as under:

A. Institution is required to submit the approved and sanctioned Building Plans from the Competent Authority considering the Total built-up area as required to run the Programme and the Divisions/ Departments for the entire duration of the Course.

B. Institution is required to submit an Occupancy/ Completion Certificate (as applicable) from the Competent Authority clearly stating that the Building(s) is/ are fully developed and ready in all respects for the intended use considering the Total Area as required to run the Programme and the Divisions/ Departments for the First year of the Course. Partial Occupancy Certificate for conducting First year classes is mandatory.

C. The Institution area is divided in, Instructional area (INA, carpet area in m2), Administrative area (ADA, carpet area in m2), Amenities area (AMA, carpet area in m2).

D. Access and Circulation Area (ACA) around 25% of built-up Area.

E. Total Built-up area in m2 is equal to (INA+ADA+AMA) + (ACA).

F. For PG Programmes, administrative area of UG Programmes may be shared.

G. Research Laboratory shall be provided with an area of 120 m2 for each Institution offering PG Programmes

Instructional Area (Carpet Area) in sq.m

Engineering/ Technology (Degree Institution)

Table 5 :Instructional Area of Engineering/ Technology (Carpet Area) in m^2

	Number of Divisions (ND)	Duration of course in years	Class Rooms (C)	Tutorial Rooms (D) PG Classrooms (H)	Laboratory Excluding additional WS/ Labs for category "X" Courses	Work Shop (for all courses)	Additional WS/ Labs for category "X" courses	Computer Centre	Drawing Hall	Library and Reading Room	Seminar Halls
Carpet Area in sq.m per room			66	33	66	200	200	150	132	400	132
Numbers of rooms required for new Institutons	A= 0.75 *ND	4	C=A	D=C/ 4	2/ Course	1	_	1	1	1	1
Total Numbers of rooms (UG)	A= 0.75 *ND	4	C=AX4	D=C/ 4	8/ Course#	1	2/ Course (Maximum 4)	1	1	1	1/ Two Course
Total Numbers of rooms (PG)	F	2	_	H=1/Specialisation	1/Specialisation	1	2/ Course (Maximum 4)	1	1	1	1/ Course

- Category X of Courses: Mechanical, Production, Civil, Electrical, Chemical, Textile, Marine, Aeronautical and allied Courses of each.
- Classrooms, Tutorial rooms and Laboratories required for subsequent years shall be added progressively to achieve total number as stated.
- Additional Library (Reading room) area of 50 m2/ per 60 student (UG+PG) Intake beyond 420.
- UG laboratories if shared for PG Courses shall be upgraded to meet requirements of PG curriculum.
- Progressive requirement, 2nd year onwards shall be calculated as 2+2+2 labs/ Course.
- Additional 4 Labs/ Course when number of divisions are more than 2/ Course.
- Round off fraction in calculation to the next integer.
- For PG Programmes, Seminar Hall of respective UG Programme may be shared.
- Laboratories for the 1st year includes Physics and Chemistry Laboratory each of 66 sq.m are required.

Architecture (Degree Institution)

Table 6 : Instructional Area of Architecture College

	Number of Divisions (ND)	Duration of courses in Years	Class Room (C)	PG Class rooms (H)	PG Studio	Model making and Carpentry Workshop	UG Studio/ Material Museum	Computer Centre	Library and Reading Room	Seminar Halls
Carpet Area in sq.m per room			66	33	66	132	132	75	150	132
Number of rooms required for new Institution	A=0.75 *ND	5	C=A	_	_	1	1	1	1	1
Total Number of rooms (UG)	A=0.75 *ND	5	C=AX5	_	_	1	5	1	1	1
Total Number of rooms (PG)	F	2	_	1/Specialisation	1/Specialisation					

- Classrooms (1+1+1+1), Laboratories (1+1+1) and Studio (1+1+1+1) required for subsequent years shall be added progressively to achieve total number as stated. UG Laboratories, if shared for PG Courses, shall be upgraded to meet requirements of PG curriculum.
- Round off fraction in calculation to the next integer.
- Construction yard (Open Space) of minimum 200 m2 is required.

Administrative Area (Carpet Area) in m^2

Table 7 : Instructional Area of Administrative Area

	Principal/ Director Office	Board Room	Office all inclusive	Department Office	Cabins for the head of Department	Faculty Rooms	Central Stores	Maintenance	House keeping	Pantry for staff/Faculty common room	Examinations Control Office	Training and Placement Office
Carpet Area in m^2 per room	20	20	150 300	20	10	5	30	10	10	10	30	30
Number of rooms required for New Technical Instituton	1	1	1	-	-	Faculty year student Intake/ 15	1	1	1	1	1	-
Total number of rooms	1	1	1	1/Dept	1/Dept	One per teaching faculty (as per norms) in the Institution	1	1	1	1	1	1

1. $Technical Campus having more than one Programme.
2. *Technical Institution having one Programme.

Amenities Area (Carpet Area) in m^2

Table 8 : Instructional Area of Amenities Area

	Toilets (Ladies / Gents)	Boys Common Room	Girls Common Room	Cafeteria	Stationery Store	First aid cum seek room	Principal's Quarter	Guest House	Sports Club/ Gymnasium	Auditorium/ Amphitheter	Boy's Hostel	Girl's Hostel
Carpet area in m^2 per room for Technical Campus having more than one programme	350*	100	100	150	10	10	150	30	200	400	Adequate	Adequate
Carpet area in m^2 per room for Technical Campus having one programme	150$	75	75	150	10	10	150	30	100	250	Adequate	Adequate
Number of Rooms required for new Technical Education	Adequate	1	1	1	1	1	-	-	-	-	-	-
Total Number of Rooms	Adequate	1	1	1	1	1	Desired	Desired	Desired	Desired	Desred	Desired

1. *Estimated total area for Technical Campus having more than one Programme
2. $Estimated total area for Technical Campus having one Programme

Circulation Area in m2

Access and Circulation area (ACA) of 25% of sum of Instructional, Administrative and Amenities area is desired covering common walk ways, staircases, entrance lobby.

Norms for Essential and Desirable requirements for Technical Institution

1. Standalone Language Laboratory
    a. The Language Laboratory is used for language tutorials. These are attended by students who voluntarily opt for Remedial English classes. Lessons and exercises are recorded on a weekly basis so that the students are exposed to a variety of listening and speaking drills. This especially benefits students who are deficient in English and also aims at confidence-building for interviews and competitive examinations. The Language Laboratory sessions also include word games, quizzes, extemporary speaking, debates, skills etc. This Laboratory shall have 25 Computers for every 1000 students.
2. Potable Water supply and outlets for drinking water at strategic locations.
3. Electric Supply.
4. Sewage Disposal System.
5. Telephone.
6. Vehicle Parking.
7. Implementation of Unnat Bharat Abhiyan.
8. Barrier Free Built Environment for disabled and elderly persons including availability of specially designed toilets for ladies and gents separately. Refer Design Manual for a Barrier Free Environment available in AICTE Web-Portal www.aicte-india.org Institution should provide appropriate facilities to take care of the physically challenged students and elderly persons. Every building should have at least one entrance accessible to the handicapped and shall be indicated by proper signage. This entrance shall be approached through a ramp together with the stepped entry. Refer guidelines and space standards for Barrier Free Built Environment for disabled and elderly persons by CPWD, Ministry of Urban Development, Government of India.

- Condition A: for Building up to 3 or 4 floors (for buildings of height <15 m)
    - Lift can be provided but not essential
    - Ramp shall be finished with non-slip material to enter the building. Minimum widhth of ramp shall be 1800 mm with maximum gradient 1:12, one way length of ramp shall not exceed 9.0

m having double handrail at a height of 800 and 900 mm on both sides extending 300 mm beyond top and bottom of the ramp. Minimum gap from the adjacent wall to the hand rail shall be 50 mm.

- All teaching-learning facilities for physically challenged people shall be provided in the ground floor itself.
- Unisex toilets with all facilities specified by the National Building Code to be provided only in the ground floor of regular buildings.

➢ Condition B: If the building is a multi-storeyed building i.e. more than 4 floors

- Lift must be provided with all provisions as per the National Building Code.
- Unisex toilets with all facilities specified by the National Building Code are to be provided in every floor.
- Special reserved car parking facilities are to be provided.

9. Safety provisions including fire and other calamities
10. Road suitable for use by Motor vehicle- Motorized Road
11. General Notice Board and Departmental Notice Boards
12. First aid, Medical and Counselling Facilities
13. Fabrication facility laboratory (FABLAB)/ Tinkering laboratory/ Innovation laboratory.
14. Rain water harvesting and Installation of grid connected solar rooftops/ Power Systems.
15. Waste management and environment improvement measures to ensure a Sustainable Green Campus.
16. Public announcement system at strategic locations for general announcements/ paging and announcements in emergency.
17. Transport.
18. Post, Banking facility/ ATMs.
19. LCD (or similar) projectors in classrooms.
20. Fire Safety:

- Fire points should be established in front of each building with fire water buckets, 2 sand buckets and 4 fire extinguishers one of each type.
- Minimum 2 no. of extinguisherof any type should be installed at every prominent location.
- Every exit, exit access or exit discharge shall be continuously maintained free of all obstructions or impediments to full use in case of fire and other emergency.

- Retro reflective signage shall be provided for escape routes at suitable heights.

21. Laboratory accident:
    - Flooring of the laboratory shall be non-skid and non-static.
    - Proper ventilation facilities shall be provided to prevent accumulation of dust and fumes.

22. Workshop accident:
    - While installing and keeping machines and tools, racks aisles and gangways should be provided.
    - Workshop floors should be made by non-skid and non-static floor tiles.
    - Proper ventilation facilities shall be provided to prevent accumulation of dust and fumes.
23. Ramps shall be provided for the differently abled for ease access to and evacuation from the building.
24. No more than 4 person/m^2 shall assemble in the assembly area.
25. Sufficient number of lifts shall be provided to avoid overcrowding.
26. Passenger and service lifts should be separately provided.
27. Construction of buildings shall be as per relevant Indian Standards and Codes of practice.
28. The most suitable and safest place shall be selected as safe assembly point for each building at the time of calamity emergency, such as earthquake.
29. Avoid glass paneling for buildings. However, if provided, shall be protected with metal screens for tackling the pressure of earthquakes and cyclones.
30. Long and continuous structure shall be avoided so as to reduce the effect of wind.
31. Provisions for the storage of drinking water at the rate of 4.5 litres/ 1 Day/ person for the total occupants for a minimum of 3 days during impending flood shall be made.
32. Provisions for storage of nonperishable easy to prepare for 3 days supply during impending floods shall be made.
33. Construct retaining walls wherever necessary to prevent erosions.
34. Avoid buildings in steep slope or along natural erosion valleys

LAND REQUIREMENT AS PER APPROVAL PROCESS HANDBOOK NORMS DURING THE PREVIOUS YEARS

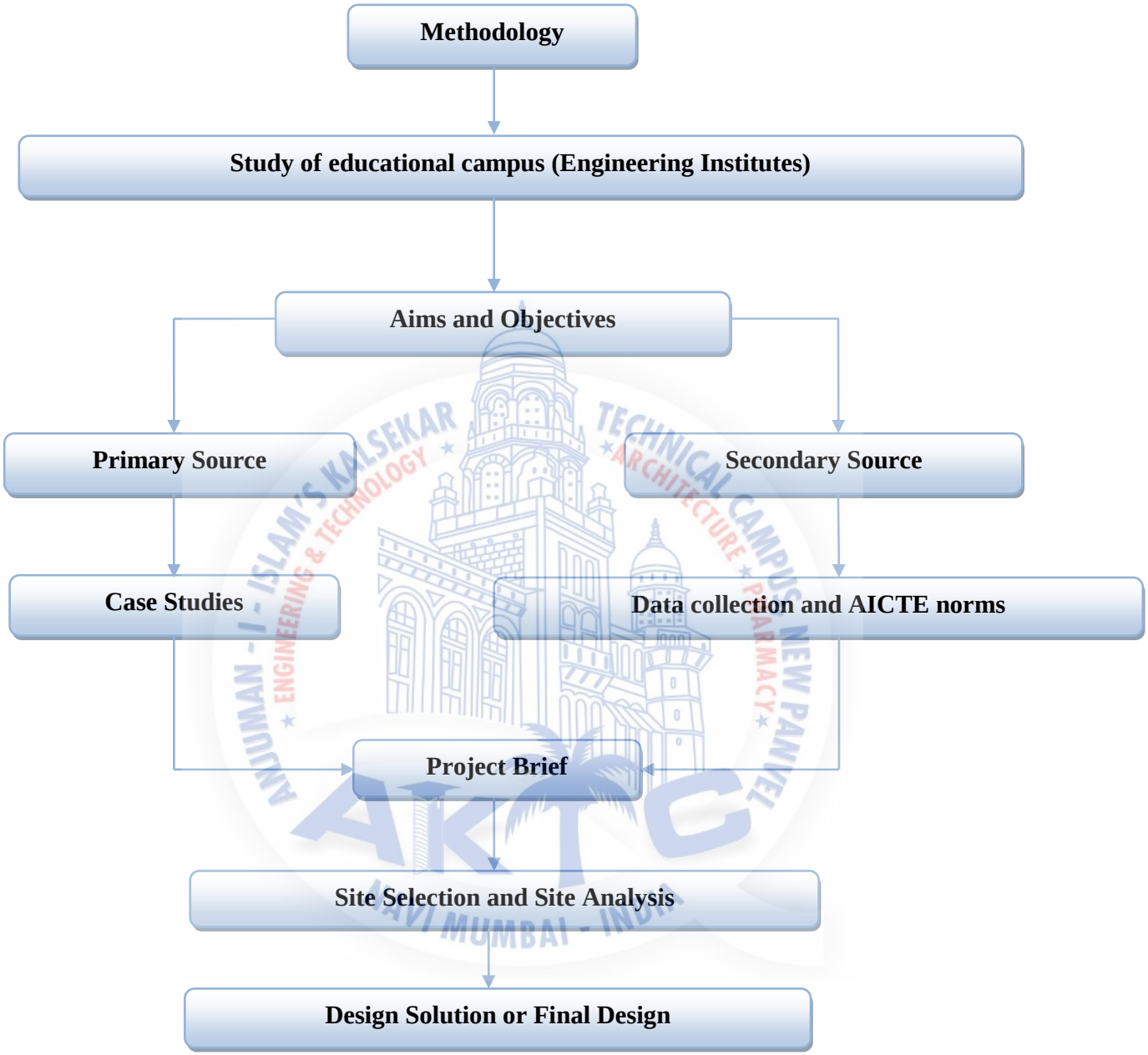
Degree Level Institutions

Table 9 :Land Requirements during the previous year

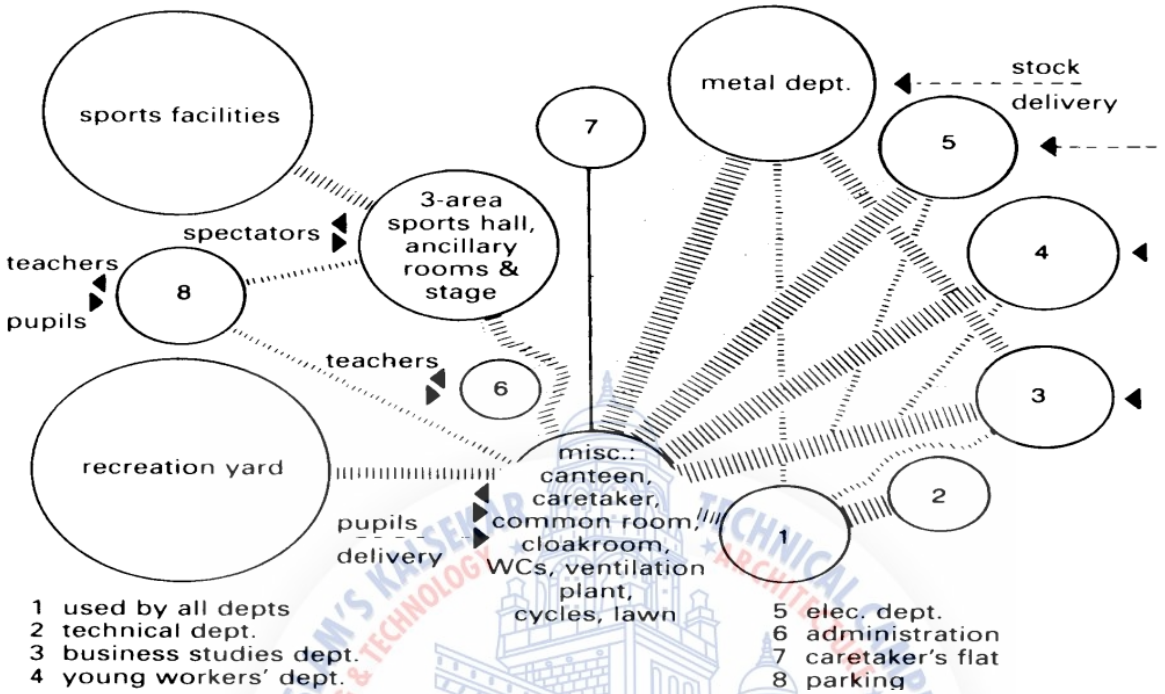
	Engineering and Technology			Architecture and Planning		
Year	Metro/ Corporation	Dist. HQ	Rural	Metro/ Corporation	Dist. HQ	Rural
1985-90	3 x plinth area for bldgs + playground + allowance for future development**					
1995		20	20			
1997	2	4	10			
1999-2003	5	10	25	2	5	10
2004-2006	5	10	10	2	5	5

	Engineering and Technology			Architecture and Planning		
Year	Mega/ Metro	Urban	Non-Urban	Mega/ Metro	Urban	Non-Urban
2006-09	3	5	10	1	1.5	2.5
2010-11	2.5	4	10	1	1.5	2.5
2011-15	2.5	2.5	10	1	1	2.5
2016-17	1.5	2.5	7.5	1	1	2.5

2.1.5 METHODOLOGY:



2.2 LITERATURE REVIEW



2.2.1 CAMPUS :

Space allocation scheme: college of further education

Figure 4 : Space allocation scheme

It is a term 'campus' meaning field-used, to describe the land and buildings university, college or other large institute of higher education conveys the image of a landscaped open space, shaped and formed Institutions play a profound role in giving direction to the process of learning due to rapid development of science and technology, key institutions in today's post industrial institutes of research rather than the industrial or is in reality a manifestation of values and attitudes, the function of an institution is to evaluate ideas; it must grow outwards short term goal is not the policy of an institution an institute should not have no time scale, no spatial sense, no measure. It grows both horizontally and vertically-wider, deeper and higher at the same time.

2.2.2 PARTS OF THE CAMPUS:

A campus is made up of visible, physical, measurable systems, which directly express and support invisible, psychologies and immeasurable systems of human interaction.

The non- physical are the interaction of academic and living activities, the time, motion and communication required. How well the visible total fabric, as an expression of the invisible, satisfies the philosophy and intentions of the universities community determines the ultimate quality and success of the campus. There are three orders of importance in listing the parts of the campus:

Buildings for

- **Educational**
- **Recreational**
- **Community Purposes.**

The physical elements of the campus plan are ranked this way because of campus plan states how to use a building in relation to the use of land. Utilities include electricity, Gas, water and circulation includes roads and space needed for parking.

Educational buildings are the palace where one of the main activities of the campus i.e. 'learning' takes place. It is a place where teachers and students come close together and different ideas of learning are spread and solved. Students come from different parts of the states.

Residential buildings like hostels and staff quarters are the places where the where the second main activity of campus, i.e. 'The living' takes place.

The main activities taking place inside the hostel are to provide residential accommodation to the students with the lodging facilities and some common room for general purpose staff quarters are the pale where teaching as well as administration staff residences are placed.

- Community buildings like a library, union, swimming pool, gymnasium, and auditorium.
- Students as well as staff get recreation by visiting libraries, swimming pool, museum, auditorium, etc.
- Administrative building is a place where goals, objectives and planning problems such for the future expansion of the university campus take place.
- Centers of activity, like the library, landscaping elements, students centre.

2.2.3 PRINCIPLES OF CAMPUS DESIGN:

- Campus master plan should both be general and specific at the same time.
- The physical plan must cover the campus and environs as well as specific site and must implement today's educational goals.
- It must be imaginative and practical.
- The plan should try and embrace both the tangible and intangible aspects of the university.
- Plan should allow for growth and change.
- Campus should be designed with full awareness of climatic factors of sun and shadow, heat and cold, rain and dust and its own form tempered by the simplicity of form and restraint on the use of material are implicit in good campus design.

2.2.4 CIRCULATION:

Circulation is a primary shaper of campus form, flexibility and growth. Though circulation and service systems are subsidiary considerations, yet they should be properly designed as an integral part of the total fabric of the campus and not superimposed on a framework that initially ignored them.

2.2.5 PEDESTRIAN PATHWAYS:

They carry the highest percentage of student traffic on a campus ground. Maximum attention should be paid to these areas. The pedestrian traffic, like a stream tends to move through the shortest distance between two points. The following pedestrian is required:

1. **Transition areas:** From building, to path systems. They may range from formal plazas to simple enlargements of paths in front,
2. **Major pedestrian paths:** These are the direct lines between the origin and destination. These are often designed to allow for in case of emergencies.
3. **Intersection and exchange areas:** These consist of sidewalks, bridges and other site elements where traffic flows across one another,
4. **Minor path:** These ate walkways and paths designed to give pedestrian across to building and outdoor areas.
5. **Base plane**: The pedestrian traffic moving directly on the base plane is sensitive to it textures, textures like any other design factor, determine type and speed of foot traffic.

2.3 CASE STUDIES

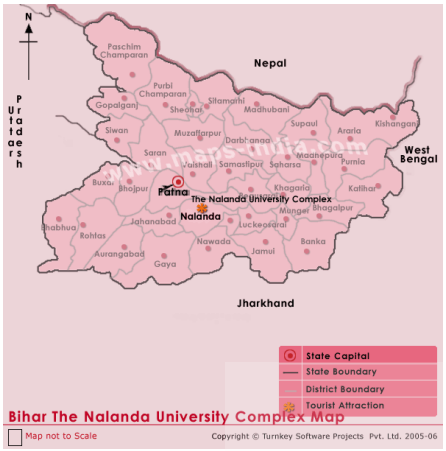


Figure 5 : Location plan of Nalanda University

2.3.1 HISTORY-NALANDA UNIVERSITY

When was it built:	5th century BC
Who built it:	Originally by Emperor Kumaragupta I of Gupta Dynasty; Expansion works continued during and after Gupta period
Where is it located	**:** Nalanda district, Bihar, India
Why was it built:	As Mahavihara (large Buddhist monastery)

Founded in 427 in northeastern India, not far from what is today the southern border of Nepal, it survived until 1197. It was devoted to Buddhist studies, but it also trained students in

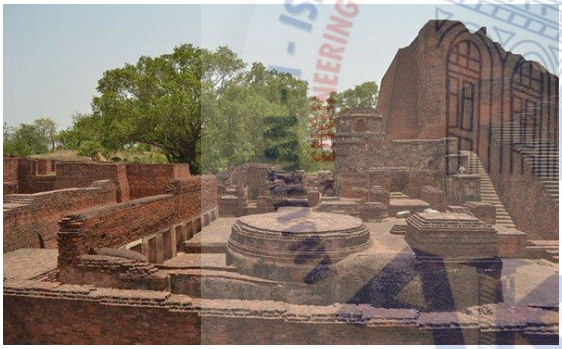


Figure 6 : Space of Nalanda University

- Fine Arts
- Medicine
- Mathematics
- Astronomy
- Politics
- The Art Of War.

Spaces of the Campus :

- The Center Had Eight Separate Compounds
- 10 Temples
- Meditation Halls
- Classrooms
- Lakes
- Parks
- It Had A Nine (Story Library Where Monks Meticulously Copied Books And Documents So That Individual Scholars

Figure 7 : View of Nalanda Campus

Could Have Their Own Collections.

Nalanda University was an ancient centre of learning in India, and among the first great universities in recorded history, predating such institutions of higher learning like Al-Azhar in Egypt (10 thcentury AD), the University of Bologna in Italy (11 th century AD), and Oxford University in England (12 th century AD). It was also the first ever residential university in the world, holding capacity for thousands of students to stay on campus in dorms

Site Plan

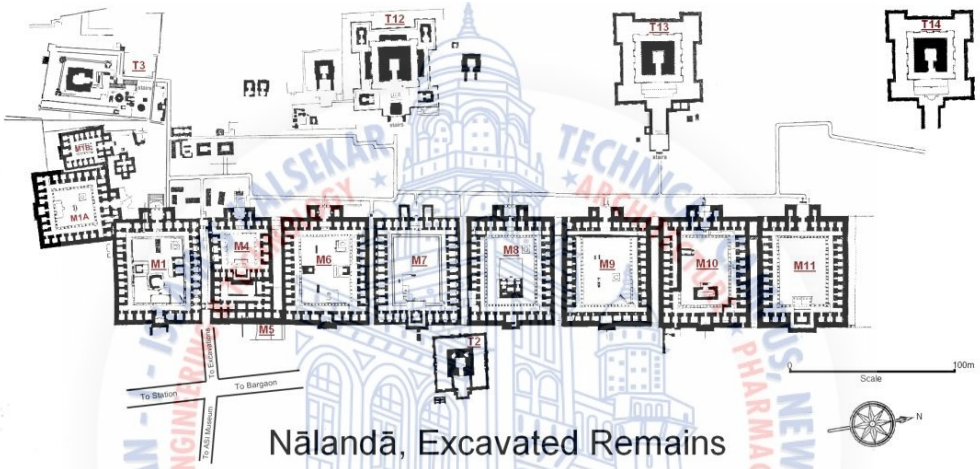


Figure 8 : Site Plan Of Nalanda Univerity

Nalanda, an architectural chef d'oeuvre that was spread over a large area during the ancient period, is today in dilapidated condition with its excavated ruins measuring an area of around 12 hectares.

Figure 8 : Arial View of Nalanda University

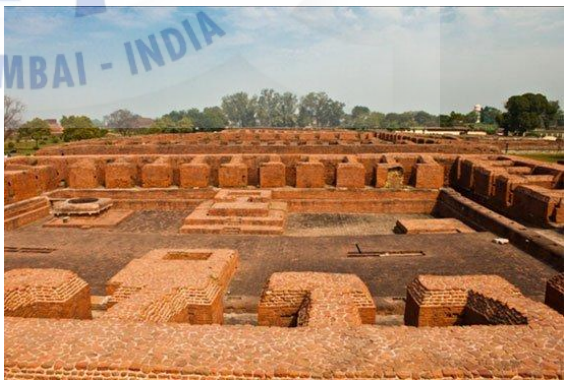


Figure 9 : Courtyard of Nalanda University

2.3.2 SINGHAGAD COLLEGE, PUNE

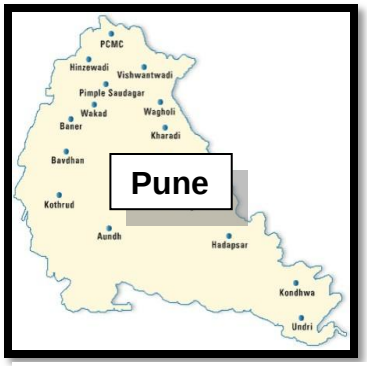


Figure 9 Location plan of Singhagad college

LOCATION:

The Sinhgad Technical Education Society is located at Vadgaon (Bk).12 km away from the heart of the Pune city in the rural context, 15 km away from Pune station and 3 km away from Katraj Bus Stand. The Mumbai-Banglore highway passes nearby. It is located at the outskirts of the Pune.

INTRODUCTION:

Architect	**Peine and Associates**
Established	In 1996
Construction period	5 to 6 years

Figure 10 Site plan of Singhagad College

The site is located on the hill top, contoured. The campus is spread over 48 acres for 2500 students. The site is 'L' shaped and can be accessed by 3 different entries. The major entries are from the two end of the campus and one is at the center of the campus. The most important factor of the campus is its location and site which has beautiful scenic view of Sinhgad mountain ranges.

CLIMATE OF PUNE:

Figure 11 Climate of Pune

- The climate of Pune is Moderate. In summer season the temperature lies between 32 to 40 degree.
- As the site is at Sinhgad mountain ranges, there is heavy rainfall.
- The buildings are designed considering climatic condition into the courtyard style planning.

COURSES:

- The campus has facilities like bank (ATM), laboratories, auditorium, seminar hall, workshops, canteen, amphitheatre, gym, sports facilities.
- Civil engineering, mechanical engineering, chemical engineering, electronic and communication, computer engineering, information technology, pharmacy, management, polytechnic colleges, dental college and school of Sinhgad.
- Sports facilities for school are provided.

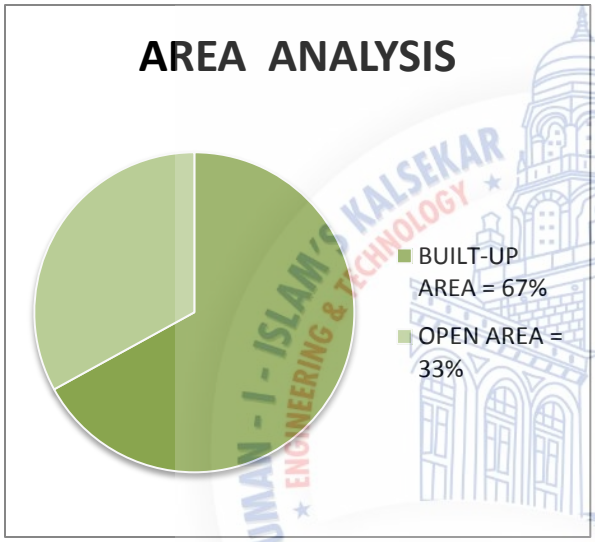


Figure 13 Area analysis of sinhagad college

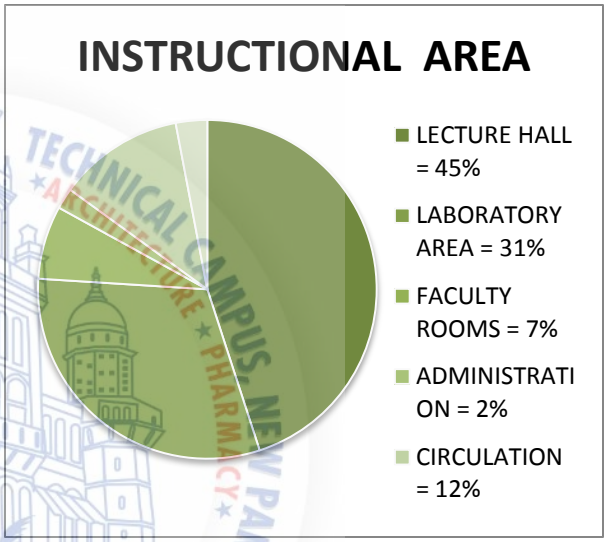


Figure 12 instructional area of the campus

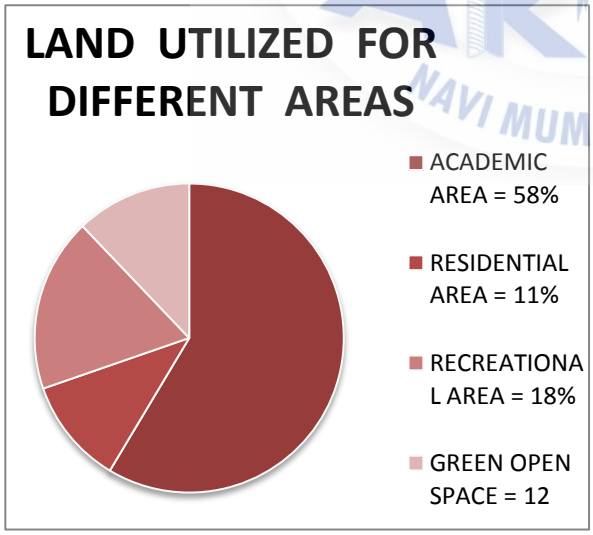


Figure 14 Land utilized of different areas of the campus

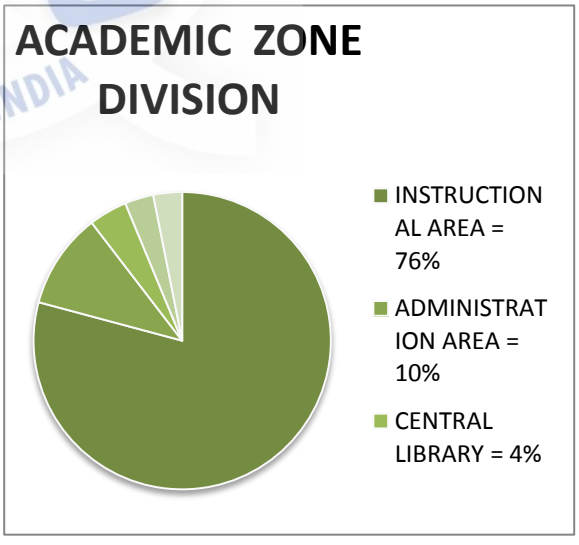


Figure 15 Academic divison of campus

ARCHITECT'S PHILOSOPHY:

- The campus has been planned for bringing all engineering institutes and others like pharmacy, management and schools.
- Architect placed the building blocks in linear form due to the site.
- He placed the academic building in between the campus and at the Northern side boy's hostel are placed which is at the 2nd main entrance, girl's hostel are placed exactly opposite to it at the Southern side of the campus.
- The academic buildings are planned in such a way that it forms courtyard.
- The Architect has given the different linear form to the campus.
- For the purpose of light and ventilation, courtyard planning has been added.
- Every building has box like features on the external wall.

Figure 17 Site plan showing Zoning

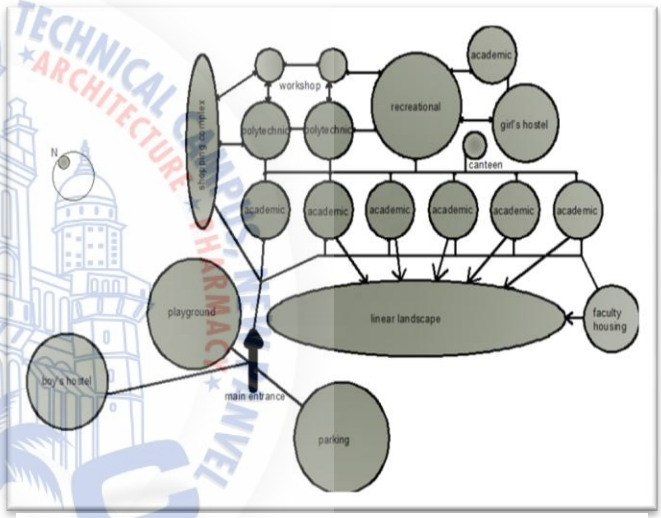


Figure 16 : Circulation of the spaces

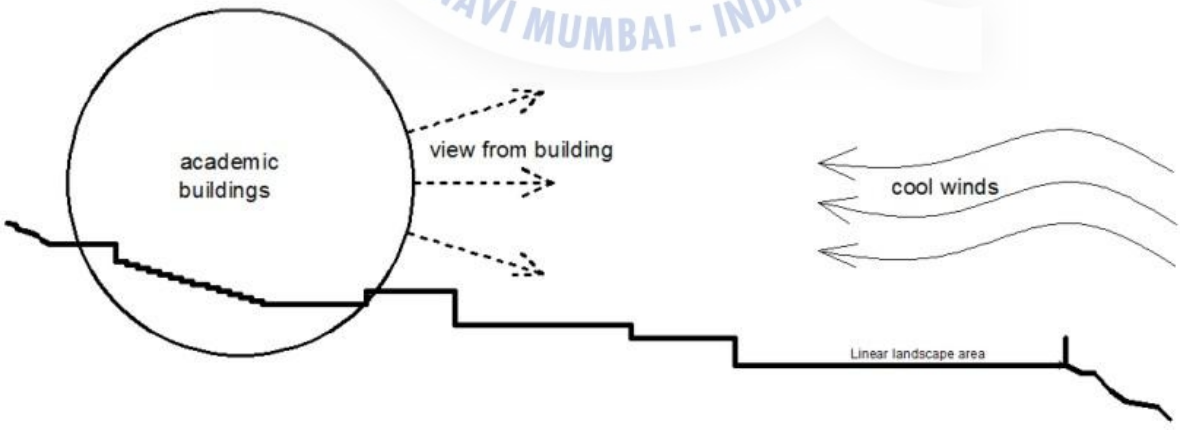


Figure 18 : section showing zoning

PLANING ANALYSIS

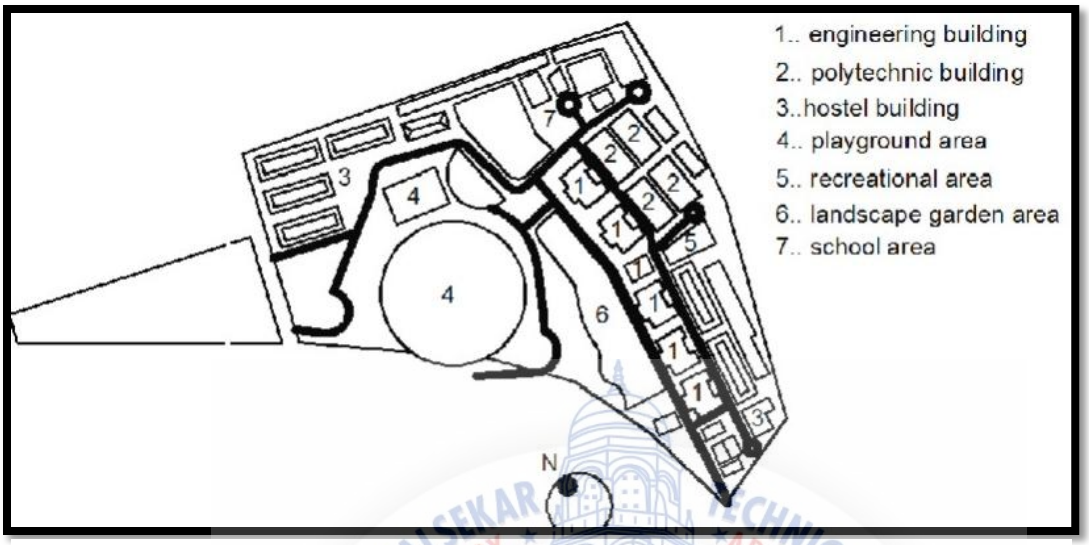


Figure 19 : Planning analysis of the campus

ANALYSIS:

There are two linear roads which run parallel to each other but at different levels connecting all academic, residential and services buildings. **The colleges are placed at regular interval so that they form interacting spaces in between..**

These points can be defined as nodes. These nodes acts as a informal gathering space for the students. **These green zones also act as buffer zones between the colleges**. As the roads connects all the buildings and spaces like mess, canteen, amphitheatre, bank and shopping complex thus most of the time the roads ac1s as pedestrian -walking plaza. The campus has limited vehicular access, only for staff vehicles are allowed.

The advantage of linear planning is that the space in linearity can be experienced more than circular or radial pattern. It also gives the effect of street.

1.. engineering building	5.. recreational area
2.. polytechnic building	6.. landscape garden area
3..hostel building	7.. school area
4..playground area	8.. parking area

BUILDING ANALYSIS:

The buildings are designed considering climatic conditions therefore Architect adopts courtyard style planning.

Due to the more **amounts of green areas, the microclimate of the site has been changed.**

As the site is situated on the hill,it is more exposed to sunrays.

Linear landscaped to each building

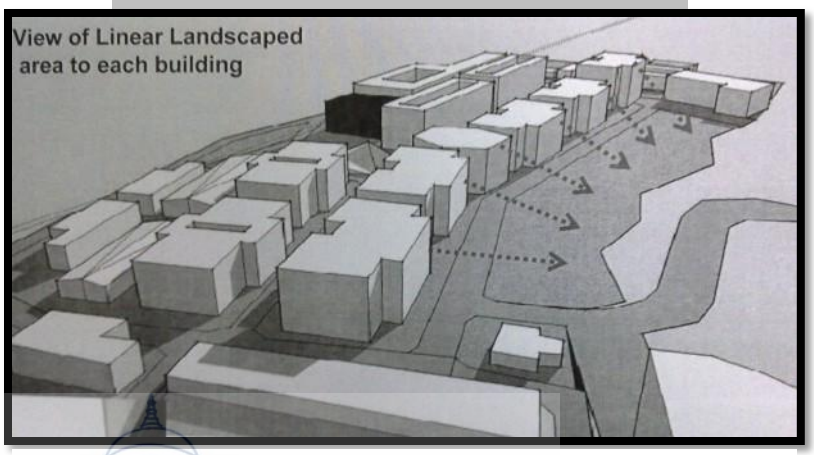


Figure 20 : Block diagram showing Landscape area linear to building

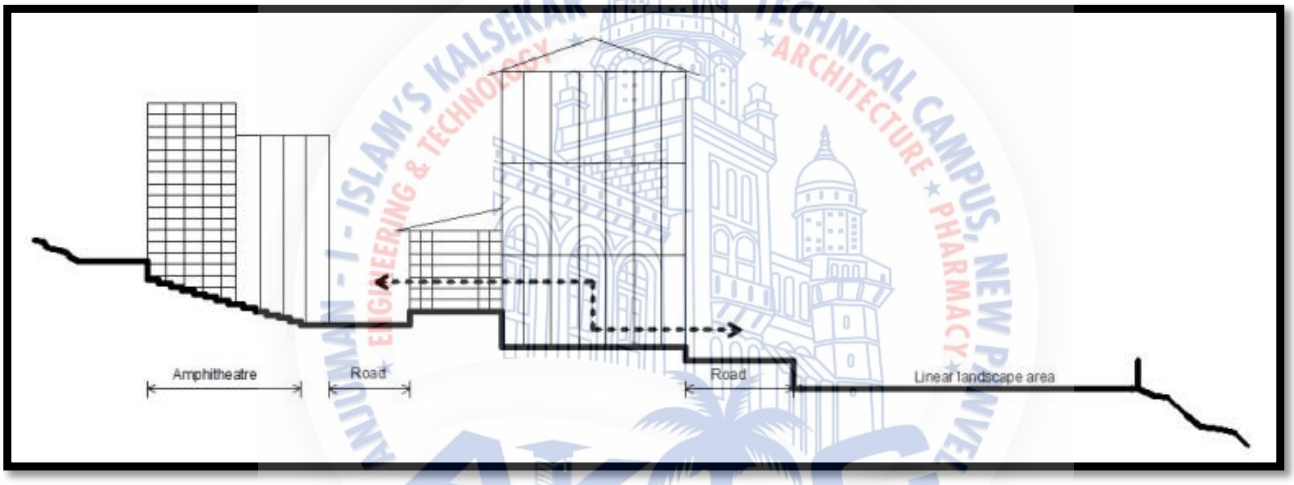


Figure 21 : Section showing working of the building on contour

ARCHITECTURAL CHARACTER:

- As the climate of Pune is Moderate, Architect has given fins and **box section for the exposure of sunrays.**
- Linear landscaped are designed in front of the engineering building and because of contour all the buildings gels the view of the landscaped.
- Shopping complex is placed towards the Northern side of the engineering buildings so that the academic area will not get disturbed.
- In all buildings **courtyard planning is adapted due to the Pune climate conditions.**

VIEW OF COLLEGE CAMPUS

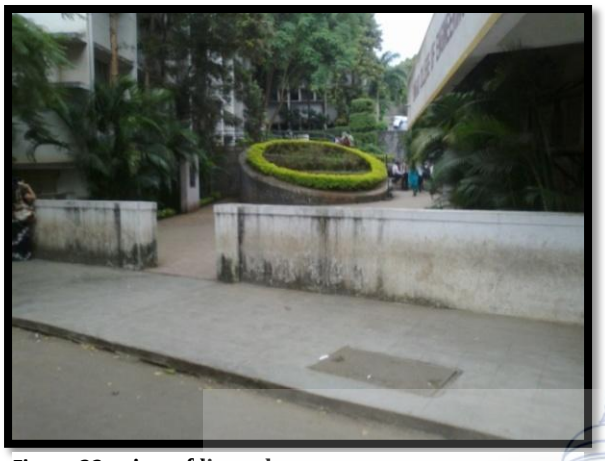


Figure 22 : view of linear lanscape

Figure 23 : Fin and box section in Elevation

Figure 25 : landscape area of the Campus

Figure 24 : Ramp leading to Upper space

2.3.3 NATIONAL INSTITUTE OF TECHNOLOGY, AHMEDABAD

LOCATION	PALADI,AHMEDABAD
ARCHITECT	SARABHAI AND GIRA
SITE AREA	63,848SQ.M
CLIENT	MINISTRY OF INDUSTRY
YEAR OF COMPLETION	1961

LOCATION : Context-(surrounding area)

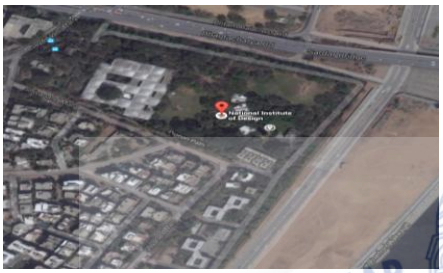


Figure 26 : Location plan of the NID

Figure 27 : Areas around the campus

- This site is connect to Sabarmati river , educational area, residential area, museum(recreational area). Main Access of the site is from the main road.
- The site is located along the Sabarmati River. The site measures about 20 acres. In its surrounding is the Tagore hall, the kite museum and opposite to the site is **Diwan Ballabhai high school.**

SITE&FEATURES:

- The shape of the site is such that it divides the site into two parts.The site is sloping towards the river. Its ground level 2.51 m below the high flood level .
- The shape of the site has influenced its design of the institute greatly.
- Most of the main buildings are provided with the river view.

Figure 28 : Area of the campus with green space

ZONING

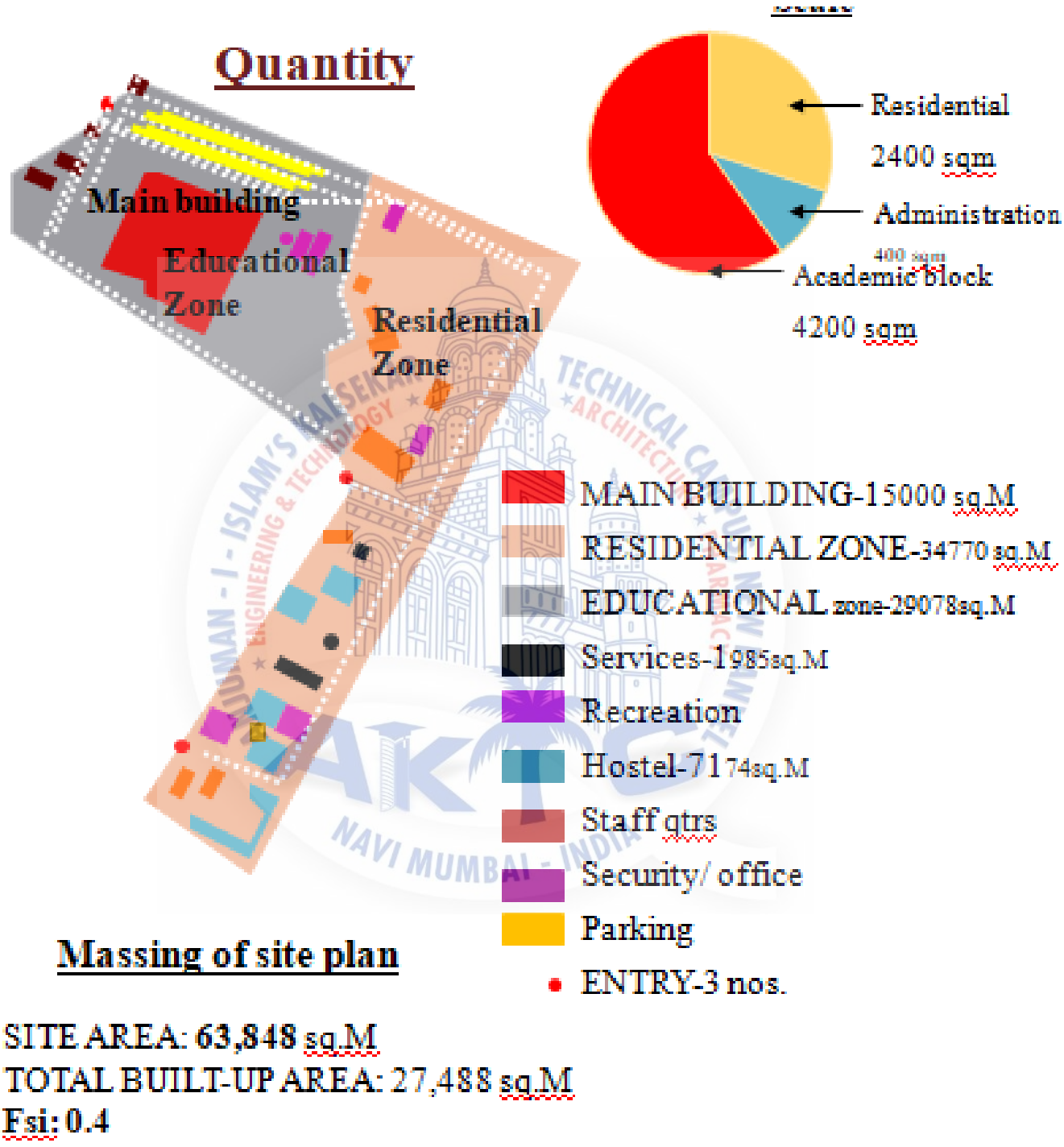


Figure 29 : Massing of the NID campus

SITE PLANNING

- **The whole Campus can be distinctively divided into two major zones –Institutional & Residential. The main block which consists both the academic and administration departments is placed on the eastern part facing the river. Sports facilities are in between the two blocks.**

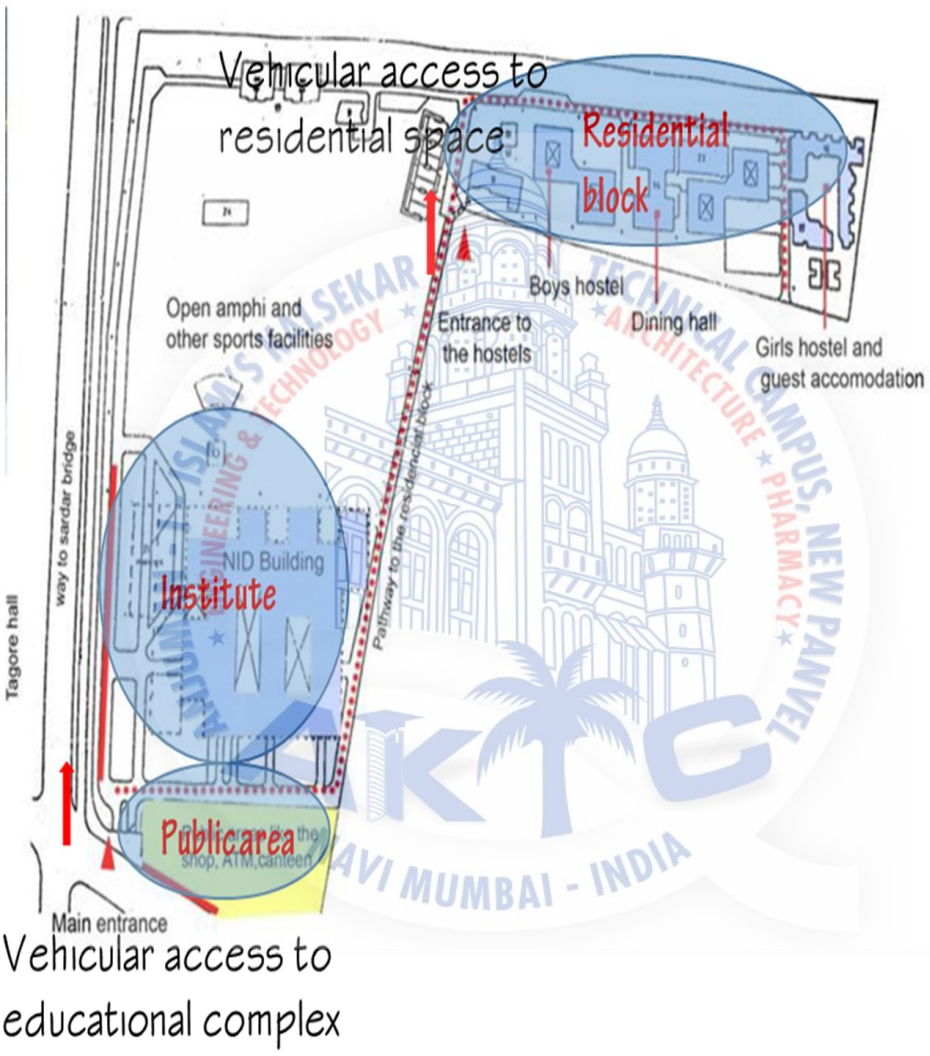


Figure 30 : Access to the Site

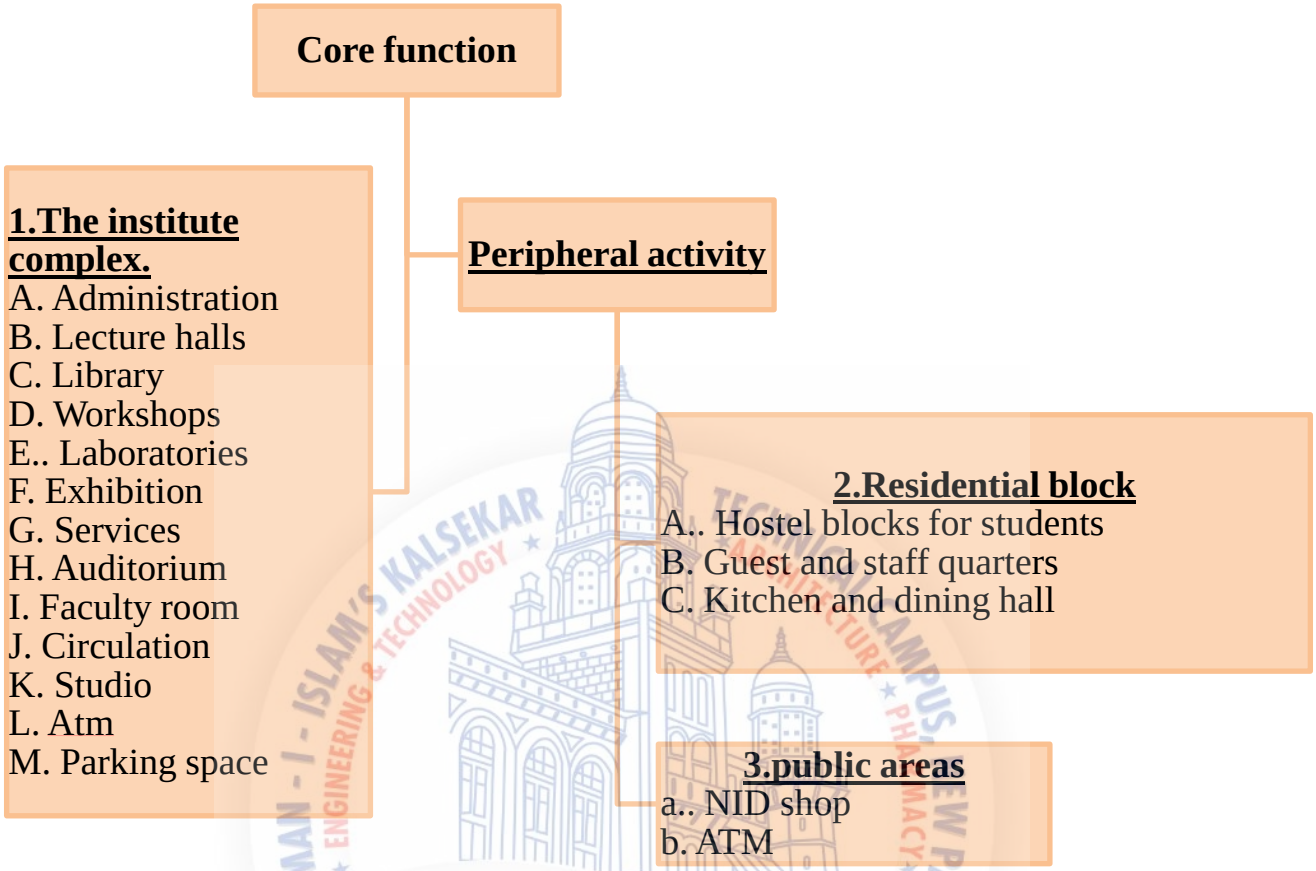


Figure 31 : Functions as per accessibility

INTERNAL ZONING

- The **courtyards,** functionally conceived as **open spaces** to segregate between **two diverse functions** of '**seminar rooms**' or '**classrooms**' and '**workshops**' or '**laboratories**' due to noise and structural reasons; spatially created **light wells** for the **dark ground spaces.** The **north-south orientation** of the studios gives more **light and cuts off the glare.**

Figure 33 : Ground floor area program for NID

Figure 32 Walking Pathways of the Campus

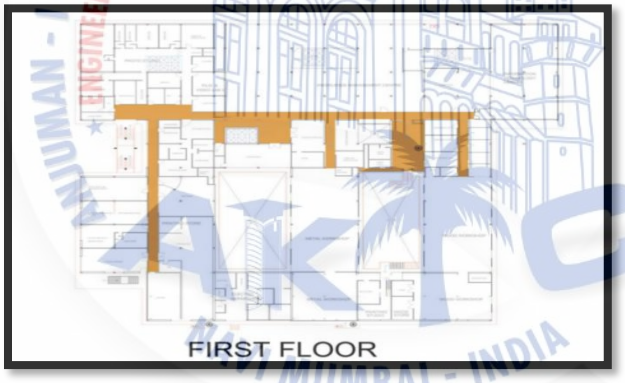


Figure 34 : walking pathways of First floor

CIRCULATION

- Emphasis has been given on the **pedestrian movement** of the site.
- **Vehicular movement** is **restricted** only till the **entrance** for the visitors. But it is **possible** from **residential areas** to **academic block** and vice-versa.
- Besides, **service entries** are provided for the various **workshops**.
- **Horizontal circulation**: The movement pattern develops on the **ground floor** through the **court like spaces** that developed under the structural grid.

VERTICAL CIRCULATION

It is by **triple height staircase** marked with **platforms** at different levels which gives a very impactful experience. One of its major functions is to formalize the **entry** to **auditorium** on the second floor. The **second staircase** has been placed in the **rear most court**, which is used as **secondary** preference to the triple height staircase. **Spiral stairs** have been provided as a means of **connecting workshop to the studios**. The **semi opened** space around the **canopied roof** of the double staircase is an excellent **activity area** where the students interact, relax and has some major source of **exchange of ideas**.

Figure 37 : Staircase with makes spatial difference in the space

Figure 36 : Structural details of the staircase

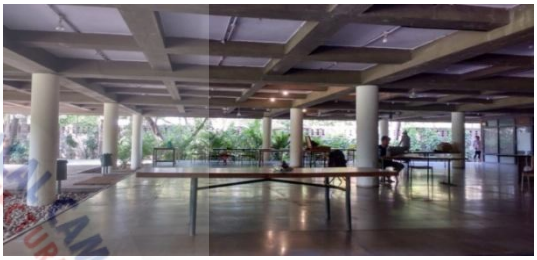


Figure 35 : Structural details of the column

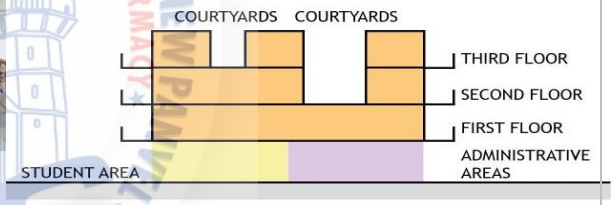


Figure 38 : working of the courtyards in building

STRUCTURALDETAILS

- **Grid planning**: The plan of NID signifies **varied spatial experiences** with different 'spatial types' such as the **pen courtyard** with **thorough way**, the **raised platform** type, the **colonnade type** facing the **green spaces**, the **multiple entrances**, the formal **entrance court** with the **brick shell**, and lastly the grid which holds the whole composition together.

- The plan displays **magnificent interconnections** and **spatial non- hierarchy** with the **openness** of the organization. The **complex modulations** with **partition walls**, created

maze with **diverse experiences**. This openness of the plan symbolizes the expression - **'free plan'**.

LANDCSAPE

• As soon as the **built form** is placed on site it generates its **own space in** and **around it**. Thus the outside **open spaces** are as much **important** a **design criteria** as **inner spaces**.

- **Lawns** are used for **informal gathering, cultural program**, etc.
- The **campus** has been completely **landscaped**. **Three platforms** extend from the **institute building** in the **lawn** acting as **built-in sit outs**.
- There is also an **ancient monument** and **open air amphitheatre** having densely planted **trees** around it.
- **Amphitheatre** is also used for **social functions, fashion shows**, etc.
- **Lawns** are not only a **feature** of **landscape** but they act as **interactive spaces**.

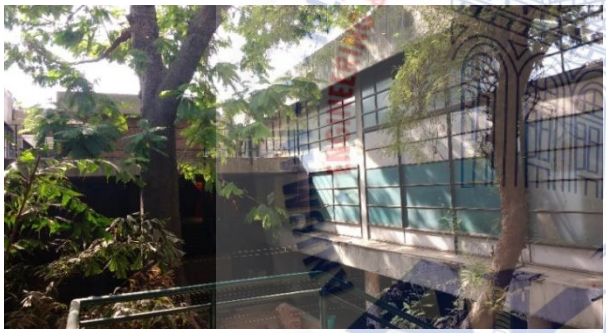


Figure 40 : Façade design including the landscape area

Figure 39 : Stilt area of the campus

- The **campus** has been **designed** taking into **consideration** the **hot and dry** climate of **Ahmedabad**. The **activities** are so **planned** that they spill over into **inward looking spaces**.

- The **courtyards** remain in the **shadow** for most part of the day. To allow the **inflow** of **light** into the **workshops**, **sliding panels** have been installed which **run** from the **height** of the **skirting** to about **10'** from the **floor level**.

- Pockets of **vegetation blend** with the **structure** on the **exterior** as well as **interior**. **Large trees** protect the building from **surface glazing** and **courtyards** from excessive **heating**.

ACTIVITY DIAGRAM

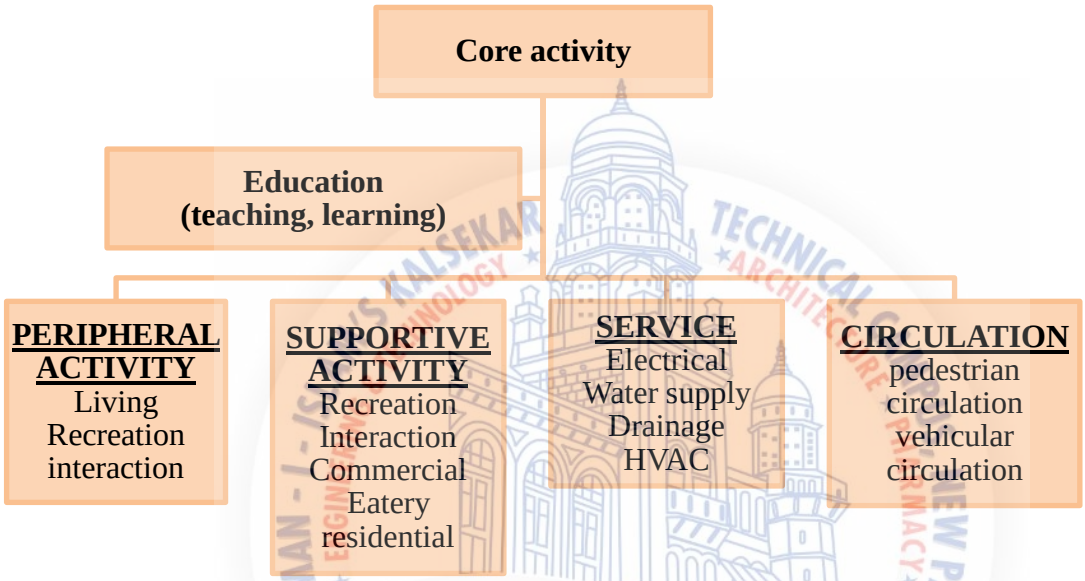


Figure 41 : Activity diagram of the spaces

SPACE DIAGRAM

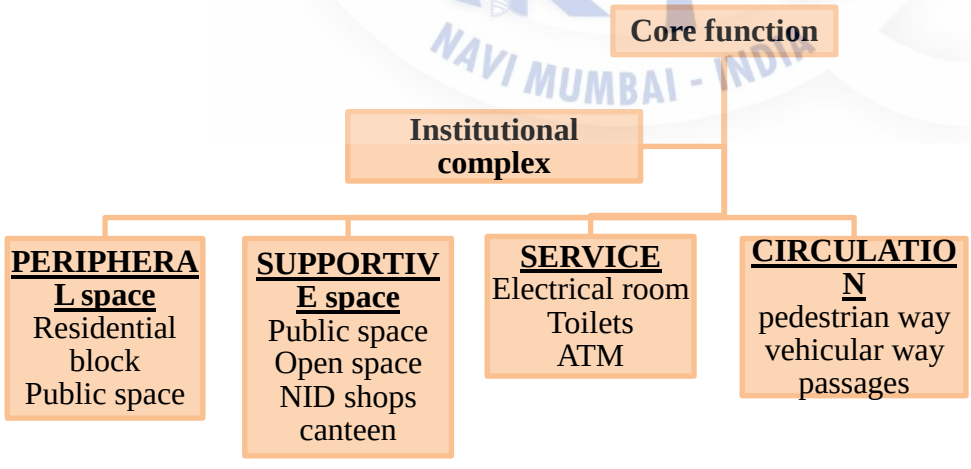


Figure 42 : Space diagram of the campus

The master plan of the campus is divided into three parts.

1. The institute complex.

2. Residential block

3. Public areas

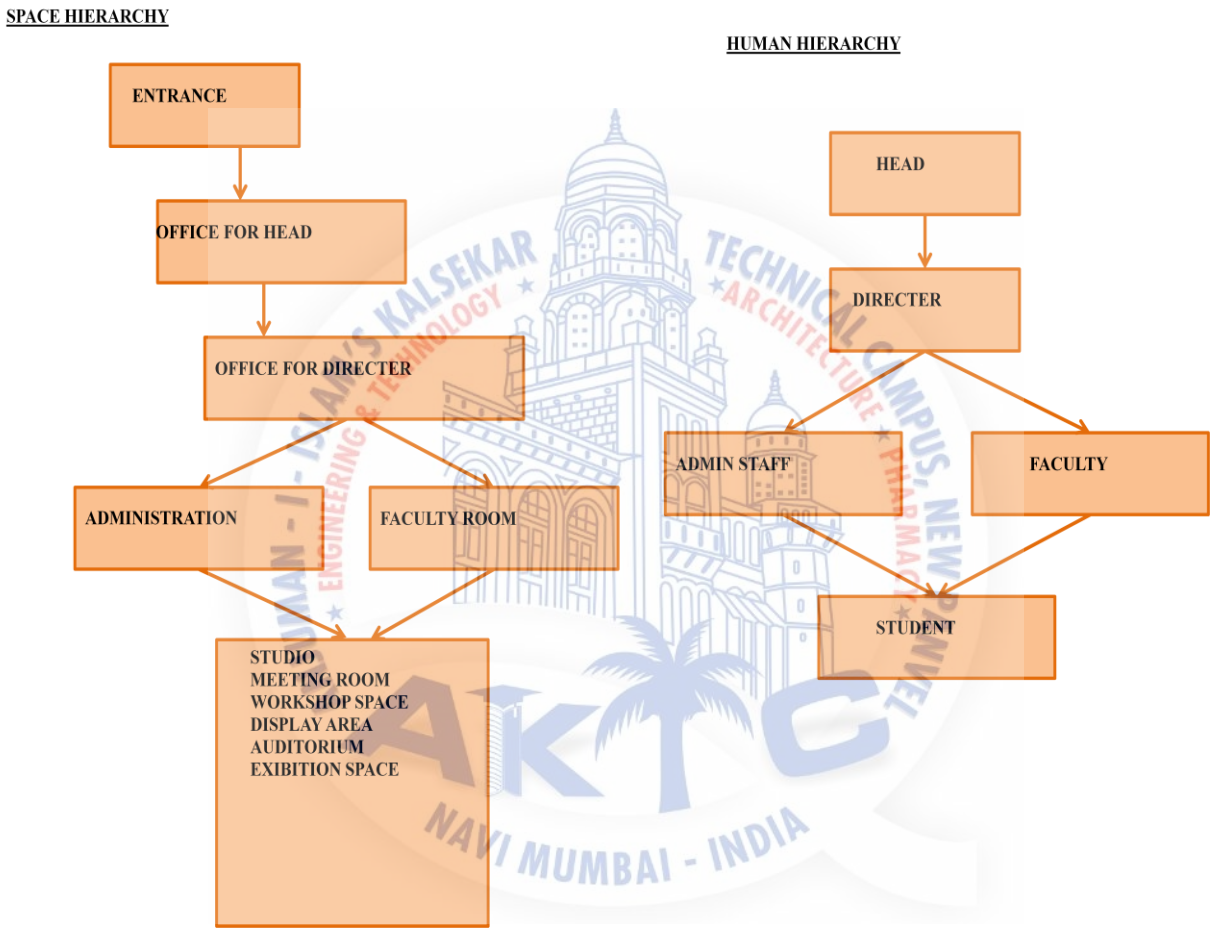


Figure 43 : Hierarchy of the spaces according to users need

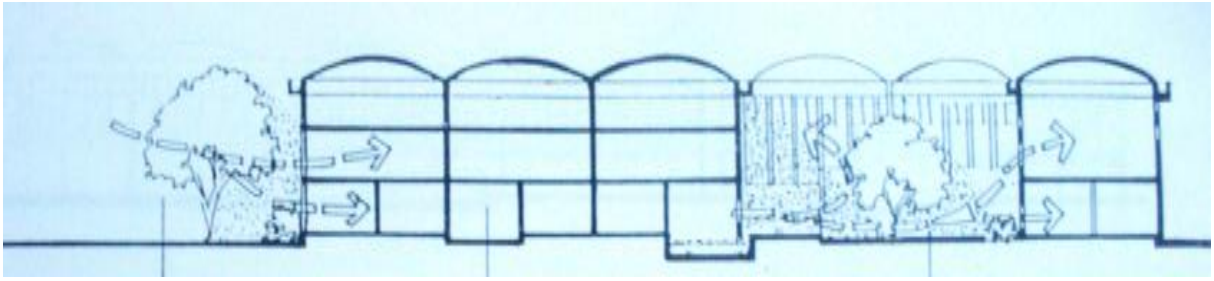


Figure 44 : Section showing working of the building

2.3.4 CENTRE FOR ENVIRONMENTAL PLANNING AND TECHNOLOGY (CEPT COLLEGE)

Figure 45 : Site plan of CEPT college

The CEPT campus is located over 6 acres of land in Navrangpura area of the historic city of Ahmedabad

The school of architecture forms a part of the building complex formed by other of the school of planning , the visual arts Centre, the institute of interior design, art Centre and community science Centre.

The planning of the building blocks has been done so as to distribute spaces amongst intensive landscape.

LOCATION	ARCHITECT	AREA
GUJRAT	B.V DOSHI	12.5acres

APPROACH :

A wide aerial road on western side. Smaller public approach road on northern side.

Internal access road on southern side.

SITE PLAN

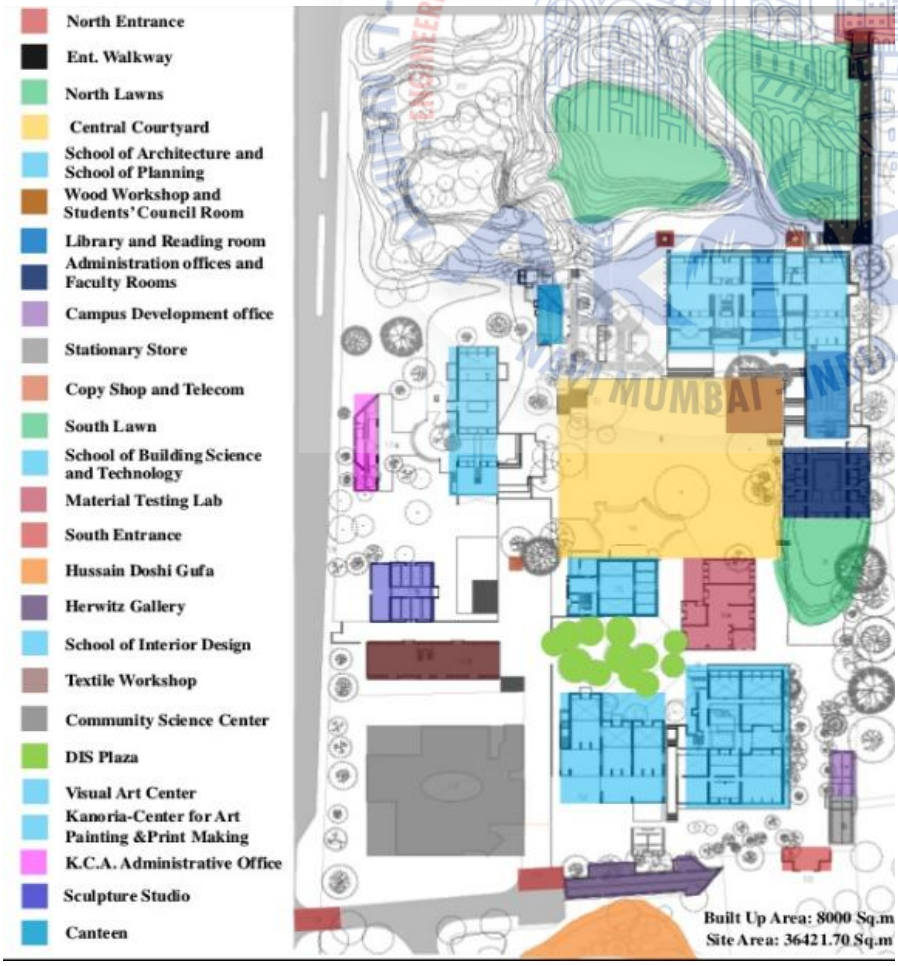


Figure 46 : Space program of the CEPT college

Comprises of four different schools

School of Planning

School of Architecture

School of building science and Technology

School o interior Design

FEATURES: The school building is at the setback of 100ft from the main road and shielded by trees to create a serene atmosphere inside the campus.

Emphasis on open flexible spaces with hardly any doors.

CAMPUS

There are two type of building in the campus –

Wide spanning,multi storeyed usually in transverse groupings

Narrower spanning, single storeyed vaulted,usually not combined.

PLANNING:

Ideologies on which the institute has been designed

- There has to be a feeling of no restriction to the exchange of ideas and thoughts through an informal environment.
- A thrust has to be given on the provision of flexible spaces which can be used in a multifunctional manner.
- A strong interconnectivity amongst spaces is required, making the school an 'open space with hardly any doors'.
- A proper working environment has been created which facilitates faculty and students to teach, learn and interact anywhere.
- Local materials have been used , essentially to reduce the installation and maintenance costs.

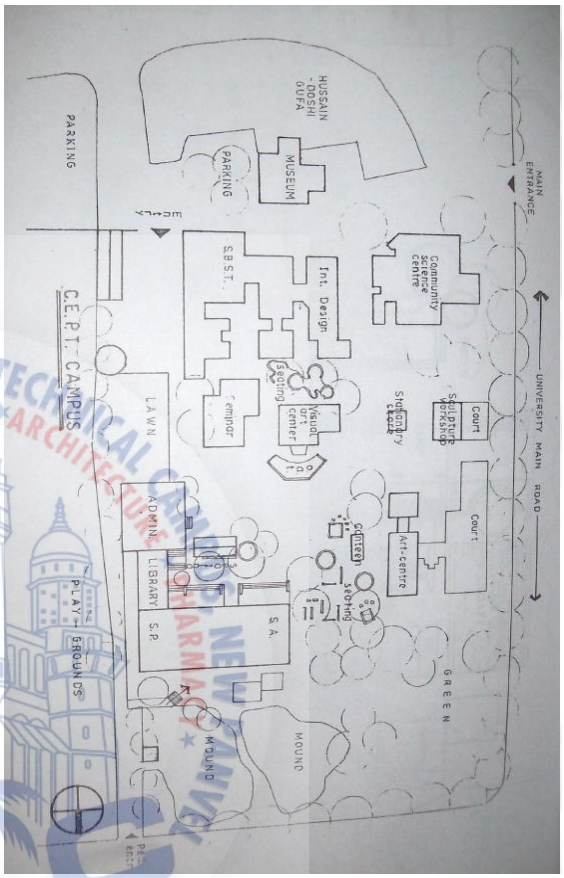


Figure 47 : Planning of the CEPT college campus

Figure 48 : Planning of the Main block

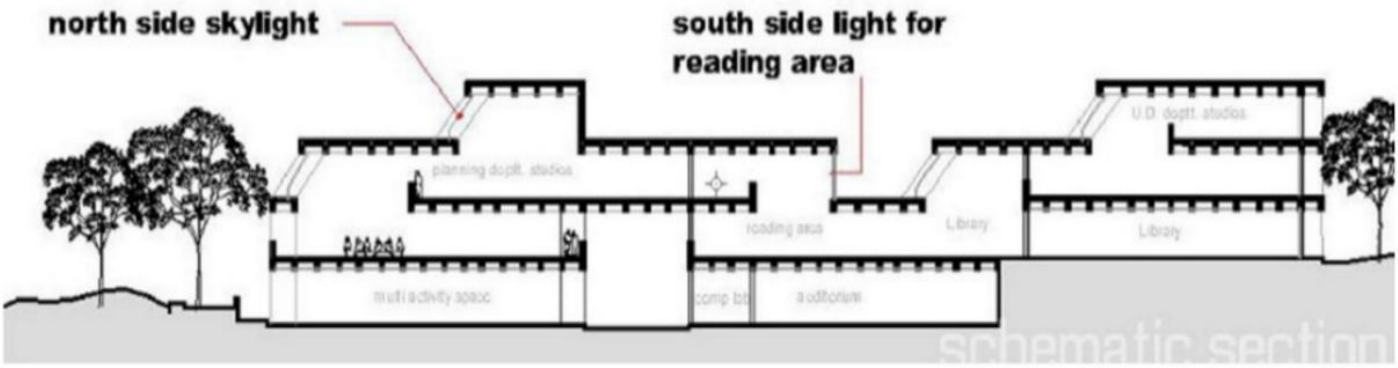


Figure 50 : Section showing Workig of light and ventilation of the building

Light and Ventialtion

The parallel walls,forming an open tube of space are predominately aligned to north south,effectively closing of the east and west sides.

The north side is heightened to allow more north light in while the south side is kept low to shield from the harsh direct sunlight radiations.

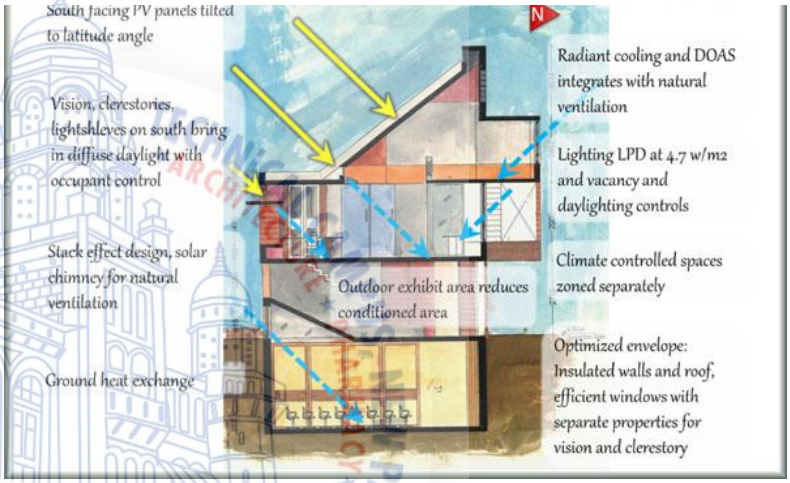


Figure 49 : Working of Heat and Light exchange of the building

This results in a configuration with a double height north side and a single height south side.

Such difference in heights in section leads to a combined volume,emphaising the directionally set out by the parallel walls in plan.

Figure 52 : Façade of the building with north light openings

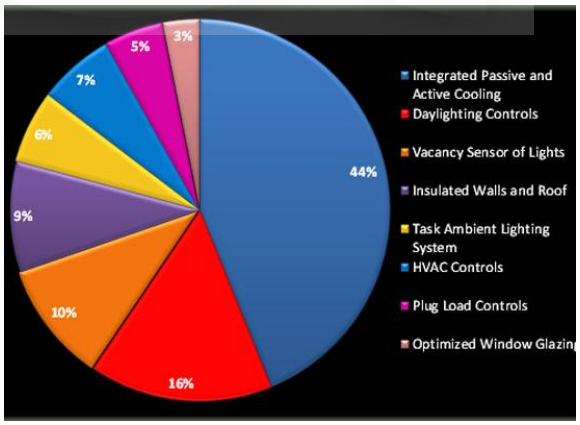


Figure 51 : Graph showing lighting control of the building

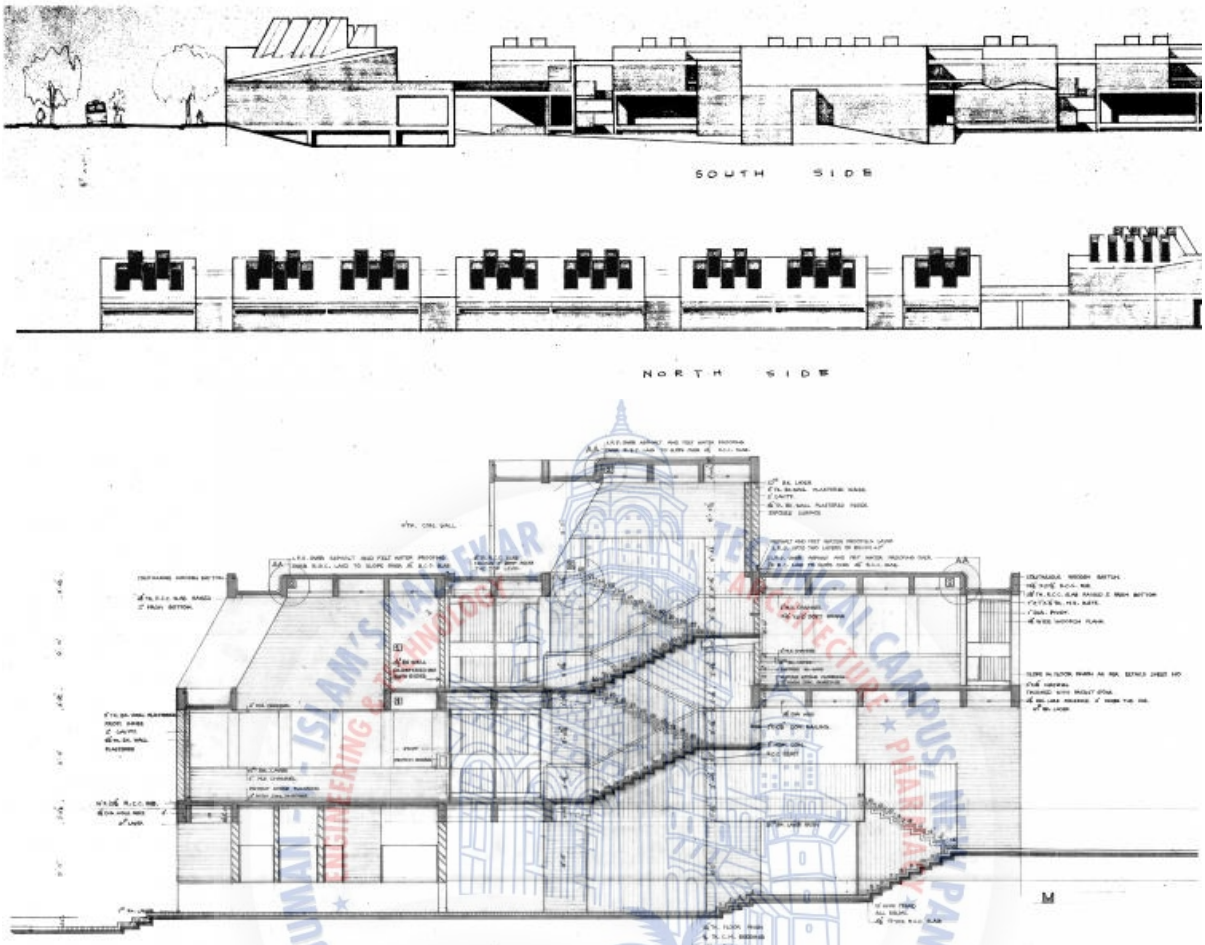


Figure 53 : Section of the individual building

Figure 56 : Facade of the building

Figure 54 : View from entrance

Figure 57 : Back Elevation

Figure 55 : View from Garden area

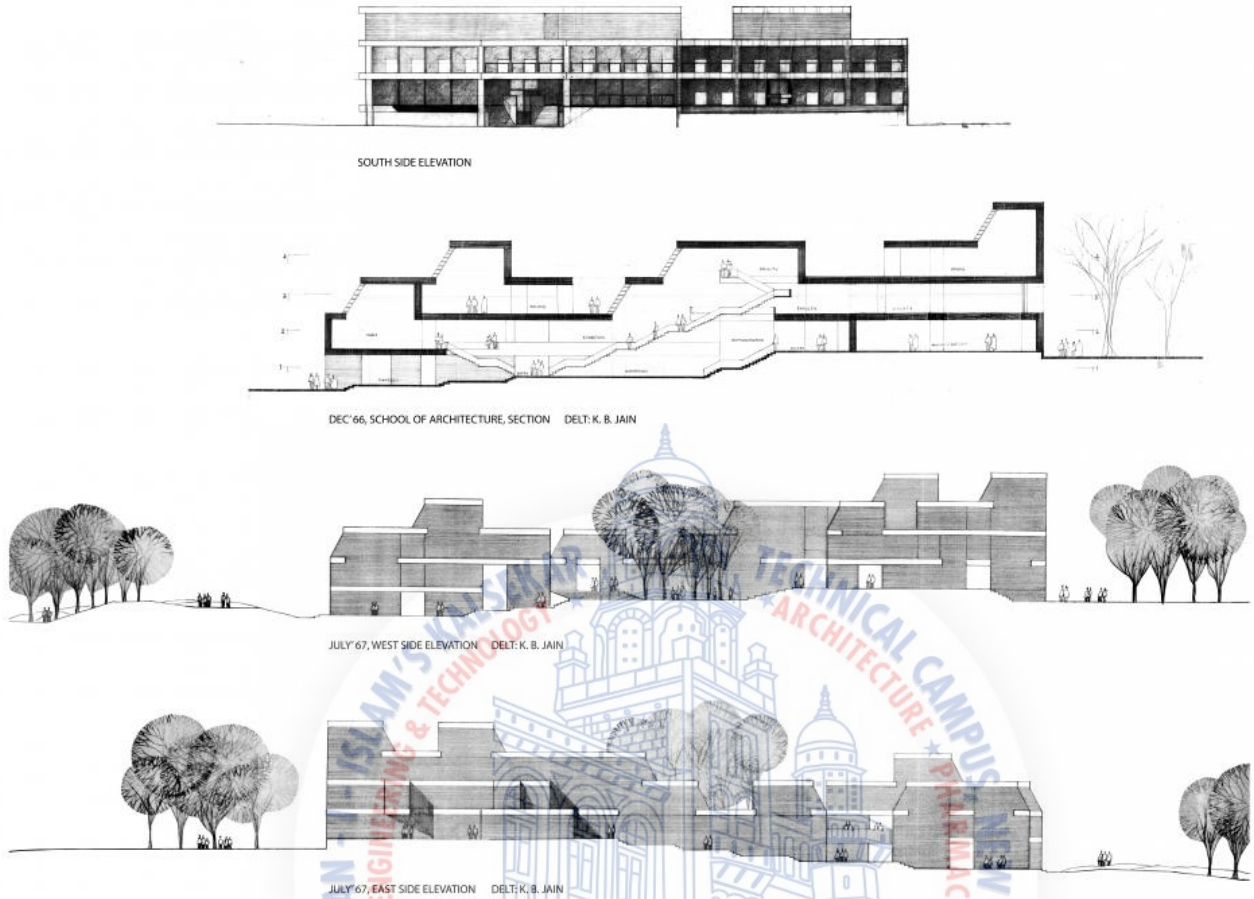


Figure 58 : Section of the building

SCHOOL OF INTERIOR DESIGN:

Figure 59 : View of Technology Building

INDOOR CIRCULATION SPACES

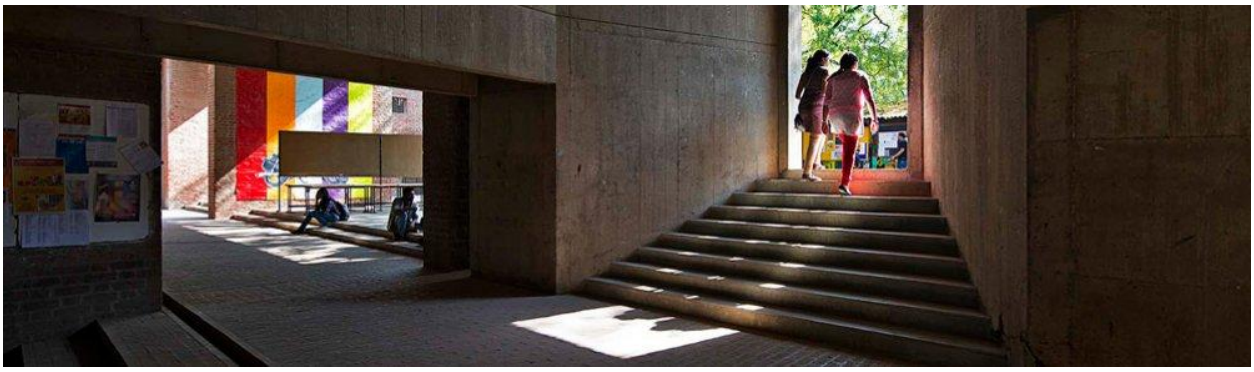


Figure 60 : The circulation inside the building is well planned with staircases at different levels.

Figure 61 : Outdoor spaces

Corridors were 2.5m wide with all the spaces within the building are visually connected by the corridor.

OUTDOOR SPACES:

The circulation within the campus is pedestrainized.The vehicular access is restricted along the periphery of the campus.

There are lots of trees within the enclosed spaces from where all the building are accessed which provides ample shade and comfort.

ACTIVITY CENTRE

The nodes and hub of activity of thr campus have been identified as following:

- Central court
- Canteen
- The school of interior design plaza
- The earth mounds
- The basement

The basic factors that contribute to spaces that have actively evolved to be activity centres of the campus are: **Activities**: eating, recreation,contemplation,

Comfort: Shade, air movement, informalities of spaces, extroverted spaces.

MULTIPURPOSE

Figure 62 : Basement of the campus

Figure 64 : café space of the campus

Figure 63 : basement as exhibition space also

BASEMENT:

LANDSCAPE:

- CEPT, Ahmedabad is good example of blend of nature with the built-up. There is a strong connectivity between the building blocks.
- `The buildings essentially 'merges with the surrounding ' to provide a unique.

Figure 65 : Landscape area with building

Figure 68 : pathways with Landscaping

Figure 67 : Building surrounded by landscape

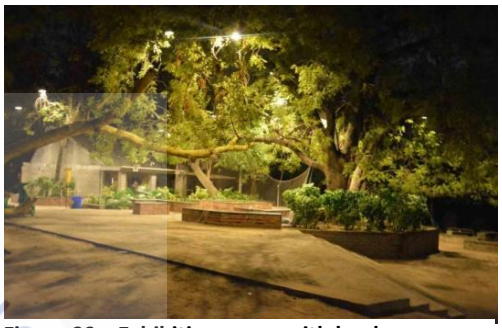


Figure 66 : Exhibition space with landscape area as open space

- Recessed windows provide protection from the hot sun, while angled windows assure that maximum light reaches the interiors.

RAINWATER HARVESTING:

Inverted channels are provided on the roof with large water spouts at the end.

These stand out in the building form as visual feature.

Figure 71 : water channels for rain water

Figure 69 : Building façade projections

Figure 70 : Façade of the building covered with trees

Figure 72 : water channels at the roof

2.3.5 INDIAN INSTITUTE OF MANAGEMENT

LOCATION PLAN

Figure 74 : Location plan of IIM

Figure 73 : Building façade of IIM

Year of completion	Chief Architect	Site Area	Building
1963	**Louis I. Khan B.V Doshi Anant Raje**	**66 Acres**	**Contemporary style**

Figure 75 : Façade of IIM

The Academic complex comprises of the following :-

- Library
- School Building
- Faculty blocks
- Dormitories
- Louis Khan Plaza

No. of Students	No. of Faculties	No. of Staff Members
500	100	350 people

Figure 76 : Site plan of IIM

Figure 77 : Panorama of IIM Facade

CAMPUS LAYOUT

- Separate entries for institutional and residential complex.
- Separate service entry.
- Academics and social activities have been integrated with students and staff living.
- Institutional Complex is taken as Focal Building.
- Auditorium is located near main entrance for easy access for visitors.
- Residential areas have been planned in Hierarchical pattern
- School building Is planned around a court.
- School building and students dorm have been placed diagonally to take advantage of winds from southwest.

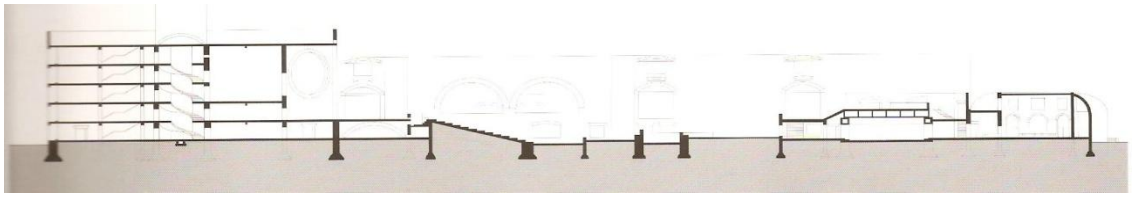


Figure 78 : Section of the building

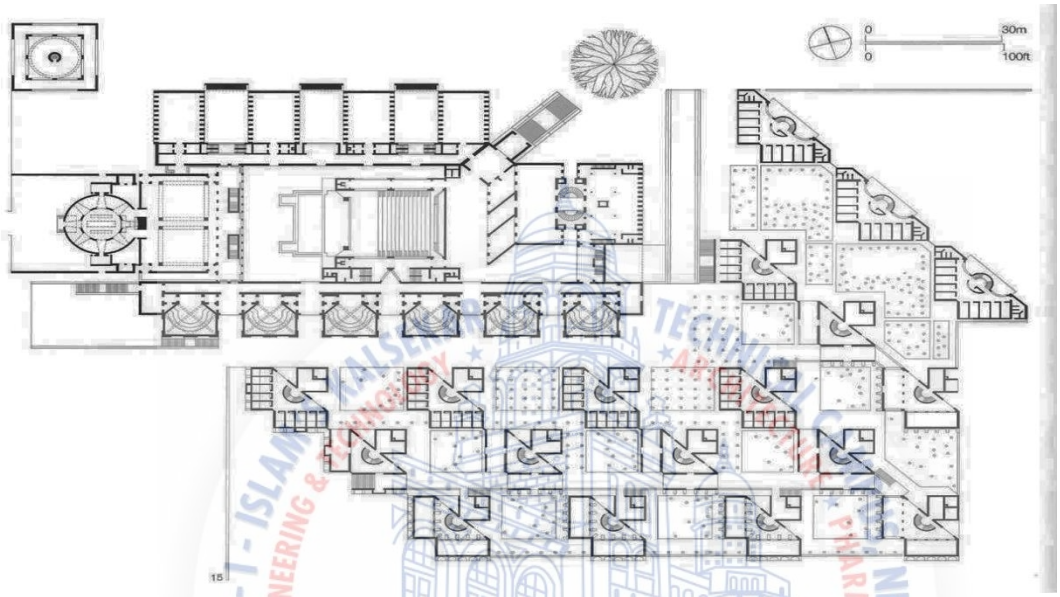


Figure 79 : Plan design with Grid system

SECTION THROUGH MAIN PLAZA

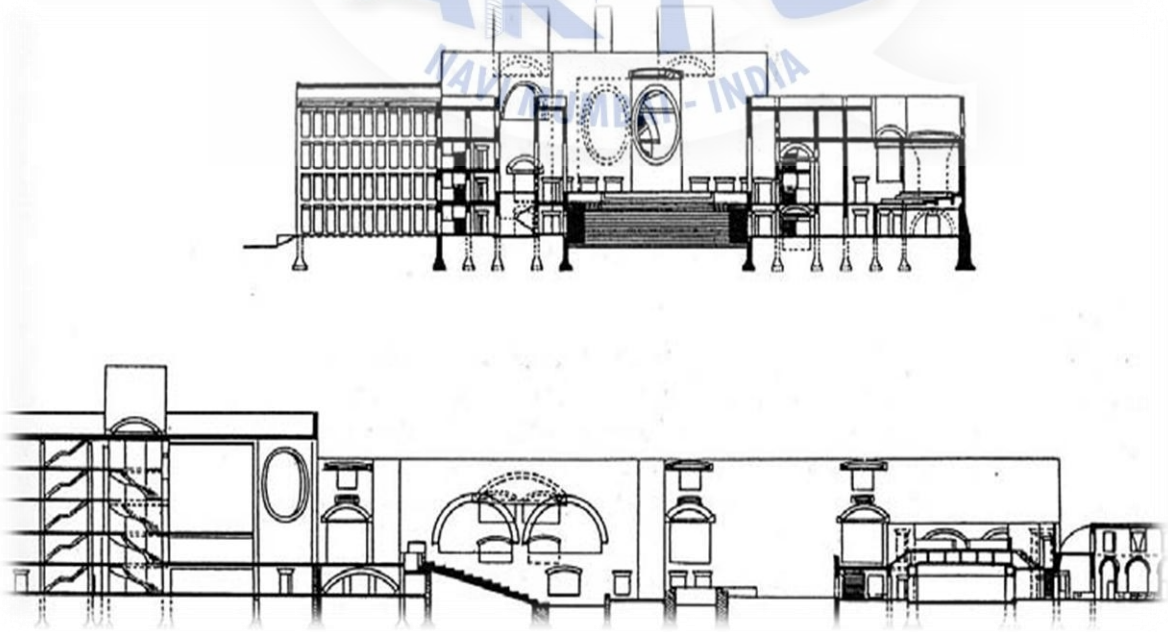


Figure 80 : Section through Main Plaza of IIM College

DIAGRAM OF DORMITORY WING

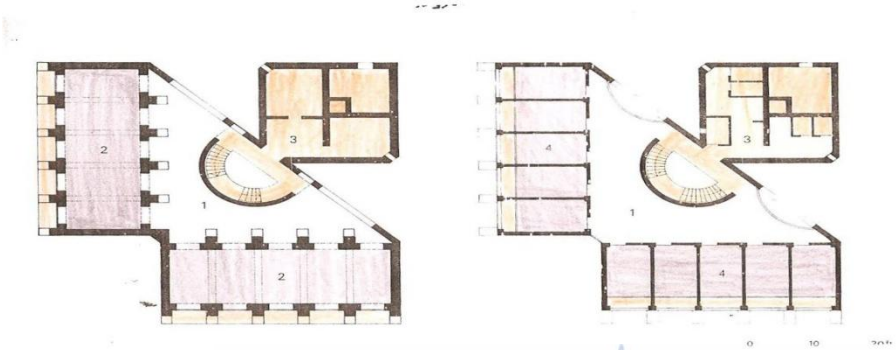


Figure 81 : Dormitory plan

Figure 83 : Façade of the building

Figure 82 : Façade of the building

Figure 84 : Façade of the building

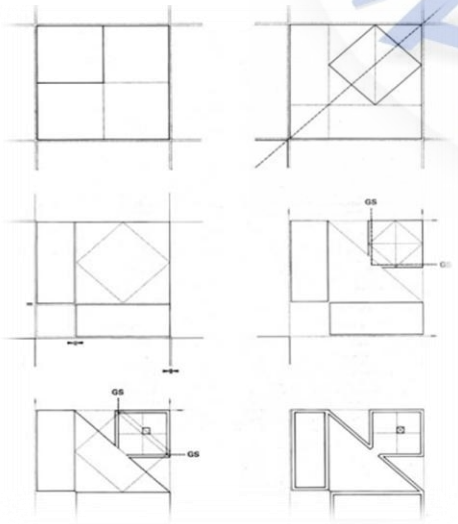


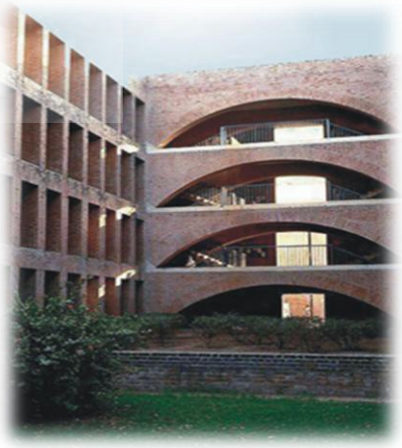
Figure 86 : Diagram of dorminatory wing

FACULTY BLOCK

Faculty block is on the right side of the main entrance.

It is four stored building with four blocks.

All the openings are designed to overlook the adjacent and landscape garden and Loius Khan plaza.



Faculty blocks over the landscapedGarden in Between

Figure 85 : Faculty block with courtyard

LOUIS KAHN PLAZA

Instead of small courtyard, one large court has been planned in the center to relate the movement around.

Figure 87 : Façade of Louis khan plaza at IIM

Figure 88 : Front façade of Louis khan plaza

LIBRARY BLOCK

- The library building is five storyed structure with rectangular plan.
- It is approached by a broad, imposing flight of steps from the parking lot.
- The design has been conceived to entail movement from the active spaces to most private and quite carrels at the farthest reaches.
- FIRST FLOOR :Main reading hall
- SECOND FLOOR **:** Accommodate triple height reading hall and conference hall**.**
- THIRD FLOOR **:** Accommodates bound volumes of journals.
- FOURTH FLOOR **:** Has bound volumes of old books and journals.

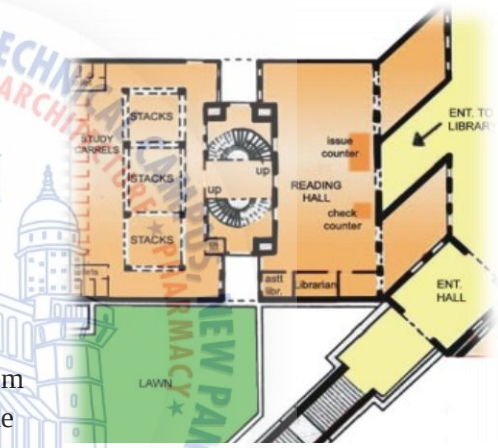


Figure 89 : Plan of Library

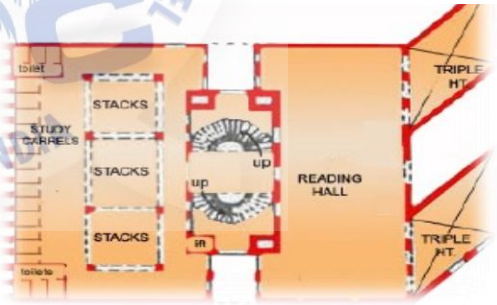


Figure 90 : Plan of Library block

Figure 91 : Building façade of IIM

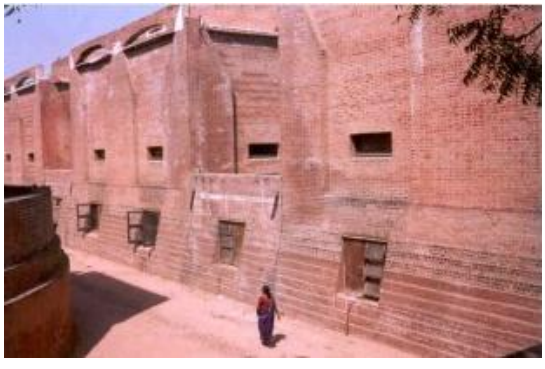


Figure 92 : Lower windows for ventilation

CLASS ROOMS

The shape of classroom is hexagonal

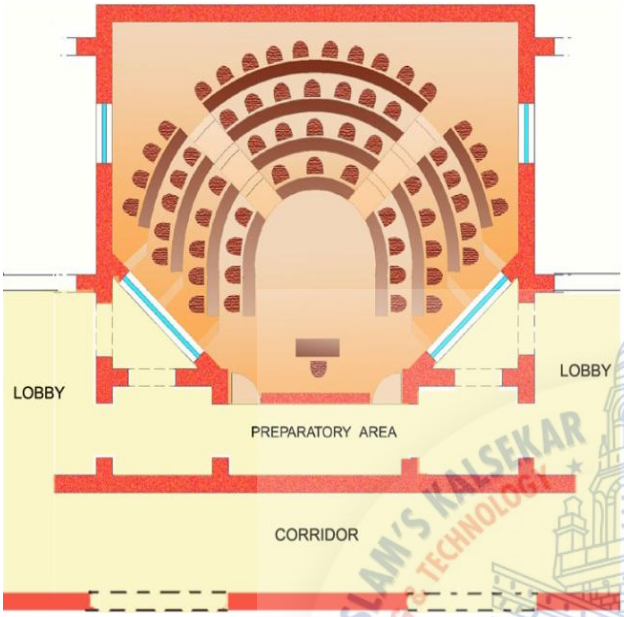


Figure 95 : Plan of classroom

Figure 93 : Classroom interior

Figure 94 : Openings for light wuth becomes facade

The Design of class room is based on the seminar type interaction between the students and the faculty.Windows are high to get glare free light

The large facade omissions are abstracted patterns found within the Indian culture that were positioned to act as light wells and a natural cooling system protecting the interior from India's harsh desert climate. Even though the porous, geometric façade acts as filters for sunlight and ventilation, the porosity allowed for the creation of new spaces of gathering for the students and faculty to come together.

AUDITORIUM

CAPACITY	ENTRANCE LOBBY	FOYER	AUDITORIUM HALL	CONFERENCE ROOM	SEMINAR ROOM
550 SEATS	560 Sq feets	560 Sq feets	3000 Sq feets	200 Sq feets	400 Sq feets Each

GROUND FLOOR PLAN

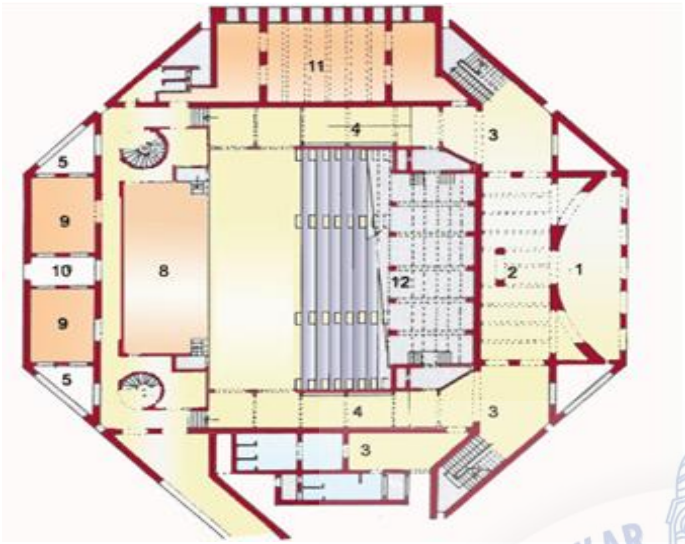


Figure 97 : Ground floor plan of Building block

FIRST FLOOR PLAN

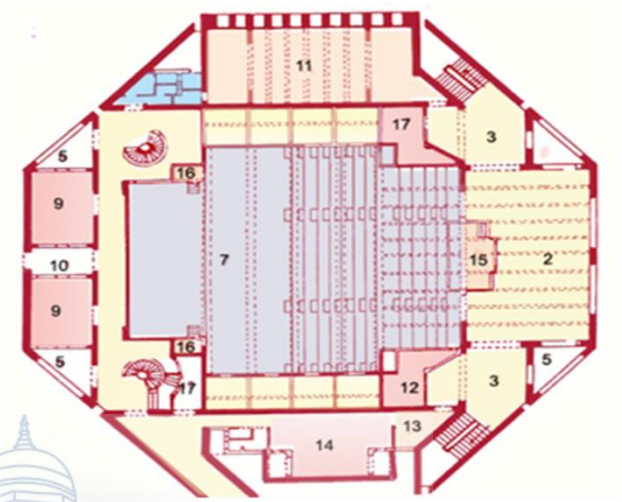


Figure 98 : First floor plan

MATERIALS

- **Brick** has been used as primary building material for the entire complex walls.
- Brick arches have been used for wider spans.
- Concrete has been restricted to floor slabs, foundations and ties for arches

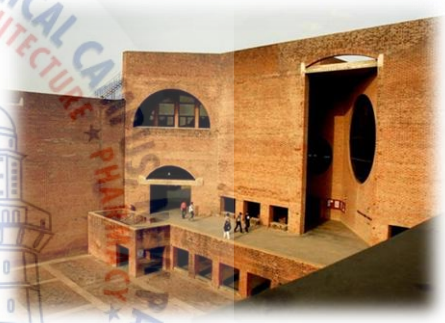


Figure 96 : Brick as a material in facade

Figure 99 : Building façade with arches

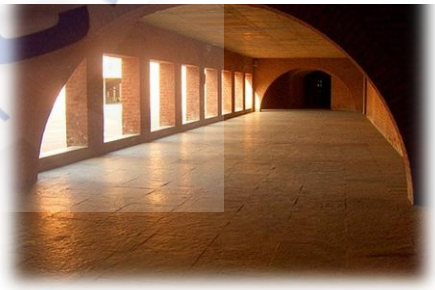


Figure 100 : brick arches with wider openings

2.3.6 YALE ARCHITECTURE AND ART BUILDING

Figure 101 : Facade of Yale College

LOCATION	**YORK STREET, NEW HAVEN, U.S**
ARCHITECT	PAUL RUDOLPH
SITE AREA OF ENITRE CAMPUS	41,07,559 SQ.M
NUMBER OF FLOORS	G + 7 FLOOR STRUCTURES
YEAR OF COMPLETION	1963

LOCATION (context surrounding area) :-

Figure 103 : Location of Yale College

Figure 102 : Location Of Yale College

DESIGN CONCEPT OF ARCHITECT :-

- One of the earliest known examples of Brutalist Architecture in America is Paul Rudolph's Yale Architecture and Art Building in New Haven, Connecticut an imposing, fortress like building, that juxtaposes masses of textured concrete with layers of steel framed glazing.

Figure 104 : Design Concept

- Completed in 1963, the building is formed of intersecting volumes of bush-hammered concrete and glass horizontal elements are supported by a sequence of towers that protrude above the roof in a series of turret.

Figure 105 : Design Concept

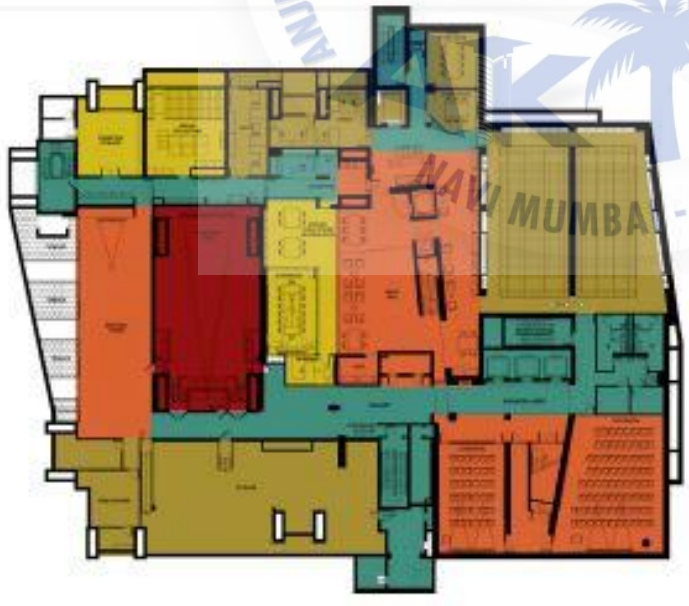
SPACE PROGRAMME :-

Figure 106 : Second Basement Plan of Yale College

PLAN OF SECOND BASEMENT

- Mechanicals
- Electricals
- Services
- Workshops
- Main Hall
- Woodshop
- Digital Media

➢ Over All Noisy & Private Area.



PLAN OF BASEMENT

Figure 107 : Basement Plan of Yale College

- Drawing Studio
- Double Height hasting's hall
- Classrooms
- Lecture Room
- Offices
- Storage for the above functions
- Entry through staircases and Elevator
- Use of sky lights to light interior reading room space

➢ Relatively Quieter & Semi Private Areas.

- Library
- Department Offices
- Administration Offices
- Public Café
- Storage & Teaching labs

➢ Quite zone near the library, noiser zone near the office half

➢ Quite and Public Areas

Figure 108 : Ground Floor Plan of Yale College

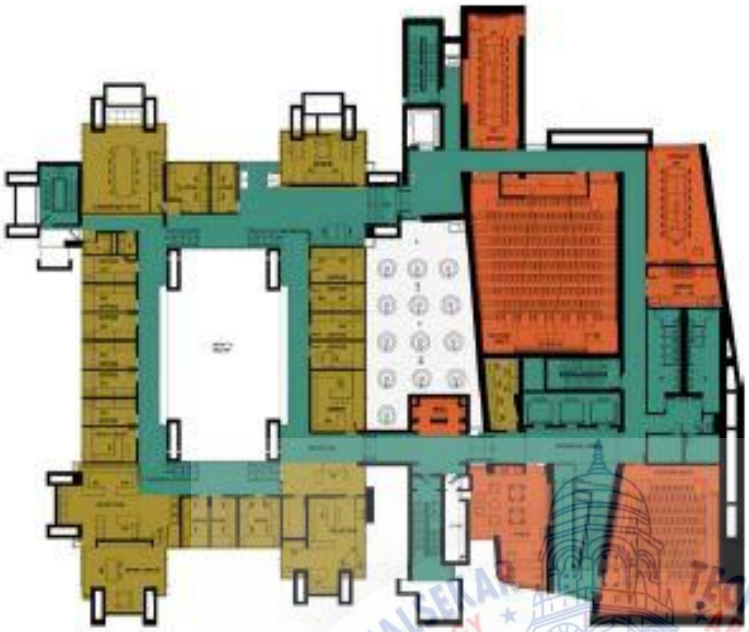
GROUND FLOOR PLAN

- Public zone
- Two stored exhibition space
- Seminar rooms
- Conference rooms
- Lecture Halls
- Unhindered entry from the road outside

➢ Noisy & Public Area

Figure 109 : First Floor Plan of Yale College

FIRST FLOOR PLAN

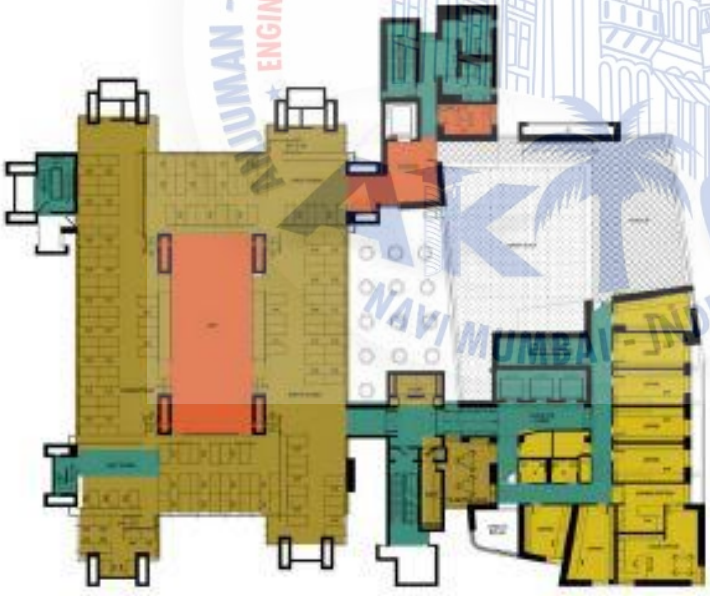


- Mass student gathering
- Departmental & Faculty rooms
- Seminar room
- Lecture room
- Interlocking Planes
- Administrative offices on Mezzanine overlooking exhibition space

➢ Quite & Semi Private Areas

SECOND FLOOR PLAN

Figure 110 : Second Floor Plan of Yale College



PRIVATE
SEMI PRIVATE
SEMI PUBLIC
PUBLIC
CIRCULATION

- 4 Studios
- Terrace to sketch and hangout space
- Threshold achieved by changing level
- Green roofs
- Natural lighting for all studios
- Common double height jury space
- Print laser cutting room

➢ Quite & Private Areas

THIRD FLOOR PLAN

Figure 111 : Third Floor Plan of Yale College

Figure 113 : Fourth Floor plan of Yale College

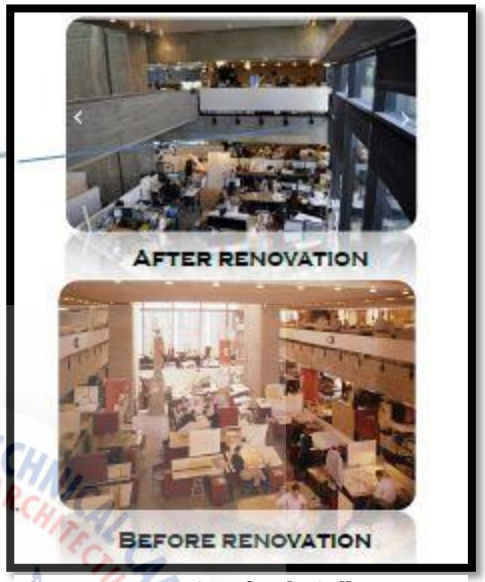


Figure 112 : Interior of Yale College

FOURTH FLOOR PLAN

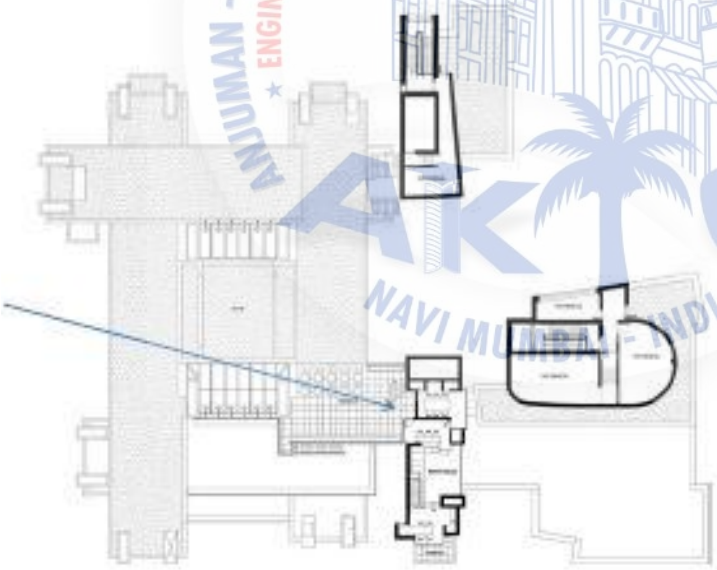
Figure 114 : Fifth Floor Plan of Yale College

FIFTH FLOOR PLAN

- Painting and Graphic art studios are on the top two levels, with an open terrace for sketching

Figure 115 : Sixth Floor Plan of Yale College

SIXTH FLOOR PLAN



- There is a penthouse apartment for guest critics, that also has its own terrace.

Figure 116 : Seventh Floor Plan of Yale College

SEVENTH FLOOR PLAN

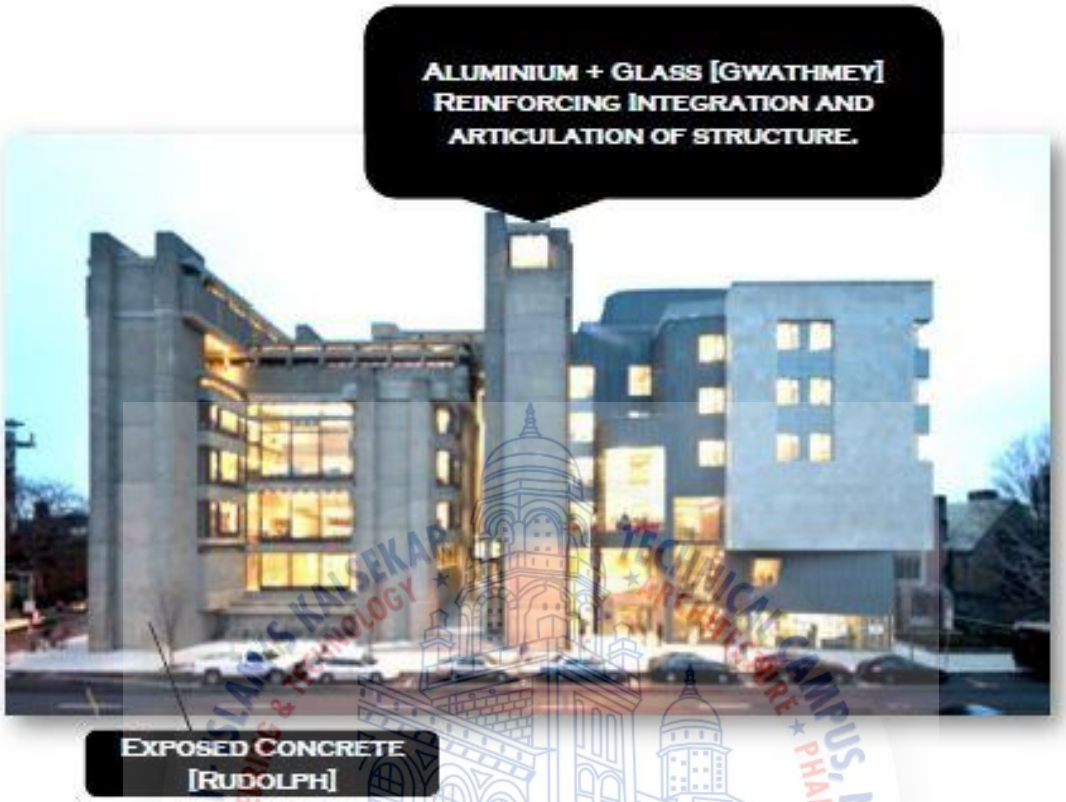


Figure 117 : Front Facade of Yale College

- Restoration specified vast glass sheets developed to reduce heat gain and energy consumption.
- After mockups were evaluated for aesthetics and performance.
- The project team selected a glazing product that provided suitable. A insulation properties, low-emmisivity and glare reduction.
- The 8 by 12 foot panels were some of the largest single sheets of insulating glass ever made in the United States.

Figure 118 : Mass Modal of Yale College

Figure 119 : View of Yale College

Figure 120 : Section of Yale College

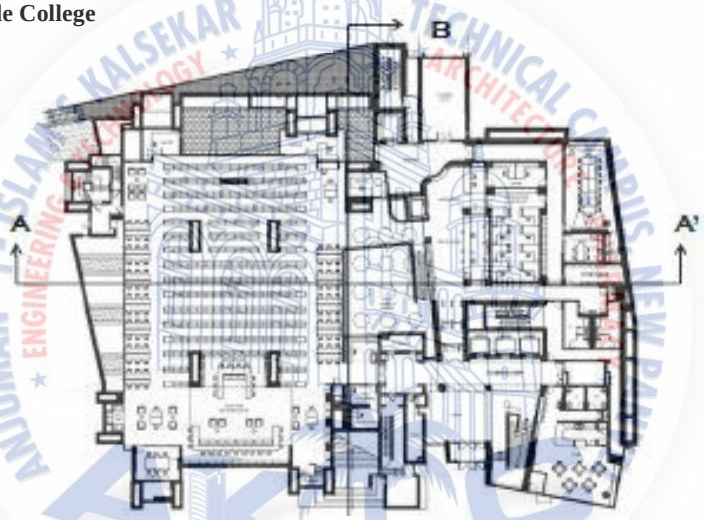


Figure 121 : Layout plan of Yale College

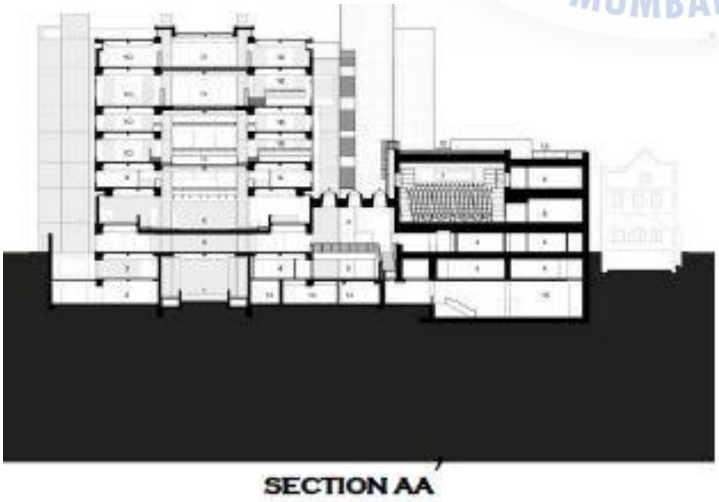


Figure 122 : Section of Yale Coolege

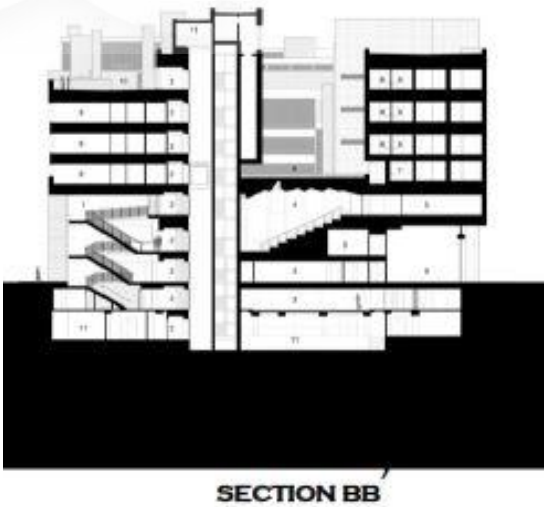


Figure 123 : Setion of Yale College

Figure 125 : Zones at Second Basement of Yale College

Figure 124 : Zones at Basement of Yale College

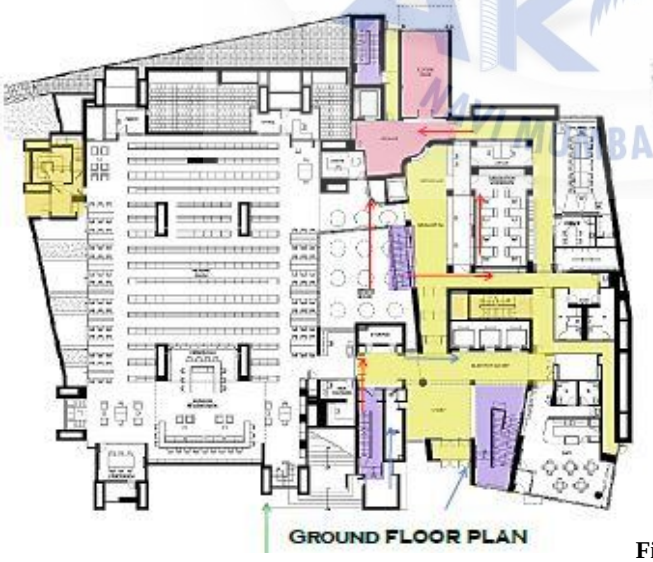


Figure 127 : Zones at Grou nd Floor of Yale College

Figure 126 : Zones at First Floor of Yale College

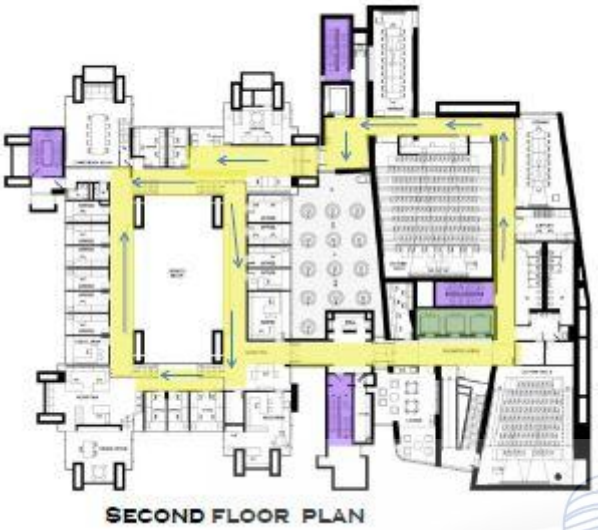


Figure 128 : Zones at Second Floor of Yale College

Figure 129 : Zones at Third Floor of Yale College

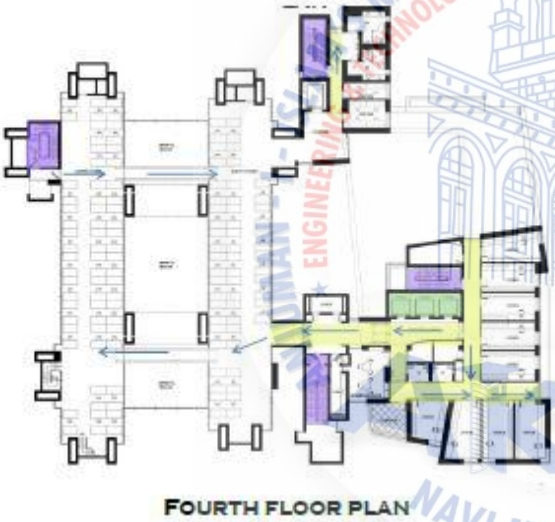


Figure 132 : Zones at Fourth Floor of Yale college

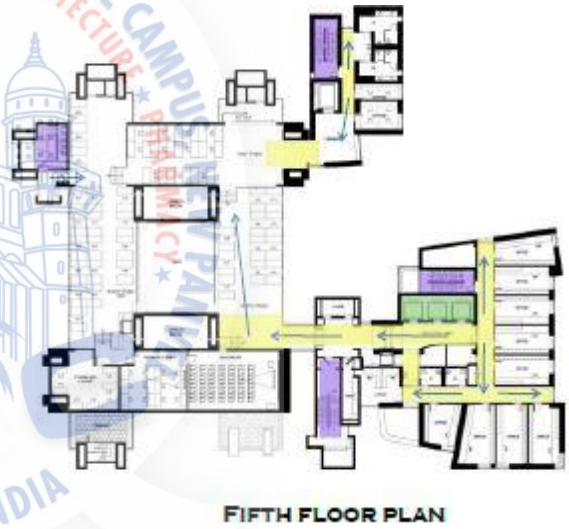


Figure 133 : Zones at Fifth Floor of Yale College

Figure 131 : Zones at Sixth Floor Plan of Yale College

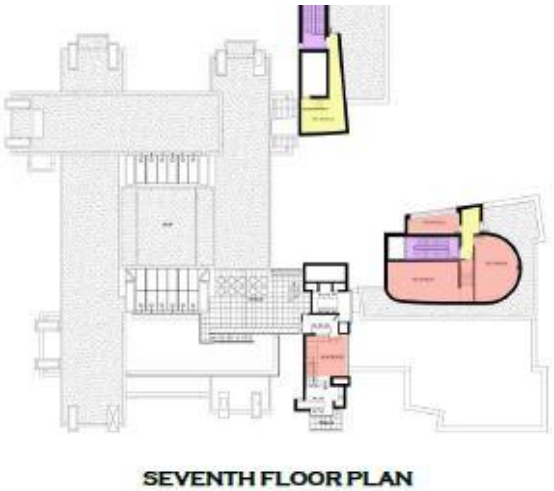


Figure 130 : Zones at Seventh Floor Plan of Yale College

- The building is formed of intersecting volumes of bush hammered concrete. Smooth concrete and glass horizontal elements are supported by a sequence of towers that protrude above the roof in a series of turrets.

Figure 134 : Material Dicription of Yale

- The building's street facing windows frame views of its modernist, forerunner, Rudolph had made a controversial turn away from the functionalism that characterized Kahn's design.

Figure 135 : Orientation Discription of Yale

- Slabs of ribbed concrete run in vertical sections on the interior and exterior of the 11,000 sq.m building. The concrete was in place using corrugated wooden moulds and bush-hammered to expose the aggregate.

Figure 136 : Contruction Technique of Yale

- Massive piers of concrete rise. Projections are over-emphasised throught. Heavy slabs are crossed by thin slabs. Spaces inside cross too and offer sequences of most dramatic effects by unexpected vistas inside the building and even out of it

Figure 137 : Construction Tachnique of yale

- Inside, the complex floor plan is made up of 37 terraced levels spaced across seven main storeys and two basement floors. Each level overlooks a central atrium that features a sunken pit and is topped by a series of skylights, while narrow concrete walkways connect the spaces on either side of the wall.

Figure 138 : Planning Concept of Yale

- Arts library provides additional classroom and office space, two lecture theatres, a café and a ground floor library for the department.

Figure 139 : Spaces of Yale

2.3.7 GLENDALE CAMPUS NIAGARA COLLEGE

LOCATION	**ONTARIO, CANADA**
PROJECT ARCHITECT	MOFFAT KINOSHITA ARCHITECTS
YEAR OF CONSTRUCTION	1998
SITE AREA	40 ACRES
B.U.A	5 ACRES
NUMBER OF FLOORS	G+3 STRUCTURE
NUMBER OF STUDENTS	2500

SPACE PROGRAMME :-

- 240 Seats auditorium
- Gymnasium
- Caletorium

Figure 140 : Zoning of Glendale Campus

Architect's Concept :-

The project dealt not only with the design and construction of a new campus facility, but also with how the college would best deliver its service.

Figure 143 : View of Glendale Campus

Niagara on the lake campus is located at the base of the Niagara Escarpment- a UNESCO- designed world biosphere reserve- featuring ecological lagoons, wetlands, landscaped gardens, and a 40 acre on-campus vineyard.

Figure 141 : Arial View of Glendale Campus

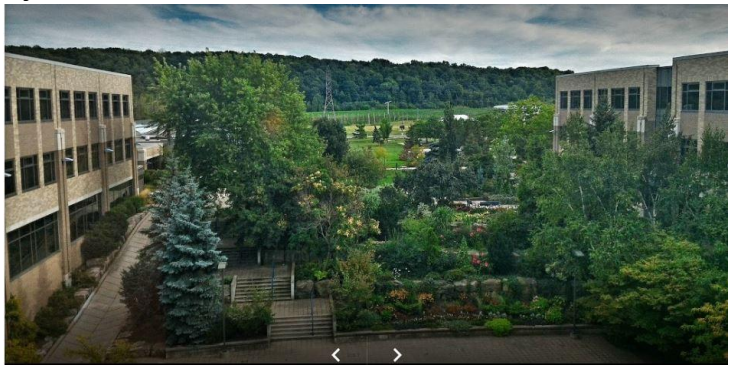


Figure 142 : View of Glendale Campus

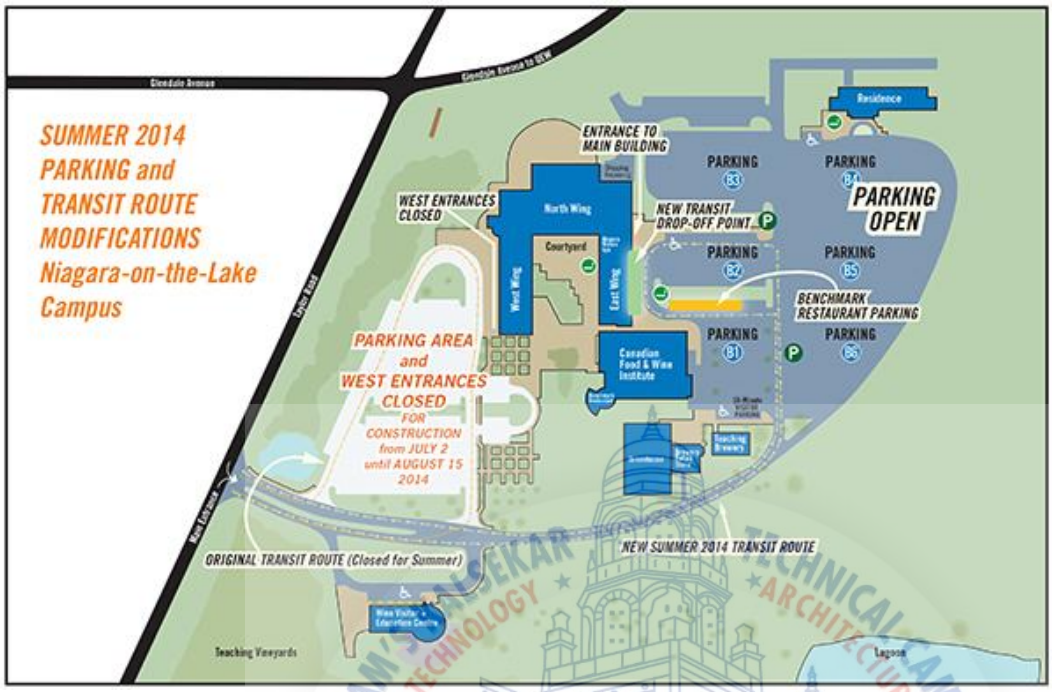


Figure 144 : Parking and Transit Route

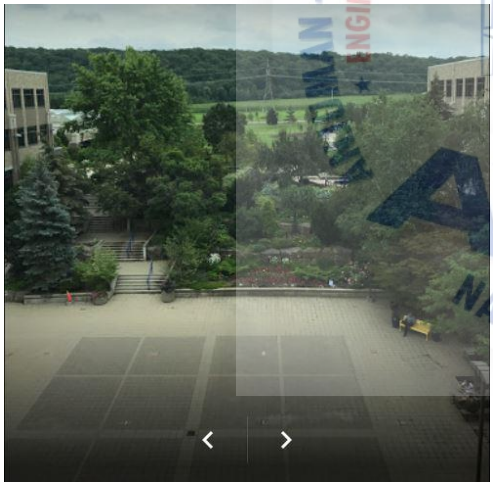


Figure 146 : View of Glendale Campus

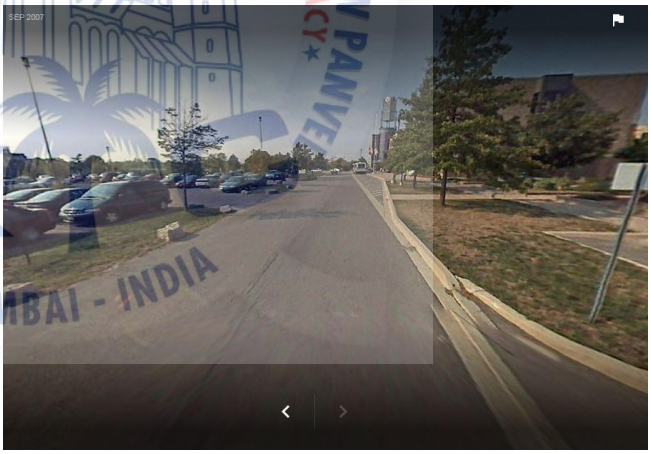


Figure 145 : Interna Road side view of Glendale Campus

2.3.8 ILLINOIS INSTITUTE OF TECHNOLOGY,CHICAGO

LOCATION	**CHICAGO**
PROJECT ARCHITECT	LUDWIG MIES VAN DER ROHE
SITE AREA	110 ACRES
YEAR OF CONSTRUCTION	1940

Figure 147 : View of Illinios Institute

Illinios Institute of technology is a campus made in an area of 110 acres consisting of 5 colleges,an institute , 2 schools and several research centres.

- It is a private Ph.D granting research university located in Chicago, in the U.S state of Illinos, with programmes in engineering, science, psychology, architecture, business, communication, industrial technology, information technology, design and law.
- It traces its history to several 19th century engineering and professional education institutions in the United States.

Figure 148 : Paul V Galvin Library in Illinios Institute

Mies van der rohe tried to maintain unity of expression for a large group of building with diversified function.

Figure 149 : Armor Institute of Technology

- Made on 3 dimensional module of 24 ft square by 12 ft high
- Self expessing skeletal frame structure
- Principal buildings are symmetric along shorter dimension while their indiviual arrangement is

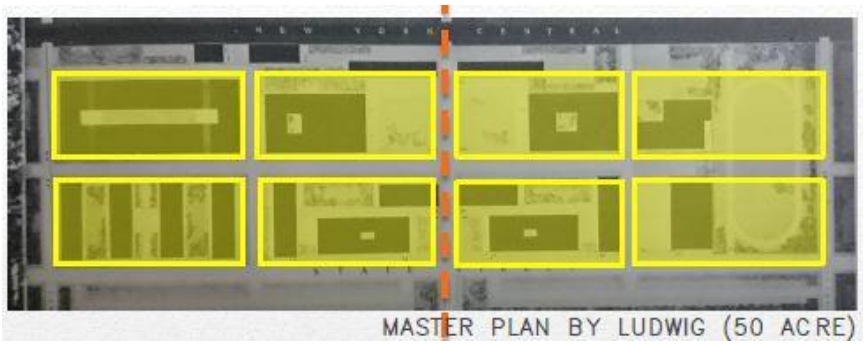


Figure 150 : Master Plan By Ludwig

assymetrical

- Campus covers rectangular area equal to 8 chicago city blocks
- Sr crown hall is considered as one of the mies greatest achievement.
- It have columnless interior.
- This is made possible by suspending roof on 4 girders supported by 8 columns.

Figure 151 : View of Illinios Institute

Figure 153 : Sr crown hall

- After mies left the project in 50's ,the remaining campus buildings were designed by som's,murphy/jahn & rem koolhas in harmony with mies design
- Academic buildings and technology park are placed on same side while play area and residential on other side
- Mtcc have ss tunel above one storey structure which nullifies train sound
- It comprise of meeting ,multipurpose and dining hall

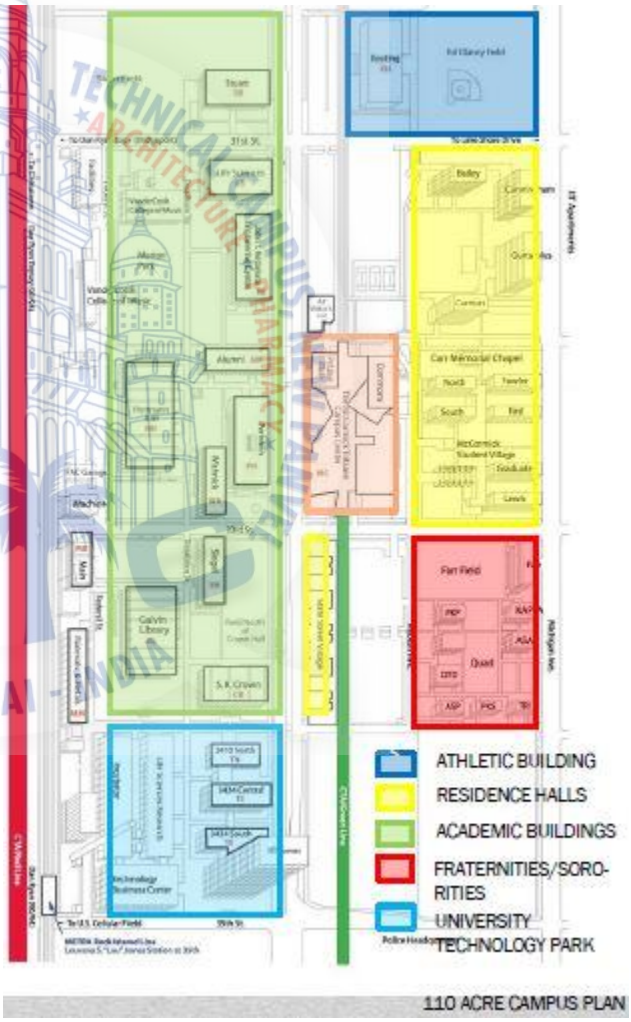


Figure 152 : Zoning of Illinios

Figure 155 : McCormick Tribune Campus Centre

Material: steel and

Figure 154 : Use of Glass as Curtain Wall, in Illinios University

concrete frames with brick and glass curtain wall(Inspired by the factories and warehouses of Chicago's South Side).

•Mies van der rohe's plan integrates invidually identifiable space into single unified space

Figure 156 : Arial View of Illinios

- Such kind of spatial qualities is due to :
- Open placement of building
- Clear expression of generously proportioned skeletal structure
- Landscape design by alred caldwell's.

Figure 157 : Building type 1 in Illinios

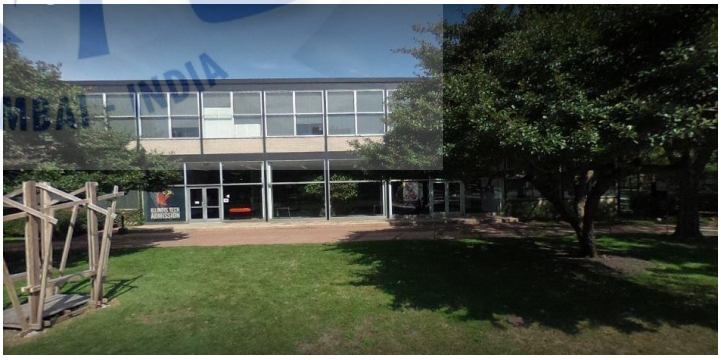


Figure 158 : Building type 2 in Illinios

Figure 159 : Library in Illinios

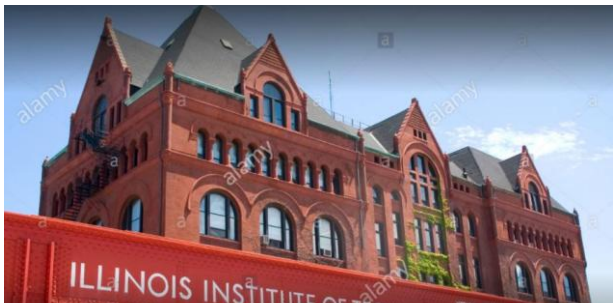


Figure 160 : Building type 3 in Illinios

2.4 COMPARATIVE ANALYSIS

a) Sinhagad College, Pune.
b) National Institute of Design, Ahmedebad
c) Centre for Environmental Planning and Technology (CEPT), Ahmedabad
d) Indian Institute of Management, Ahmedabad
e) Yale University, Art & Architecture College, United States
f) Glendale Campus Niagara College, Canada
g) Illinios Instiute of Technology, Chicago

Table 10 : Comparative Analysis of Case tudies

	a	b	c	d	e	f	g
Climate	Hot & Humid	Hot, Semi-arid	Hot, Semi-arid	Hot, Semi-arid	Warm & Humid	Cold & Snow	Humid Continetal
Topology	Contoure	Contoure	Contoure	Contour	Flat	Flat	Flat
Admin	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Library	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hostel	Yes	No	No	Yes	No	Yes	Yes
First Aid Room	Yes	No	No	Yes	Yes	Yes	Yes
Parking	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sports Ground	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Studios	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Classrooms	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Seminar-rooms	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Lecture room	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Drawing Studios	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Stationery	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Departmental & Faculty Rooms	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Conference rooms	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Public Café	Yes	Yes	Yes	Yes	Yes	Yes	Yes

2.4.1 INFERENCES OF CASE STUDIES:

- There should be more use of interaction and transition areas like corridors, galleries and courts throughout the campus.
- Structural obstructions should be less to make spaces multifunctional and active zoning campus.
- Circulation should be well planned to make easy access to all the buildings in the campus.
- There should be informal interaction spaces provided trees and seating areas.
- Use of proper material for sustainability is must.
- Building orientation for proper circulation of Natural light and Ventilation.
- Spaces connectivities from **private to public** and **public to private** is a important factor for designing a campus.

2.5 RESEARCH

- **Learning environment** refers to the diverse physical locations, contexts, and cultures in which students learn
- In a societal sense, learning environment may refer to the culture of the population it serves and of their location. Learning environments are highly diverse in use, learning styles, organization, and educational institution.
- The culture and context of a place or organization includes such factors as a way of thinking, behaving, or working, also known as organizational culture.
- For a learning environment such as an educational institution, it also includes such factors as operational characteristics of the instructors, instructional group, or institution; the learning styles and pedagogies used; and the societal culture of where the learning is occurring.
- **Learning environment** refers to the diverse physical locations, contexts, and **cultures** in which students learn. Since students may learn in a wide variety of settings, such as outside-of-school locations and outdoor environments, the term is often used as a more accurate or preferred alternative to *classroom*, which has more limited and traditional connotations—a room with rows of desks and a chalkboard, for example.
- The term also encompasses the culture of a school or class—its presiding ethos and characteristics, including how individuals interact with and treat one another—as well as the ways in which teachers may organize an educational setting to facilitate learning—e.g., by conducting classes in relevant natural ecosystems, grouping desks in specific ways, decorating the walls with learning materials, or utilizing audio, visual, and digital technologies. And because the qualities and characteristics of a learning environment are determined by a wide variety of factors, school policies, governance structures, and other features may also be considered elements of a "learning environment."
- Educators may also argue that learning environments have both a direct and indirect influence on student learning, including their engagement in what is being taught, their motivation to learn, and their sense of well-being, belonging, and personal safety.
- . For example, learning environments filled with sunlight and stimulating educational materials would likely be considered more conducive to learning than drab spaces

without windows or decoration, as would schools with fewer incidences of misbehavior, disorder, bullying, and illegal activity.

- How adults interact with students and how students interact with one another may also be considered aspects of a learning environment, and phrases such as "positive learning environment" or "negative learning environment" are commonly used in reference to the social and emotional dimensions of a school or class.

- Developing a total learning environment for students in a particular course or program is probably the most creative part of teaching. While there is a tendency to focus on either physical institutional learning environments (such as classrooms, lecture theatres and labs), or on the technologies used to to create online personal learning environments (PLEs), learning environments are broader than just these physical components. They will also include:

  - the characteristics of the learners;
  - the goals for teaching and learning;
  - the activities that will best support learning
  - the assessment strategies that will best measure and drive learning
  - the culture that infuses the learning environment.

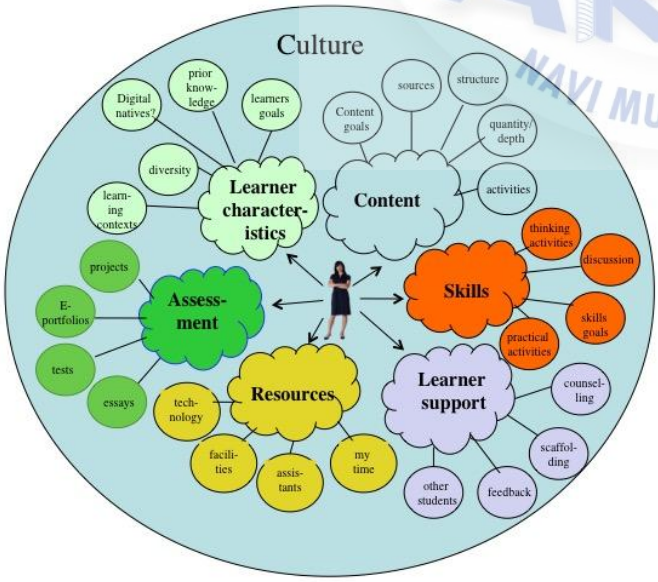


Figure 162 : Learning Culture

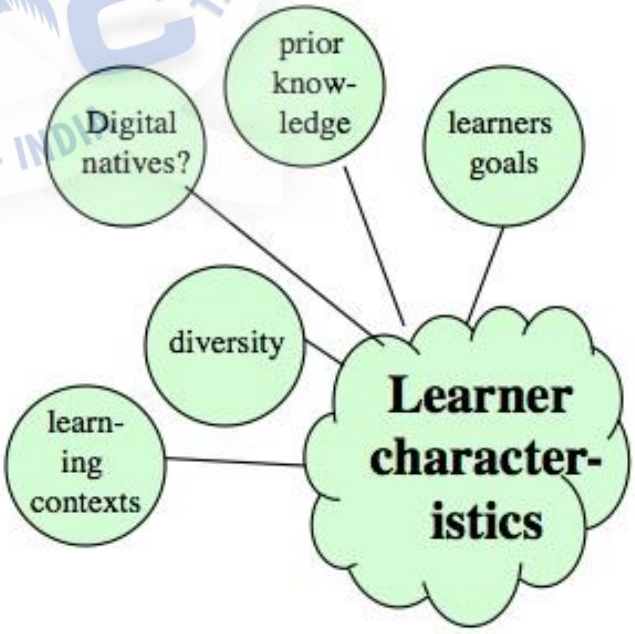


Figure 161 : Learning Characteristic

- A combination of good design and an appropriate use of technology will greatly facilitate the personalization of learning, allowing for instance for different students to work at different speeds, and to focus learning on students' specific interests and needs, thus ensuring engagement and motivation for a diverse range of students.
- However, the first and perhaps most important step is for instructors to know their students, and in particular, to identify from the vast range of information regarding students and their differences, which are the most important for the design of teaching and learning in a digital age.

- **Prior knowledge or skills**

  - Future learning often depends on students having prior knowledge or an ability to do things at a certain level.

  - If the difficulty level of the teaching is aimed too far beyond the capability or prior knowledge and skills of a learner, then learning fails to occur.

  - However, the more diverse the students in a program, the more diverse the knowledge and skill levels they are likely to bring with them.

  - At the same time, some students may not have the same basic knowledge as others in a course and will need more help. In such a context it is important to design the learning experience so that it is flexible enough to accommodate students with a wide range of prior knowledge and skills.

- **Digital natives**

- Most students today have grown up with digital technologies such as mobile phones, tablets and social media, including Facebook, Twitter, blogs and wikis. Prensky (2010) and others (e.g. Tapscott, 2008) argue that not only are such students more proficient in using such technologies than previous generations, but that they also think differently (Tapscott, 2008).

- However, it is particularly important to understand that students themselves vary a great deal in their use of social media and new technologies, that their use is largely driven by social and personal demands, and their use of digital technologies does not naturally flow across into educational use.

- They will use new technologies and social media for learning though where instructors make a good case for it and when students can see that the use of digital media will directly help them in their studies.

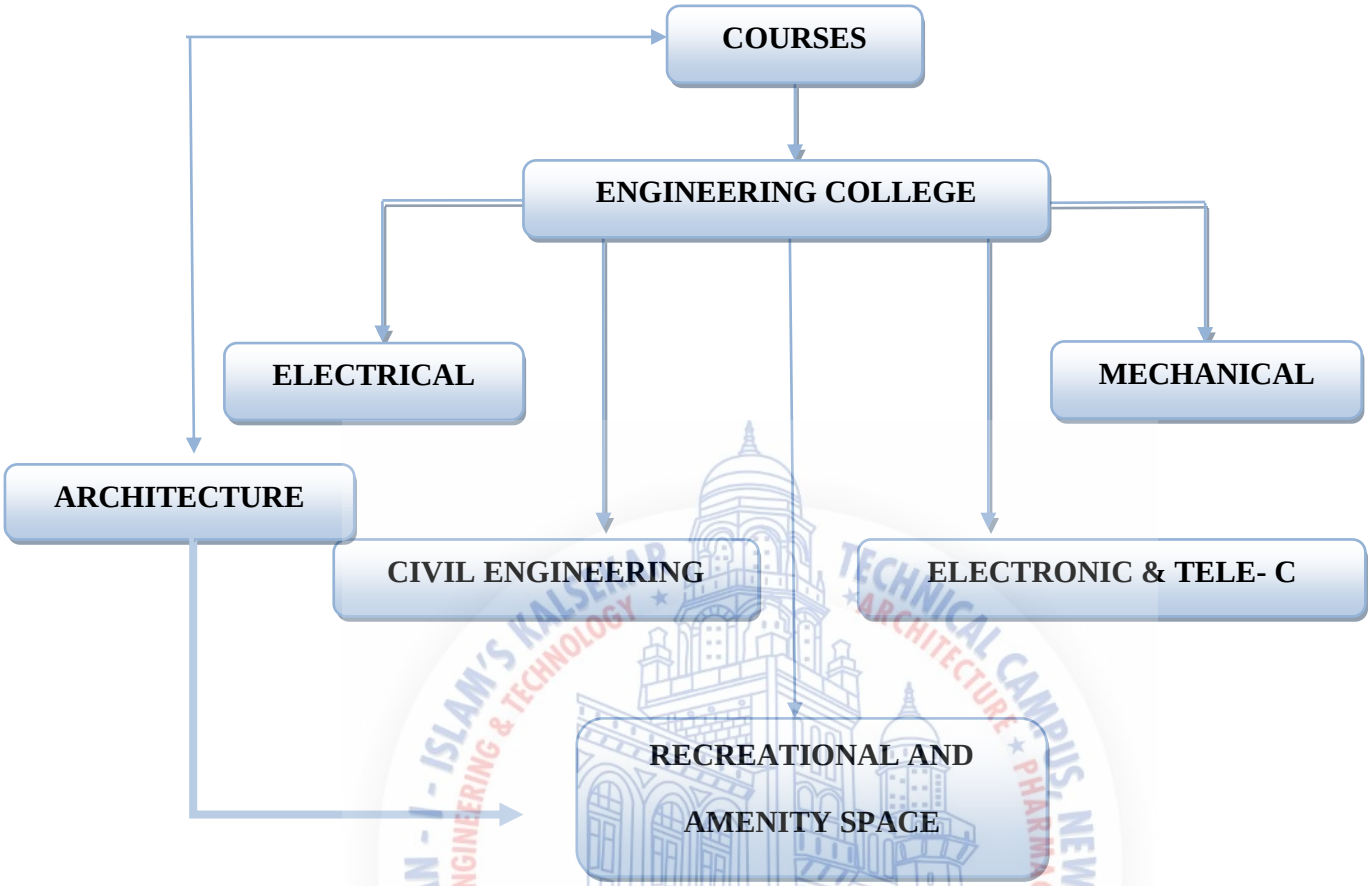
- **Conclusion**

- The work and home context, learners' goals, and students' prior knowledge and skills (including their competence with digital media) are some of the critical factors that should influence the design of teaching.

- For some instructors, other characteristics of learners, such as learning styles, gender differences or cultural background, may be more important, depending on the context.

- Whatever the context, good design in teaching requires good information about the learners we are going to teach, and in particular good design needs to address the increasing diversity of our students.

2.6 STREAMS OF ENGINEERING EDUCATIONS :



2.7 NEUFERDS DATA

DRAWING STUDIOS:

- Each space requires 3.5-4.5m2, depending on size of drawing table. Natural lighting is preferable and so a north-facing studio is best to receive even daylight. For right-handed people it is best if illumination comes from the left.

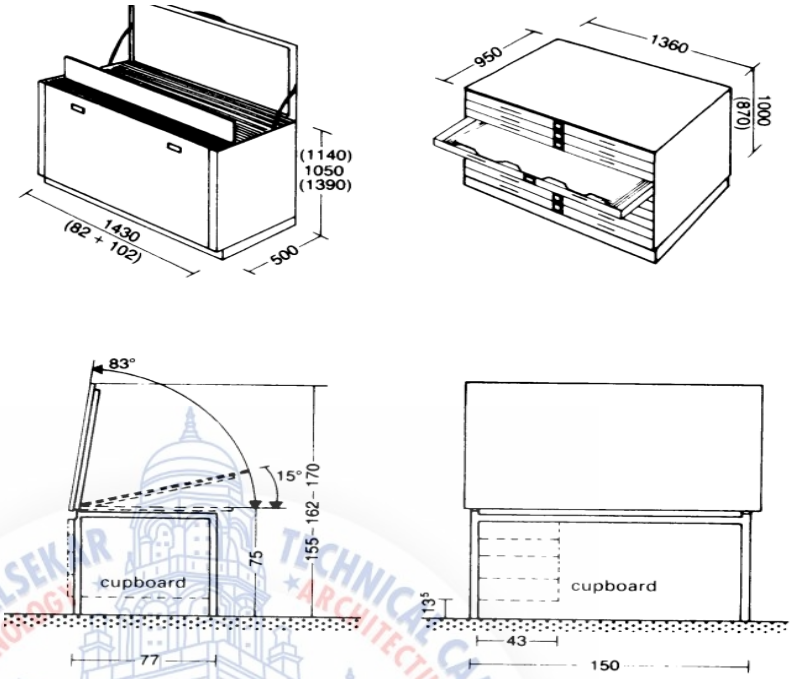


Figure 163 : Neufert Data

Dimension of desk table with adjustable board

- Artificial light should be at 500Ix, with 1000 Ix (from mounted drawing lamps or linear lamps hung in variable positions above the long axis of the table) at the drawing surface.

LABORATORIES:

ACCORDING TO USE:

- Laboratories for teaching and practicals, comprising a large number of workstations, usually with simple basic equipment. Research labs are usually in smaller spaces with special equipment and additional rooms for activities such as weighing and measuring, centrifuges and autoclaves, washing up, climatised and cold storage rooms with constant temperature, photographic rooms/dark rooms, etc.

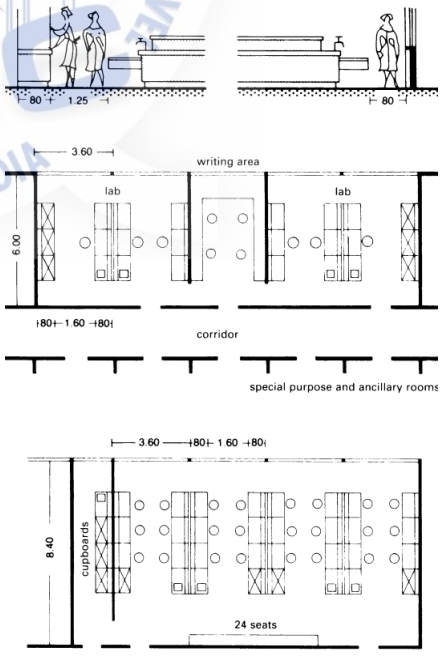
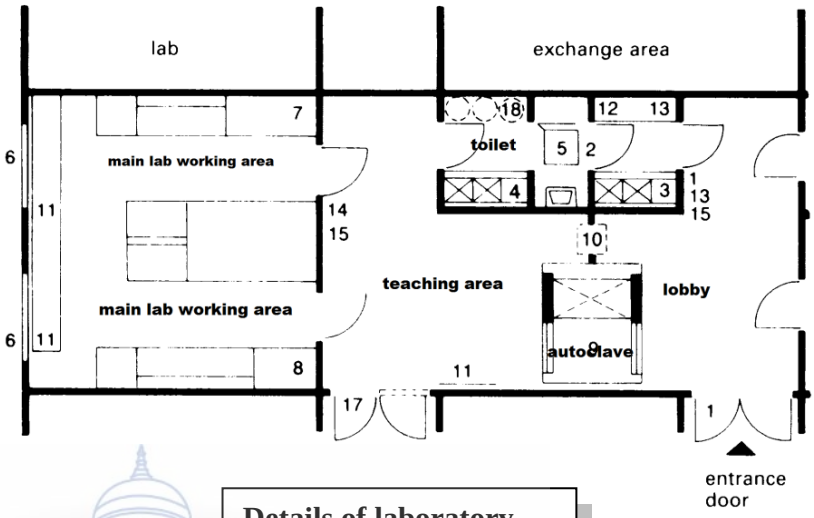


Figure 164: Neuferts Data

Arrangement of table according to use

Special labs for specific requirements, e.g. isotope labs for work with radioactive substance in differing safety categories. Clean-room labs for work needing dust-free filtered air, e.g. in the field of microelectronics or for particularly dangerous substances, which should be prevented from entering surrounding rooms by separate air circulation and filtering systems (microbiology, genetic engineering,



Details of laboratory safety levels.

Figure 165 : Neufert Data

WORKSHOPS:

Study cells, service rooms for lab, workshops. Also central rooms such as general storerooms and supplies with special protective equipment, isotope stores with cooling containers, etc. Experimental machines are kept in a special location. Particular kinds of equipment are needed, depending on the type of field and they have differing requirements for separate air circulation.

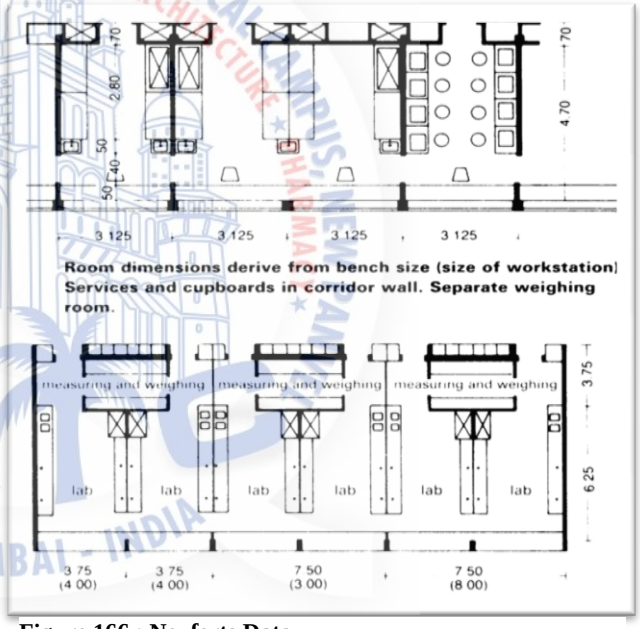


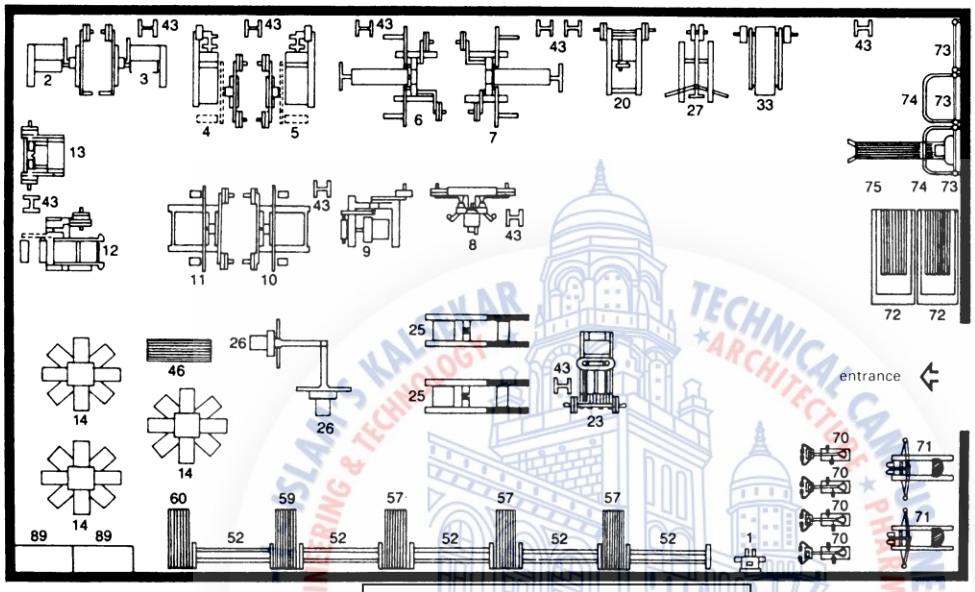
Figure 166 : Neuferts Data

VENTILATION:

Low-pressure or high-pressure systems, the latter are recommended particularly in multi-storey buildings for institutes with higher air requirement in order to reduce the cross-sections of the ducts. Cooling and humidification as required. **Metal, Fitting, Welding, Carpentry, Machine, Store room.**

GYMNASIUM:

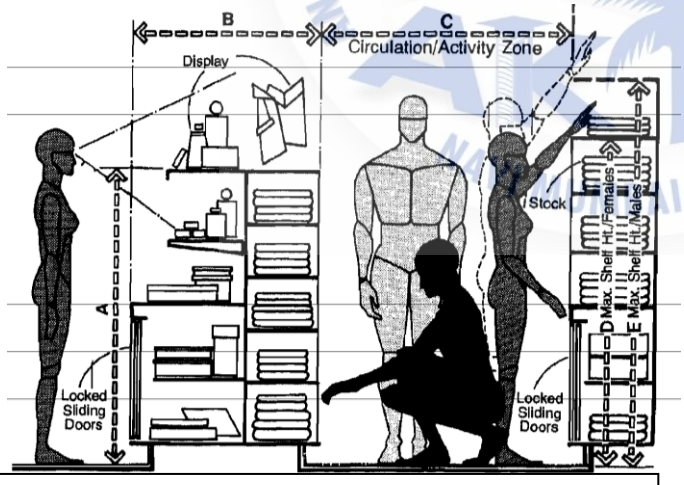
For 40-45 users a room size of at least 200 m2 is needed. Clear room height for all rooms should be 3.0m – 4.0m. For an optimum double-row arrangement of machines, the room should be at least 6m wide. To allow clear supervision of all training, the room length needs to be 15m or less. The minimum room size of 40m2 is suitable for 12 users.



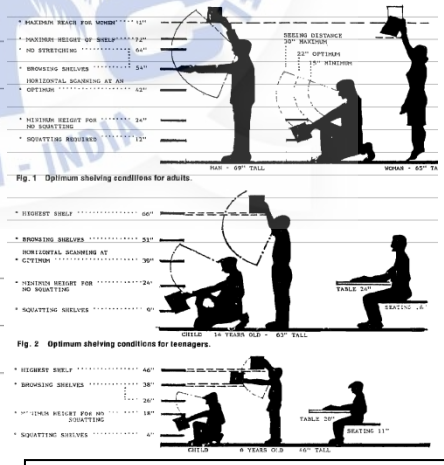
1 handroller
2 biceps station
3 triceps station
4 pull-over machine I
5 pull-over machine II
6 latissimus machine I
7 latissimus machine II
8 chest station
9 abdominal station
10 hip station I
11 hip station II
12 leg station
13 foot station
14 multi-exercise centre
20 press equipment I
23 leg-press equipment
25 stomach muscle station
26 pulley equipment
27 high pulley
33 latissimus barbell bench
43 small plate stand
46 training bench
52 short dumbbell stand
57 sloping bench I
59 multipurpose bench
60 general workout bench
70 exercise bike
71 rowing machine
72 treadmill
73 wall bars
74 pull-up bar
75 stomach muscle bench
89 equipment cupboard

Layout of gymnasium

Figure 167 : Neuferts Data



Anthropometrical detail for library and reading area



Book store/ display area of library

3 SPACE PROGRAMME

Engineering College

Sr. no	Space	Nos	Sub-space	Type of space	Quality of space	Capacity (No. of people)	Min size	Area
1	Classrooms	30		Private	Closed	60/class	66m^2	70m^2
2	Tutorial rooms/ PG classrooms	7		Private	Closed	20/class	66m^2	70m^2
3	Laboratories **(Tool room** and Lab **Assistant's cabin** should be there in each **Lab** of **10m^2 each)**	45	• Computer – 4 nos	Private	Closed	24	66m^2	70m^2
			❖ MECHANICAL ENGINEERING					
			• Web design	Private	Closed	24	66m^2	85m^2
			• Refrigeration & AC & Heat & Mass transfer	Private	Closed	24	66m^2	85m^2
			• Automobile Engineering	Private	Closed	24	66m^2	85m^2
			• Mechatronics	Private	Closed	24	66m^2	85m^2
			• Strength of materials & materials technology	Private	Closed	24	66m^2	85m^2
			• Fluid mechanics and hydrolics	Private	Closed	24	100m^2	120m^2
			• Mechanical vibrations and theory of machines	Private	Closed	24	66m^2	70m^2
			• Machine shop	Private	Closed	24	200m^2	215m^2
			• Mechanical Utility System	Private	Closed	24	66m^2	85m^2

Sr.no	Space	Nos	Sub-space	Type of space	Quality of space	Capacity (No. of people)	Min size	Area
			❖ CIVIL ENGINEERING					
			• Geotechnical Engineering	Private	Closed	24	$66m^2$	$85m^2$
			• Building Materials and construction	Private	Closed	24	$66m^2$	$85m^2$
			• Concrete Technology	Private	Closed	24	$66m^2$	$75m^2$
			• Survey	Private	Closed	24	$66m^2$	$70m^2$
			• Project	Private	Closed	24	$66m^2$	$85m^2$
			• Environmental Engineering	Private	Closed	24	$66m^2$	$85m^2$
			• Geological lab	Private	Closed	24	$66m^2$	$85m^2$
			❖ ELECTRONICS AND TELECOMMUNICATION					
			• Embedded System and Electronics	Private	Closed	24	$66m^2$	$85m^2$
			• Communication	Private	Closed	24	$66m^2$	$85m^2$
			• Network and Simulation	Private	Closed	24	$66m^2$	$85m^2$
			• Microwave Engineering	Private	Closed	24	$66m^2$	$85m^2$
			• Digital Electronics and Measurement	Private	Closed	24	$66m^2$	$85m^2$

Sr.no	Space	Nos	Sub-space	Type of space	Quality of space	Capacity (No. of people)	Min size	Area
			• Analog Circuit Design	Private	Closed	24	$66m^2$	$85m^2$
			• Signal Processing & Computer	Private	Closed	24	$66m^2$	$85m^2$
			❖ ELECTRICAL ENGINEERING					
			• Electrical Machine	Private	Closed	24	$66m^2$	$85m^2$
			• Electronics	Private	Closed	24	$66m^2$	$85m^2$
			• Switch Gear and Protection	Private	Closed	24	$66m^2$	$85m^2$
			• Control System	Private	Closed	24	$66m^2$	$85m^2$
			• Basic Electrical Engneering	Private	Closed	24	$66m^2$	$85m^2$
			❖ COMPUTER ENGINEERING					
			• Software Engineering	Private	Closed	24	$66m^2$	$85m^2$
			• Artificial Intelligence	Private	Closed	24	$66m^2$	$85m^2$
			• Cloud and Web Development	Private	Closed	24	$66m^2$	$85m^2$
			• Project	Private	Closed	24	$66m^2$	$85m^2$
			• Programming Paradigms	Private	Closed	24	$66m^2$	$85m^2$
			• Electronics and Signal Processing	Private	Closed	24	$66m^2$	$85m^2$
			• Network and Security	Private	Closed	24	$66m^2$	$85m^2$
			• Server and Computer Centre	Private	Closed	24	$66m^2$	$85m^2$

Sr.no	Space	Nos	Sub-space	Type of space	Quality of space	Capacity (No. of people)	Min size	Area
4	Workshops	2	• Assistant's cabin- 10m^2 • Tool room- 10m^2	Private	Semi-open	40	200 m^2	200 m^2
5	Library & Reading room	1	• Entry counter • Book counter • Librarian desk	Private	Closed	Assuming 400 at a time	550 m^2	600 m^2
6	Seminar halls	1		Private	Closed	150	132 m^2	150 m^2

Architecture College

Sr.no	Space	Nos	Sub-space	Type of Space	Quality of Space	Capacity (no. of people)	Min size	Area
1	UG Classrooms	5		Private	Closed	40	33m^2	40m^2
2	UG Studio	5		Private	Closed	40	66m^2	85m^2
3	Modal making and Carpentry workshop	1	• Tool room -10m^2 • Assistant's cabin- 10m^2	Private	Closed	40	132m^2	150m^2
4	PG Classroom	2		Private	Closed	20	33m^2	40m^2
5	PG Studio	2		Private	Closed	20	132m^2	150m^2
6	Material museum	1		Private	Closed		132m^2	150m^2
7	Library and Reading room	1	• Entry counter • Book counter • Librarian desk	Private	Closed	Assuming 300	400m^2	400m^2

Administrative Area

Sr.no	Space	Nos	Sub-space	Type of space	Quality of space	Capacity (no. of people)	Min size	Area
1	Board room	1		Private	Closed	10	$20m^2$	$20m^2$
2	Office all inclusive	1	• Registerar cabin- $10m^2$ • Head of admin- $10m^2$ • Cashiers 4 desk • Other works 15 desk	Private	Closed	20	$150m^2$	$300m^2$
3	Central stores	1		Private	Closed	15	$40m^2$	$40m^2$
4	Faculty rooms	6	• Pantry • Cabins for each faculty • Locker rooms • Conference area • Restroom	Private	Closed	30/each	$200m^2$	$200m^2$
5	Maintenance	1		Private	Closed	10	$25m^2$	$30m^2$
6	Examination control office	1	• Xerox room • Locker room • Cabins 6 nos- $10m^2$ each	Private	Closed	15	$50m^2$	$60m^2$
7	Training and placement office	1		Private	Closed	10	$30m^2$	$30m^2$

Amenities Area

Sr.no	Space	Nos	Sub-space	Type of space	Quality of space	Capacity (no. of people)	Min size	Area
1	Toilets at required places (ladies\gents\ staff)		• Changing area • Wc,s • Abulition space • Wash Basins • Urinals	Private	Closed	10\wc	$25m^2$	$25m^2$.
2	Boy's common room	1		Private	Closed	300	$350m^2$	$400m^2$
3	Girl's common room	1		Private	Closed	300	$350m^2$	$400m^2$
4	Cafeteria\ Canteen	1	• Kitchen • Serving platform • Wash area • Sitting area	Public	Semi-open	600	$600m^2$	$700m^2$
5	Stationery	1	• Xerox centre • Printing store • Common stationery	Public	Open		$40m^2$	$50m^2$
6	First aid	1	• Waiting area • Seek room	Public	Closed	5	$40m^2$	$40m^2$
7	Principal's quarter	1	• Reception • Waiting • Toilets	Private	Closed	25	$100m^2$	$100m^2$
8	Guest house	1		Private	Closed	5	$50m^2$	$70m^2$
9	Sports club/ Gymnasium	1	• Washroom • Changing area • Locker room • Gym area • Indoor games	Private	Closed	200	$300m^2$	$300m^2$
10	Auditorium	1	• Storage	Public	Closed	500	$500m^2$	$500m^2$
11	Amphitheatre	1		Public	Open	750	$1000m^2$	$1000m^2$

Boys's / Girl's Hostel

Sr.no	Space	Nos	Sub-space	Type of space	Quality of space	Capacity (no. of people)	Min size	Area
1	Reception	1	Personal room with attached washroom	Private	Closed	3	$25m^2$	$25m^2$
2	Mess	1	• Kitchen • Wash space • Seating area	Public	Closed	500	$600m^2$	$600m^2$
3	Rooms	250		Private	Closed	2	$10m^2$	$10m^2$
4	Washrooms	Min 2 on each floor	Bath area WC Changing area	Private	Closed	50	$50m^2$	$50m^2$
5	Indoor game room	1		Private	Closed	100	$200m^2$	$250m^2$
6	T.V room	1		Private	Closed	50	$85m^2$	$85m^2$
7	First aid cum sick room	1		Private	Closed	5	$30m^2$	$30m^2$

Total Builtup Area :- 13110 m^2

From DCR of Bhiwandi Notified and Surrounding Area (page no. 58 & page no. 74)

Number of Parking Required :

Four Wheeler – 130

Two Wheeler – 260

Permissible F.S.I – Maximum 1.5

4 CITY ANALYSIS

HISTORY:

In the early Twentieth century, Bhiwandi was a small town, inhabited by Maharashtra's and Kokni Muslims. The main occupation of the people at that time was agriculture, fishing and handlooms. With the advent of electricity, the handloom began to be quickly replaced by power looms. It became a hub of textile industry in 1930s.

Figure 168 : Power Loom

BACKGROUND:

The city of Bhiwandi known for its textile industry, has the largest number of power looms in the country and sometimes called as The Manchester of India'.
A major portion of the population is employed by the power loom sector.
The Mumbai - Agra highway passing through Bhiwandi ensures the smooth connectivity of the city with Mumbai, Thane, Nashik and the rest of India. Now Population is 804,703

CLIMATOLOGICAL DATA:

TEMPERATURE:

- It is observed that the mean maximum temperature varies from 35 to 40 degree C during the whole year.
- The temperature is maximum during the month of March to June. Due to the humidity during this period, the weather condition is intolerable being sultrier.
- The weather is tolerable during the month of December to February with temperature ranging from 25 to 35 degree C being the minimum out of the year.

RAINFALL:

- Being in the western coast, the rainfall is usually experienced from beginning of June to the end of the September with annual mean rainfall of 2500m. Most of the rainfall received is a result of southwest monsoon, though occasionally some rainfall has been reported in the winter months or in the later summer.

HUMIDITY:

- The range of variation in humidity is from 48% to 100%.
- The highest humidity is observed in the month of August.
- The overall humidity throughout the year is on the higher side.
- The average humidity throughout the year is 44% and the maximum humidity experienced during the year of monsoon month is about 98%.

Figure 169 : Topography of Bhiwandi

TOPOGRAPHY:

- Bhiwandi lies in the Kokan Coastal lowlands.
- There are many hills surrounding Bhiwandi, which add to its scenic beauty.
- The site is flat.
- The Verhal Devi Lake is the largest lake in Bhiwandi.

5 . LOCATION OF THE SITE:

- The site is located near to the sai baba mandir which comes under Bhiwandi.
- This site is located in the outerside of Bhiwandi and also connected to the national highway, kalyan and Thane.

Figure 170 : Location of site

Figure 171 : Zoomed View of Site Location

- **LOCATION OF THE SITE IN BHIWANDI DEVELOPMET PLAN:**

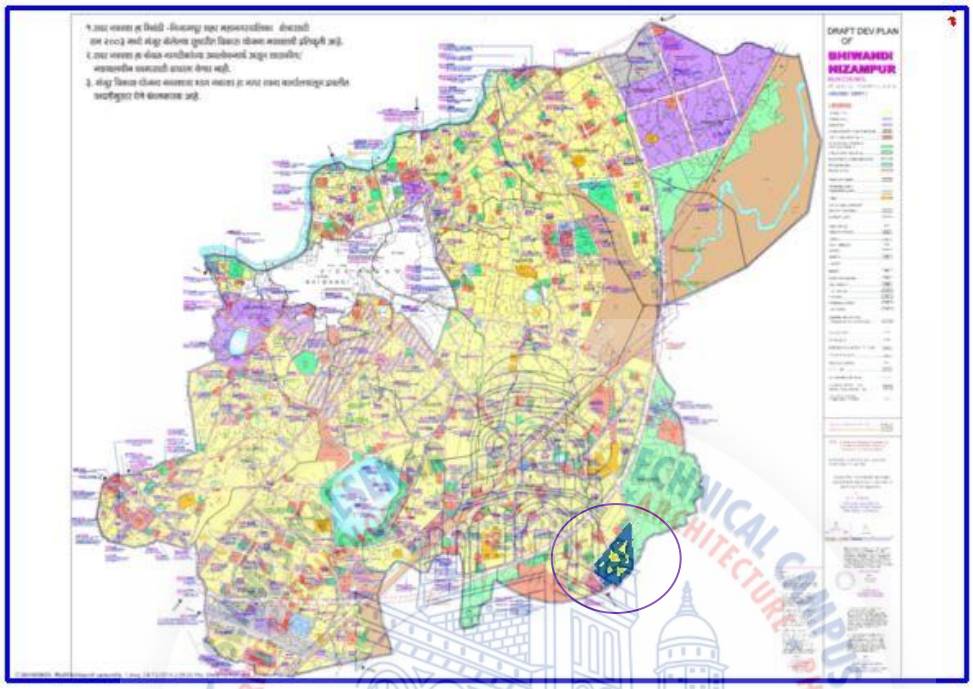


Figure 172 : Bhiwandi Development Plan

Figure 173 : Site In Development Plan

5.1 SITE PLAN

LAND USE

- An educational zone is not demarcated as such.
- Ancillary uses are permitted in Residential zone to the extent of 50% floor space of the principal.

  -From Draft Development Control Regulations of Bhiwandi Surrounding Notified Area (Published under section 28(4) of MR & TP Act, 1966),

  5th September 2012.

  Appendix-D :- Land Use Classification and Uses Permitted (Regulation 6.3) Point No. 5

  Page Number :- 116

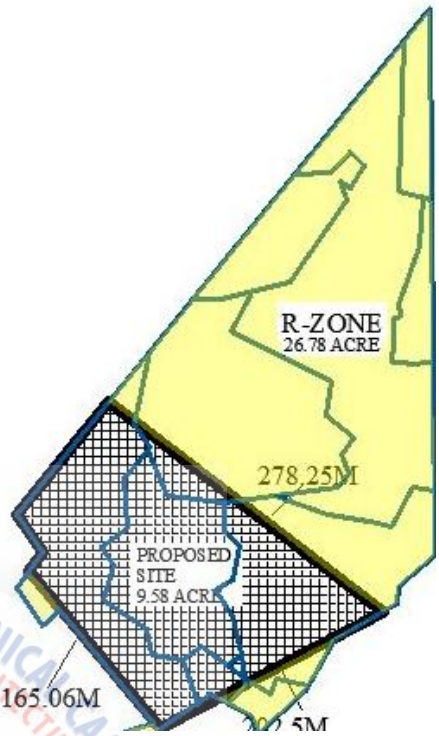


Figure 174 : Site In R-Zone

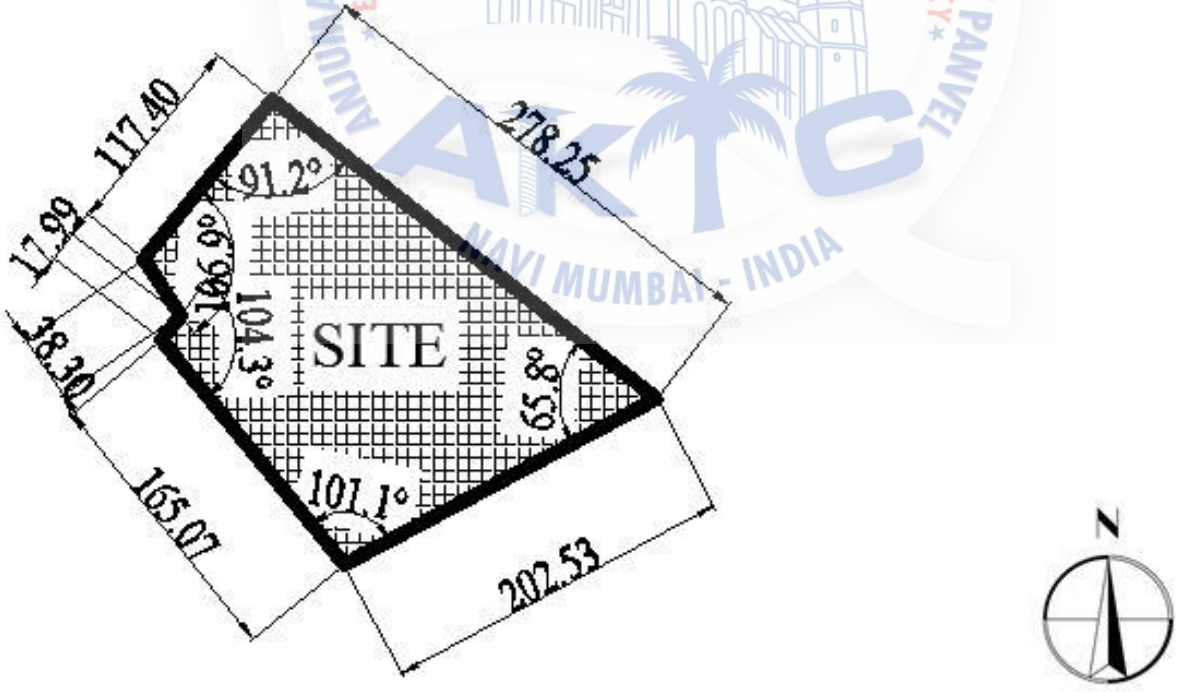


Figure 175 : Proposed Site

5.2 CLIMATOLOGY OF THE SITE :

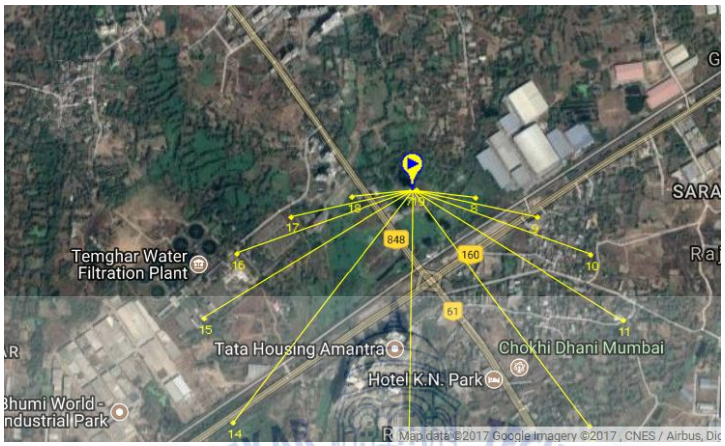


Figure 176 : Sun Path Diagram

Figure 177 : Shadow Diagram

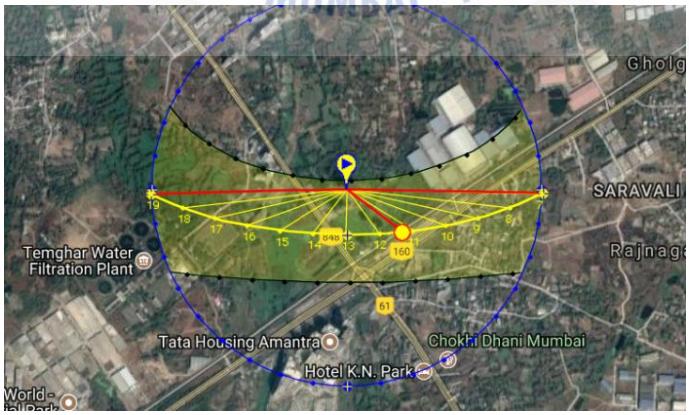


Figure 178 : Sun Path and Rays Diagram

5.3 SITE CONTEXT AROUND THE SITE :

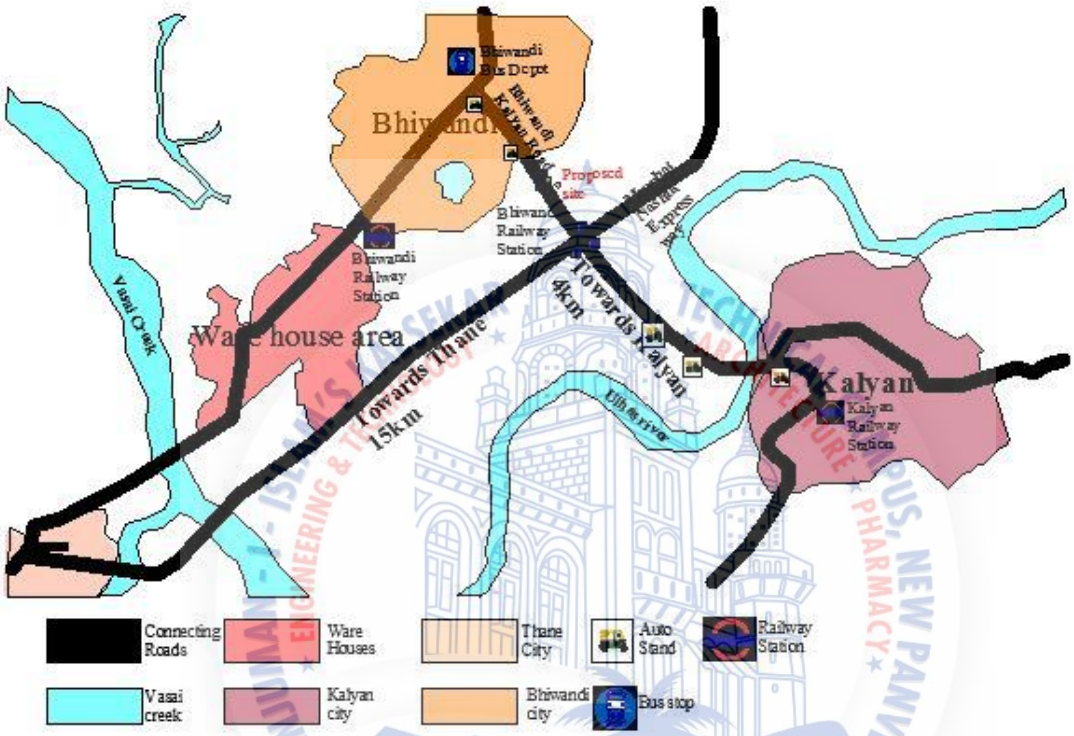


Figure 179 : Site Context Within 10KM radius

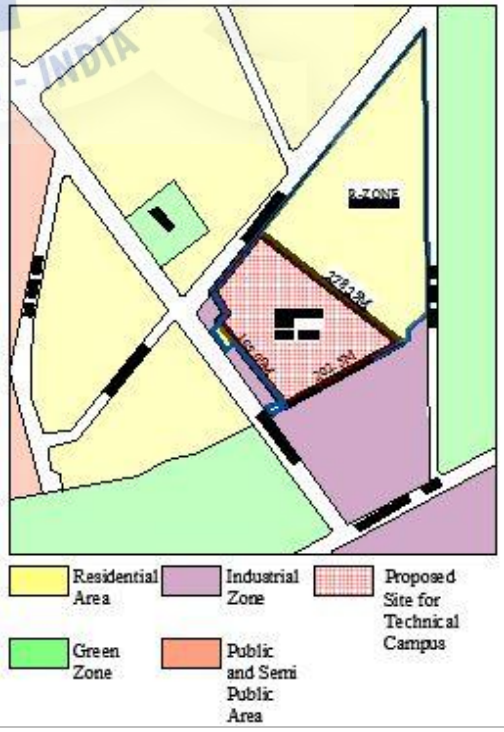


Figure 180 :Site Context Within 2km Radius

5.4 SITE PHOTOGRAPHS :

Figure 181 : Site

Figure 182 : Site

Figure 183 : Site

5.5 REASON FOR SITE SELECTION:

- The site is under the limit of Bhiwandi Tehsil, which is connected to the National highway, Thane and Kalyan.
- On one side of the site is a river so that the site remains cool and calm.
- Bhiwandi Bus stand is 4 km away from the site and railway station (Kalyan) is 5 km away from it. Bazaar (Mandai) is 5 km away from the site.
- The site has no disturbance from any point.
- The area of the site is approximately 10 acres.
- The location of the project is at outer area of city approx 4kms , which has a direct connectivity from Kalyan at 4 kms towards East , Thane at 20 kms towards South and from Padhga 12kms towards North ,an average of 30 mins from each cities.

5.6 ABOUT THE SITE:

- The site offered a perfect location to all the students of the city. The existing trees on the site are very small in size but it will help in shading. The site has only one access from the main road and the surrounding area is densely calm and cool because of river.
- The site is almost flat, have a very gentle slope towards the river.
- No overhead electrical wire line passing through the site.
- Sun movement is from west to east and wind is blowing from the river side.

5.7 S.W.O.T ANALYSIS

- **Strenght**

- The site is on the outer side of the city, which also have a direct connectivity from other cities also.
- Bus and rickshaw stands are also located near by the site.
- Water facility is also available at the site because of the near by pipeline.

- **Weakness**

- The site is 4 to 5 kms away from the main cities.

- **Opportunities**

- The project will give employment to around 500 peoples including teaching staff, peons, security men etc.
- Main opportunity is to built a sustainable and suitable learning environment for the students
- This will also becaome a landmark for the city and an example of sustainability in that region.

- **Threats**

- Industrial and Residential zones are beside the site, which may effect or may be usefull for the students.

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