

**A
Report
on
Academic Tour to Chandigarh-Manali**
(Date: 13th December 2024 to 21th December 2024)

Sarvajanik University

FACULTY OF CIVIL ENGINEERING

B. Tech. - IV (SEM-VII)



List of students of B.Tech.-IV(SEM-VII)
(FACULTY OF CIVIL ENGINEERING)

Sr. No.	Enrollment No	Full Name of the Student (Begin with Surname)	Gender (M/ F)
1	ET21BTCL003	BHADESIYA HARSH NAYANKUMAR	M
2	ET21BTCL008	CHAUHAN DIVYA DHARMENDRAKUMAR	F
3	ET21BTCL010	CHHATROLA NISARG SANJAYBHAI	M
4	ET21BTCL011	PAL MITUL DESAI	F
5	ET21BTCL012	DHAMELIYA RUSHI YOGESHBHAI	M
6	ET21BTCL013	DHIMAR SHREYA RAKESHKUMAR	F
7	ET21BTCL014	AANCHAL ENGINEER	F
8	ET21BTCL017	JAIN JEEL RAJESHKUMAR	M
9	ET21BTCL019	JARIWALA RAJVI UDAYKUMAR	F
10	ET21BTCL021	KAHAR SUJAL VIPULBHAI	M
11	ET21BTCL023	MAHATO PAWAN NAGENDRA	M
12	ET21BTCL024	MANIYA MEET SANJAYBHAI	M
13	ET21BTCL026	MUKHERJI JACK	M
14	ET21BTCL027	PARMAR DARSHANKUMAR DIPAKBHAI	M
15	ET21BTCL033	JINNITH NARESHBHAI PATEL	M
16	ET21BTCL037	PATEL KUNJ SUNILKUMAR	M
17	ET21BTCL040	PATEL MIT JAGDISHBHAI	M
18	ET21BTCL045	MAHESH RAYAKA	M
19	ET21BTCL047	SHAH KAVISH DEVESH	M
20	ET21BTCL048	SHAH SANJANA AMITKUMAR	F
21	ET21BTCL054	MALAY P TAMAKUWALA	M
22	ET21BTCL055	UKANI DAKSH MAGANBHAI	M
23	ET22BTCL801	AKSHAT SHAILESHBHAI VEKARIYA	M
24	ET22BTCL802	BAKARANIYA AYUSHKUMAR ASHVINKUMAR	M
25	ET22BTCL803	BARAIYA JAYKUMAR DILIPBHAI (Detained)	M
26	ET22BTCL807	GANJAWALA DARSHAN AJAYKUMAR	M
27	ET22BTCL810	KATHIYA KRUTAGANASINH UDAYSINH	M
28	ET22BTCL813	PAREKH MILIND HARSHULKUMAR	M
29	ET22BTCL816	PATEL VASTAV PANKAJ	M
30	ET22BTCL817	PATIL GUNJAN PITAMBER	M
31	ET22BTCL818	PRAJAPATI DIP ASHOKBHAI	M
32	ET22BTCL820	RAVATKA NITANSH BHUPENDRABHAI	M
33	ET22BTCL821	SHAH JEET SHAILESHKUMAR	M
34	ET22BTCL822	TOLAT DEV TUSHARKUMAR	M
35	ET22BTCL824	MOHITE JAY INDRAKANT	M
36	ET22BTCL825	TIRMALE KRISH BHAI DASHBHAI	M
37	ET22BTCL826	GHASKATA DARSHAN VINODBHAI	M
38	ET22BTCL827	THAKUR HITEN KAMAL	M
39	ET22BTCL808	ITALIYA ANIKET SURESHBHAI	M
40	ET21BTCL009	CHAUHAN TANISHA CHANDRAKANTBHAI	F
41	ET21BTCL020	JOSHI SHANA BIRJUBHAI	F

List of Faculty/Staff members accompanied the tour

01	FACULTY MEMBER	DR. KAMLESH S. DALAL	M
02	FACULTY MEMBER	PROF. HEMALI J. JARDOSH	F
03	FACULTY MEMBER	ADHOC.PROF. CHAITALI D. PATEL	F
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ACKNOWLEDGEMENT

The academic tour to Chandigarh-Manali would not have been possible without the kind support of many people. We take this opportunity to acknowledge those who have been a great sense of support and inspiration, for the academic trip to be successful. We are grateful to our Management, **Dr Hiren Patel (Principal)** and **Dr Mehali Mehta (Head of the Department)** for giving us an opportunity to have an academic tour to Chandigarh-Manali.

On behalf of Faculty of Civil Engineering and The Principal of Sarvajanik College of Engineering & Technology, Surat, we thank the various authorities who gave us permission to visit the corresponding places and gave us sufficient technical knowledge/information about various historical structures from planning, construction and design point of view. We are also thankful to the travel agent who has provided us good quality food, accommodation and transportation. We once again extend our sincere thanks to all those who knowingly or unknowingly helped us to make this tour successful.

Last but not the least we the accompanied faculty/staff members and the students of BE-IV are very much thankful to entire civil engineering department, each and every person of the department for extending their great support either in terms of adjusting the teaching load and/or boosting up our moral and/or guiding us to make the tour very successful.

List of places visited:-

- **Chandigarh**

- 1. Capitol complex**

The Open Hand Monument

Tower of Shadows

Assembly hall

The Secretariat

The High Court

- 2. Architecture museum**

- 3. Le-Corbusier Centre**

- **Manali**

- 1. A.D. Hydropower plant**

- 2. Atal Tunnel**

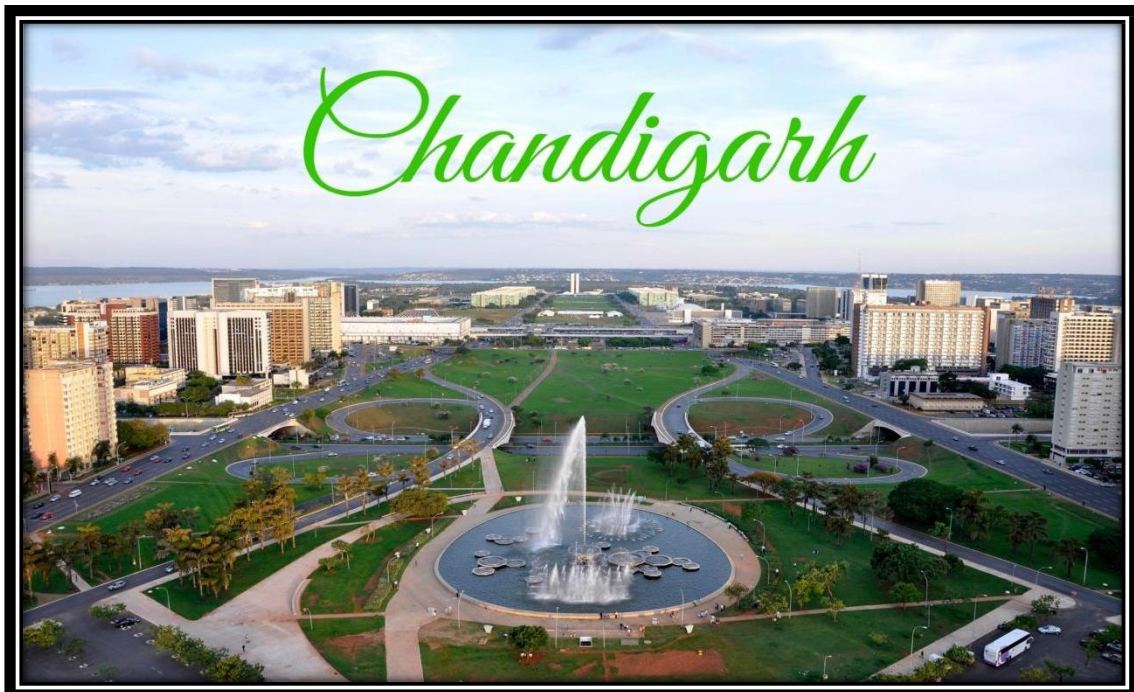
- 3. Club House**

Chandigarh

Chandigarh is a city and a union territory of India that serves as the capital of the Indian states of Haryana and Punjab. As a union territory, the city is governed directly by the Union Government and is not part of either state.

Chandigarh is bordered by the state of Punjab to the north, west and south, and to the state of Haryana to the east. Chandigarh is considered to be a part of the Chandigarh capital region or Greater Chandigarh, which includes Chandigarh, and the city of Panchkula (in Haryana) and cities of Kharar, Kurali, Mohali, Zirakpur (in Punjab)

Chandigarh was one of the early planned cities in the post-independence India and is internationally known for its architecture and urban design. The master plan of the city was prepared by Swiss-French architect Le Corbusier, which transformed from earlier plans created by the Polish architect Maciej Nowicki and the American planner Albert Mayer. Most of the government buildings and housing in the city, were designed by the Chandigarh Capital Project Team headed by Le Corbusier, Jane Drew and Maxwell Fry. In 2015, an article published by BBC named Chandigarh as one of the perfect cities of the world in terms of architecture, cultural growth and modernization.



Capitol Complex

Of the many projects undertaken by Le Corbusier, the Capitol Complex, Chandigarh is acclaimed as a benchmark of his iconic architecture with regionalist sensibilities.

When India acquired independence in 1947, Prime Minister Jawaharlal Nehru was faced with the challenge of accommodating the refugees from Pakistan, and of setting an example for the modern Indian state. After a number of proposals being turned down for the town planning of Chandigarh, Le Corbusier was brought on board. His idea of sector wise planning and the superimposition of the Vitruvian man was appreciated by the leaders of the time.

The Capitol Complex represents the administrative pinnacle of Punjab and Haryana, and is constructed in Sector 1 in Chandigarh. It houses –

- a) The Legislative Assembly
- b) The Secretariat
- c) The Tower of Shadow
- d) The Open Hand monument and High court



The planning is primarily axial in the sense of placement of buildings. While approaching the unimaginative elevation, comprising of rows and rows of boxed windows. However, upon entering the building, the sheer volume and seemingly endless floor heights one aback. Walking through the ramp are some of the experiential features of the Assembly. The beautiful hyperbolic paraboloid dome of the assembly which provides natural lighting to the Parliament hall of Punjab is the highlight of this building. An artificial pond-like entity is constructed next to the Assembly. The reflection thus created is a statement in itself.

The Legislative Assembly

The legislative assembly is made in a hyperbolic shell with an average thickness of 15 cm, constant throughout its surface, resulting in a very low cost and a minimum weight. A large rectangular block that reaches 38 m at its highest point houses two legislative chambers of curved forms, linked by a foyer. The assembly chamber has a seating capacity for 252 persons. Additional galleries are provided for ladies, journalists, and officials. A ladies gallery with 90 seats, a men's gallery with 104 seats, and a press gallery with 24 seats are also provided in this chamber.



The assembly hall sits serenely next to its pools, while its sculptural roof overlooks the promenade.

This pier, support a huge trough from which rainwater spills out at higher either 4 end, falling into reflecting pools

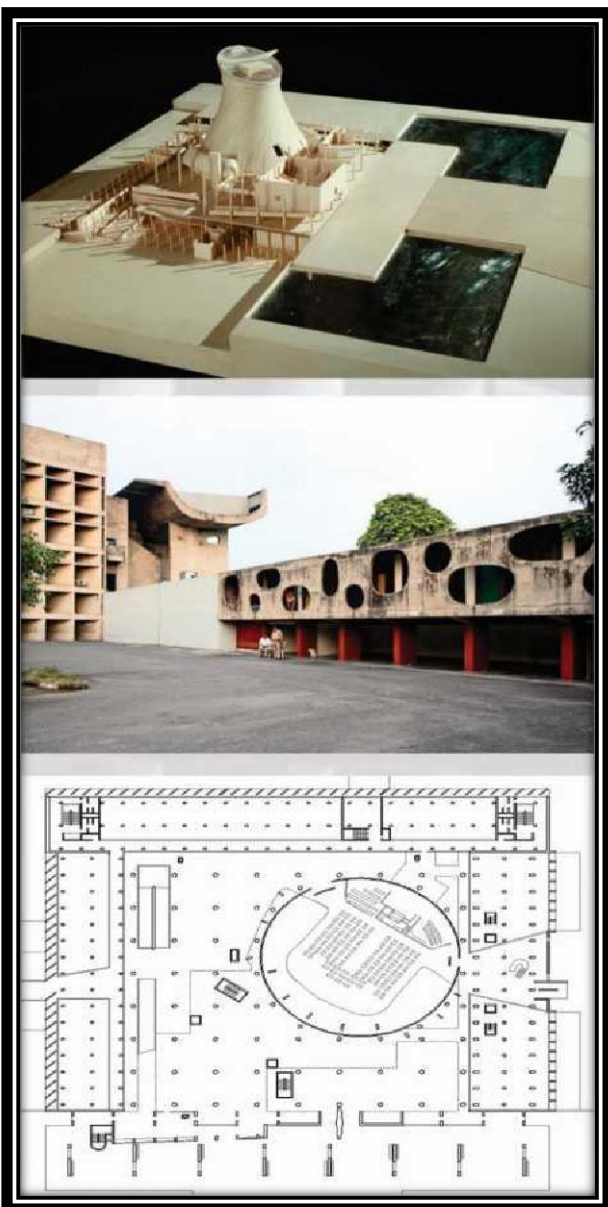
The Great Portico, facing the highcourt, consist of eight thin piers



The use of primary colors.

Planning

The planning of the building clearly shows the design principles of Le Corbusier like use of louvers, planning in grid, use of concrete, primary colours, etc. The most significant aspect of the building is the *coverage* of the legislative chambers, formed by a pyramidal prism in the case of the council chambers and a sculptural hyperbolic paraboloid to the house of assembly. It is said that le Corbusier was inspired by cooling chimneys he saw in Ahmedabad and also by his fascination for the Indian bulls. The scale and magnificence of the Assembly is spectacular. Staircases, lifts and provide various means of circulation and access to different levels of the building. The construction of the entire structure is in exposed reinforced concrete painted black, it highlights the dramatic game of light that gives the space generating a sense of solemnity.



Le Corbusier was big on symbols and it is said that the roof's sculptural elements are a reflection of the sun and the moon which he thought would be a good modern guide for the deliberations of the politicians within, (coming from Europe to be designing in and for India, le Corbusier became fascinated with India's sun.)

Why Concrete?

Steel and other material are too scarce and expensive for any large building, the principle material in Chandigarh architecture is handmade bricks and concrete with rough finishes

Acoustics:

Acoustic treatment has been given to the assembly chamber to modulate and control the sound levels by providing sound absorbing panels in bright colors and random curvilinear shapes.

The Secretariat

The building is a long horizontal concrete slab of 254 meters long and 42 meters high. It is composed of eight-storied block divided by expansion joints and measures over 800feet, flanked by two sculptural ramps providing vertical circulations throughout the levels.

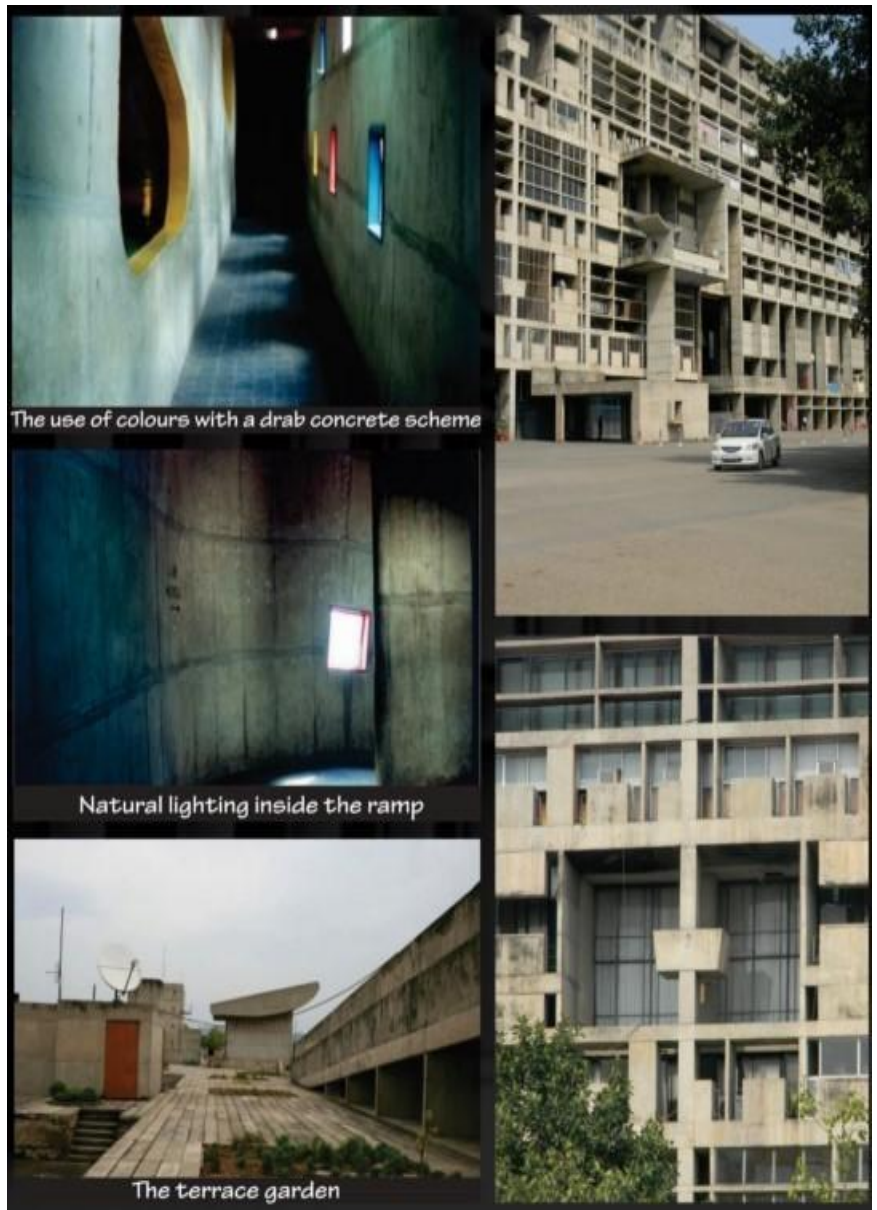
Completed in 1952, the Secretariat building functions as the headquarters of Punjab and Haryana municipal governments and is the largest of Corbusier's three completed administrative building. In this building careful attention is paid to natural lighting, ventilation, and organizational efficiency.

Features:-Natural Light Lamp and Ventilation

To maximize natural lighting and increase cross-ventilation, a long and narrow plan was implemented. To visually reduce the scale of its massive facade, the Secretariat was designed with a modular *facade* that fragments the elevation into legible, programmatic elements. This *approach* not only prevents onlookers from being overwhelmed by its scale, it also plays an important role with regard to the day lighting scheme of the project as a whole.

Corbusier has used louvers on the southern facade to mitigate solar gain; there is a almost a meter distance between solar breaks and windows which helps to reduce the heat.

The various projections, recesses, circulation elements, and multi-level interior spaces act as sun-breaks ('brise- soleils'¹) to mitigate solar gain.



Facade

It emphasizes a sense of hierarchy of facades and by its sheer cliff-like size and volume, completes the vista through distant mountains, where eye is led onwards to the smaller, more significant buildings and space beyond.

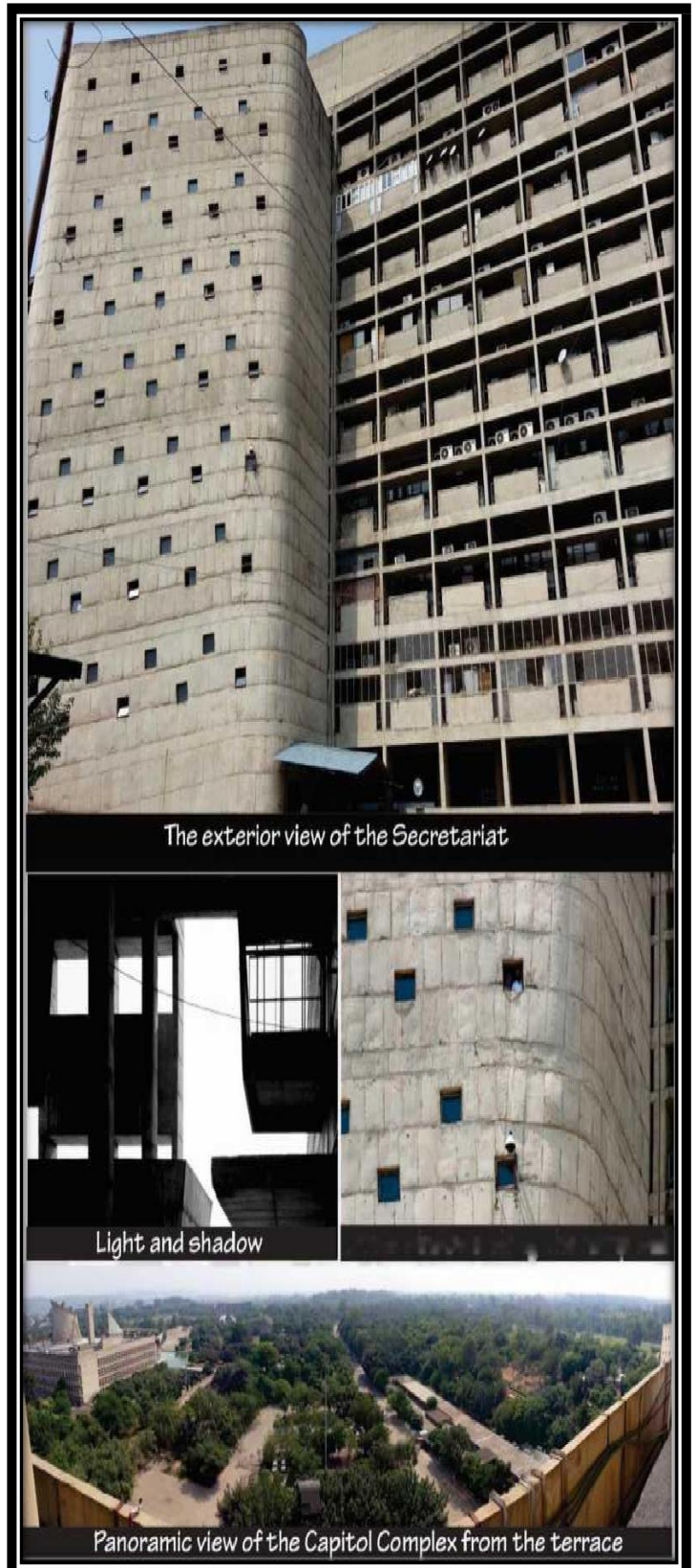
The undulatory glass-panels are well protected against the sun and rain by a grill of brise-soleil on the two principal facades.

Ramps:-Two Ramps in the Secretariat Building were provided to transport the materials for construction to the upper stories, as the budget was low for planning the city of Chandigarh, and cranes were not used.

The whole structure is constructed in 'beton brut' (rough-cast concrete) with Corbusier's signature 'brise-soleils' facade.

Over 800 feet long, the extensive facade of the building gives a sculptural aesthetic with exposed *concrete* ramps, punctured with small square windows dictating the front and rear views.

Accordingly, the Secretariat building avoids overshadowing the Capitol as a whole with its bulk size.



Tower of Shadows

Designed to study solar movement, this building was used by Le Corbusier to support his thesis that it is possible to control the sun in the 4 corners of a building, and may even play with him in a hot country and obtain low temperatures.

The studies of sunlight are clearly evident in many of the Indian projects. The most consummate example of this approach is without question-the Tower of shadows, also known as the 'Tower of 4 horizons', with which Le Corbusier graced the esplanade of the Capitol at Chandigarh.

Construction

The Tower rises at the North corner of the 'Fosse de la Consideration'¹, not far from the 2-4- solar hours' diagram. Like the Open Hand and Monument to the Martyrs, the Tower is a symbolic attribute of the Capitol and has no specific function.

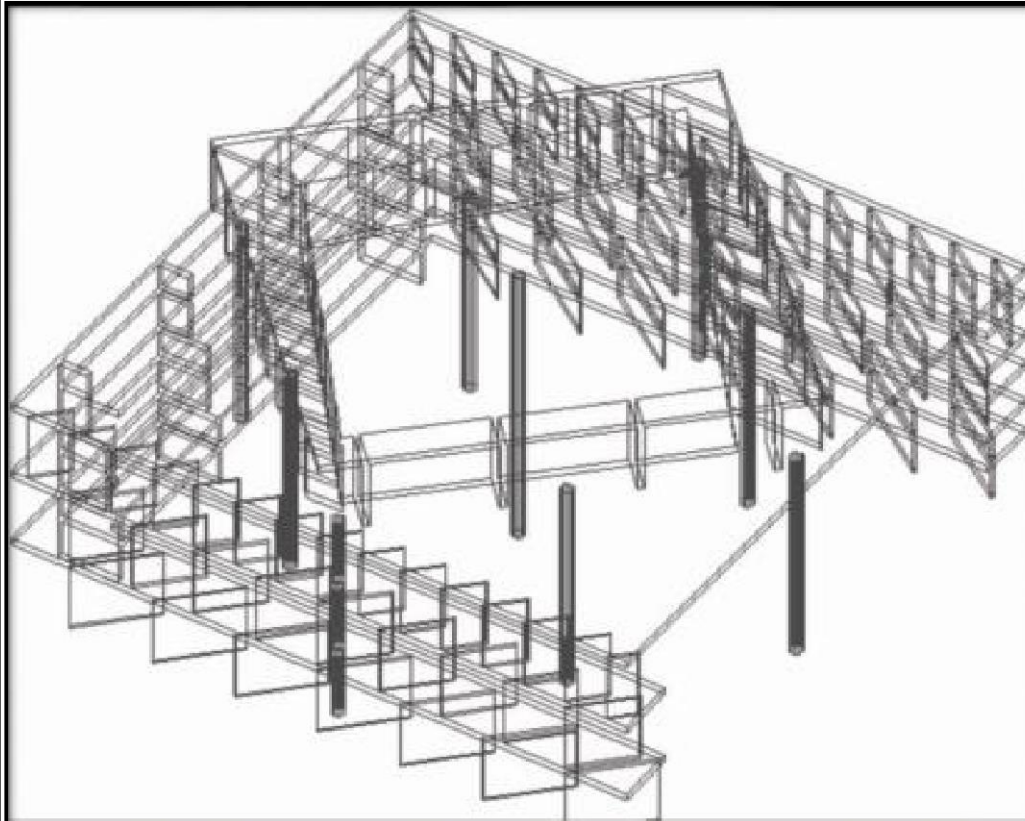
Le Corbusier described it as 'a very open hall, very high and shadowy'; its somber atmosphere intended to invoke meditation.

It can also be seen as a sort of manifesto for the brise-soleil, demonstrating, as the architect noted, 'that the sun can be controlled at all four *cardinal* points of an edifice and even manipulated in a hot country to reduce temperatures'.

The sun are known for the date and hour under study: the ray of sunlight is *traced*, then its trace is *drawn* in elevation in height (thrown in the frontal plane) and lastly, by projecting down onto the horizontal plane, the ray of sunlight's point of impact is determined forth given time.

However ingenious it may be, the construction is not difficult to understand.





Angle of fins determined by the sun's position and wind flow



The visual nature of the brise-soleil

But the rest is more complex. To understand it, we need to refer to the study written by A. What we see are lines that correspond to the graphic determination of azimuths and heights of the sun for given latitude, at the solstices (winter and summer) and the equinoxes.

The first thought directed towards this project appears to date from the early 1950s. For example, in December 1952, at much the same time as Xenakis drew his solar diagram for Paris, Le Corbusier noted in his Sketchbook : 'urgent / Get Xenakis onto the Tower of Azimuths to settle the brise-soleil question with precision'.

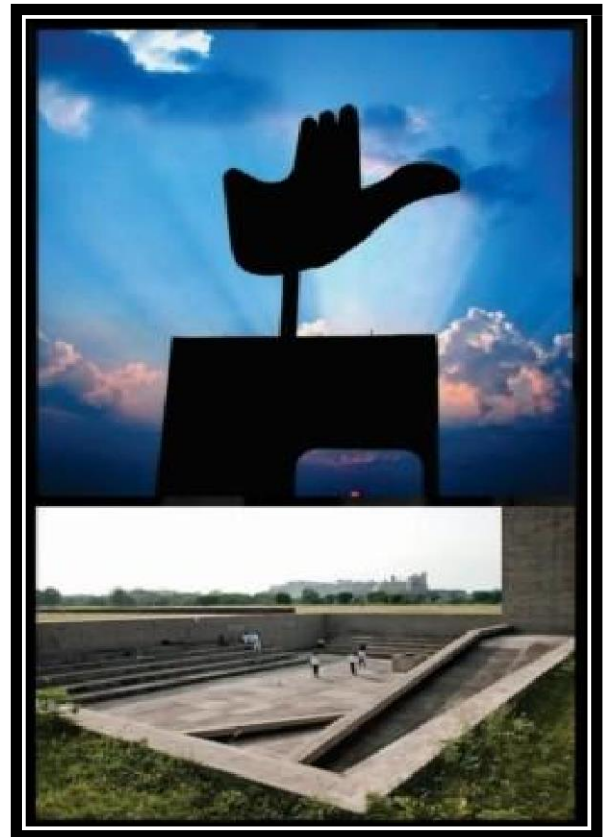
The Open Hand Monument

The Open Hand monument is the official emblem of Chandigarh. The purpose behind the construction of this open hand structure was for the people to have at least one place in the city where they could freely discuss the problems concerning Chandigarh and eventually take the right decisions for the betterment of the city. A small monument with a very big purpose.

Construction:-

The Open Hand (La Main Ouverte), a *prominent* and recurring motif in all of Le Corbusier's structures, measures 12.5 by 9.0m. It crowns an excavated plaza called the Trench of Consideration, conceived as a forum for debates on vital public affairs.

Rising 27m from a sunken pavilion with seating arrangements around, the giant hand is designed to rotate on ball bearings fitted on a shaft, like weather - cock, to indicate symbolically the direction of the wind. Its surface is covered with polished steel grey metal sheets and weighs



The High Court

In the high court building, Le Corbusier employed the concept of parasol, a large-scale overhanging roof structure, to provide a visual metaphor for the law's power.

The high court symbolized three ideas in its structure-

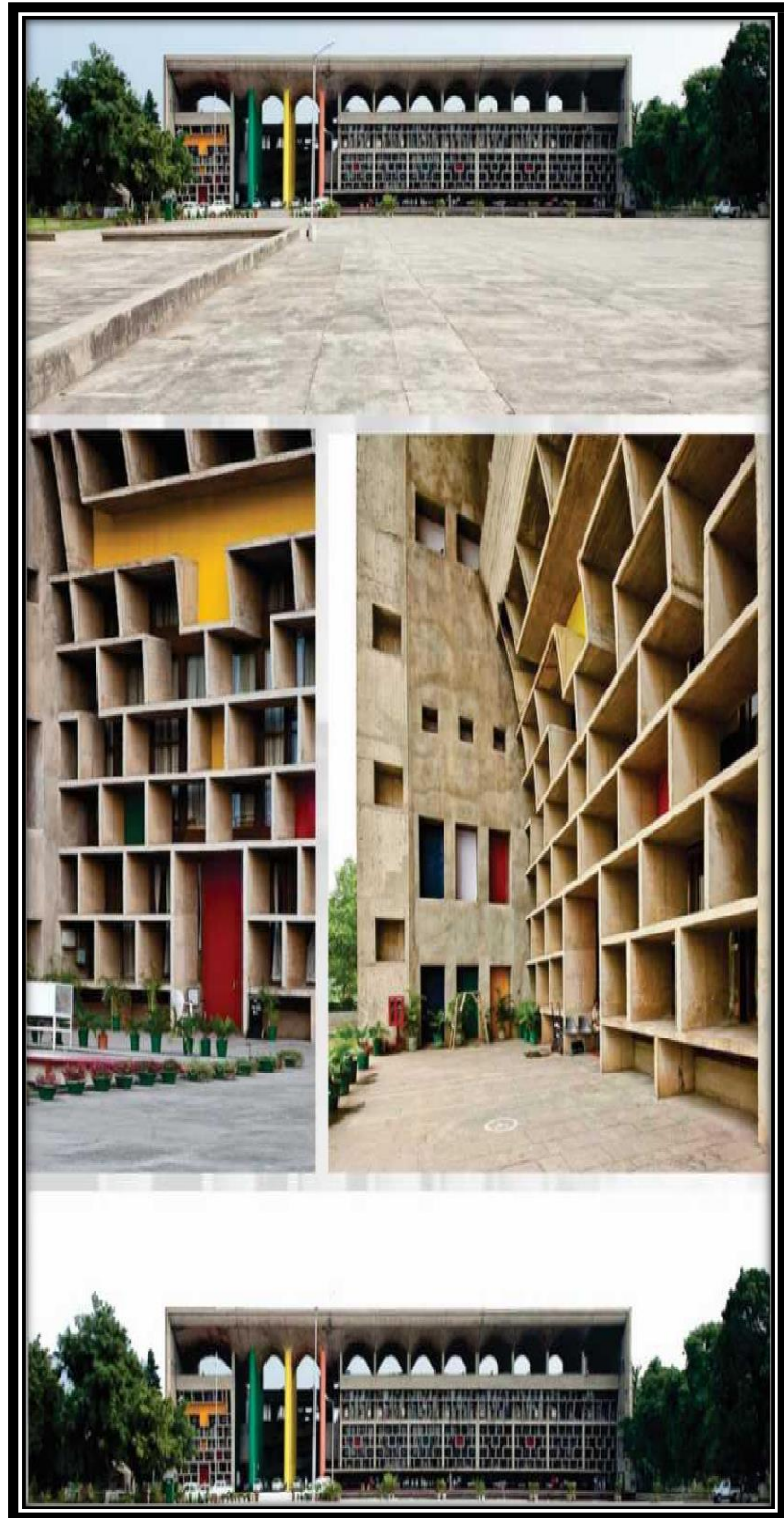
The majesty of law,

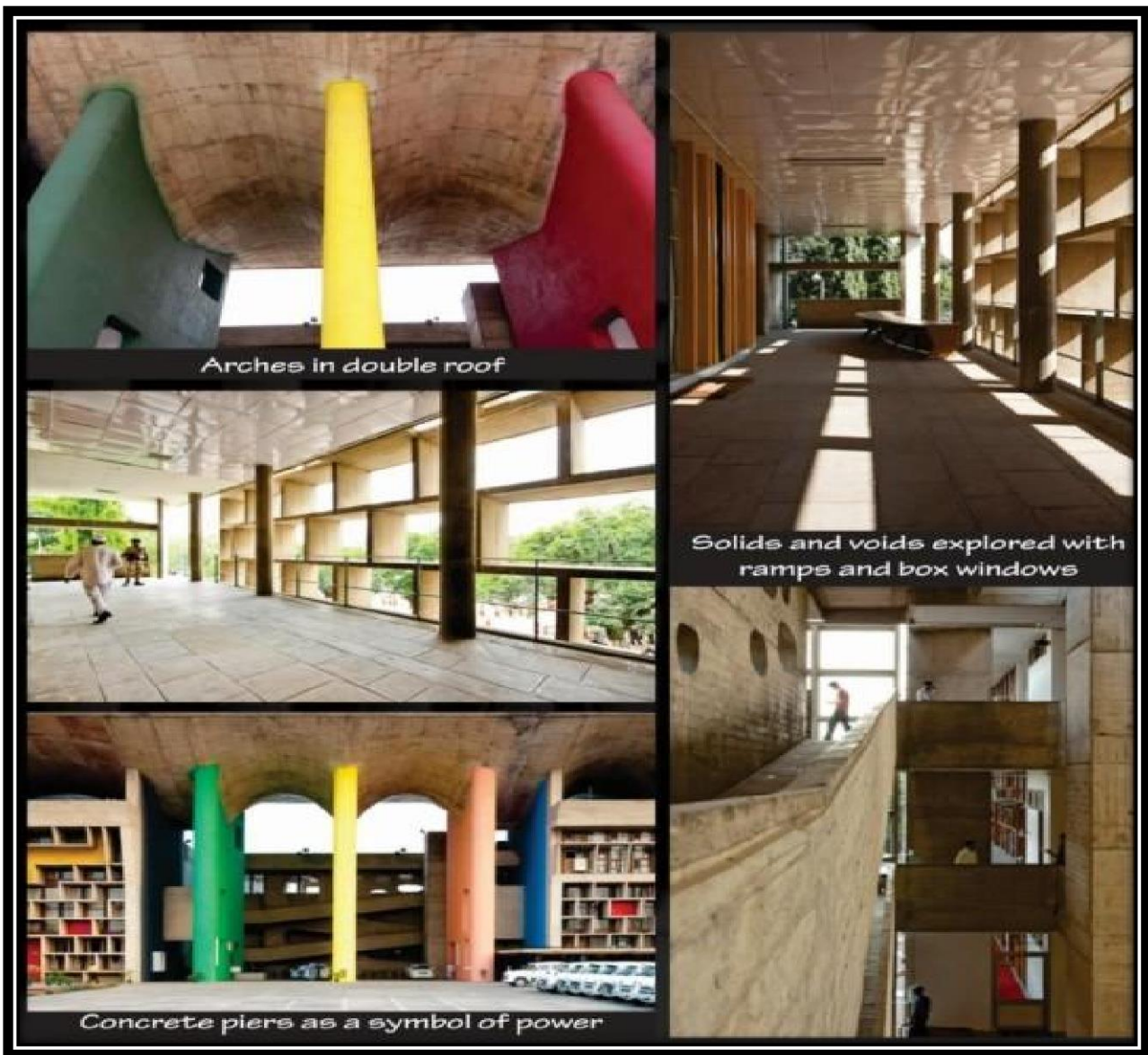
The shelter of law and

The power and fear of law.

The space between the two roofs is open to enable currents of air to move between the flat roof of the office block and the underside of the parasol roof which slopes towards center in the form of rows of arches

The eight court rooms are identically expressed on the main facade and separated from the larger high court by a monumental columned entrance rising the height of the building.



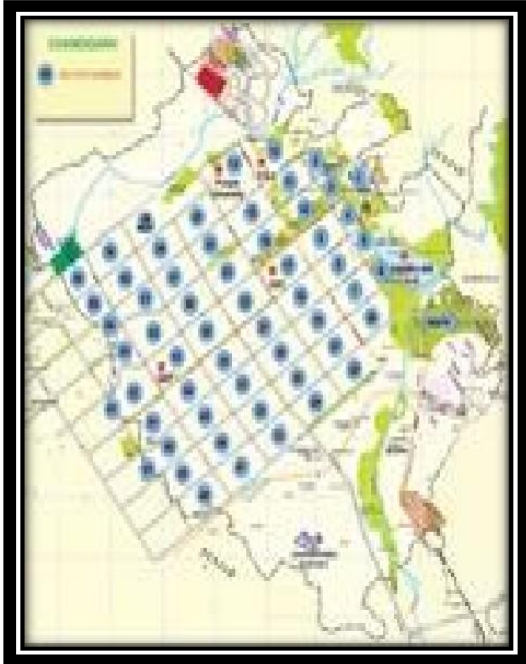


On the main facade the deep fixed concrete brise-soleil gives a strong and scale less pattern to the building. It is the concrete screen which gives the main facade its overall unity. Behind the brise-soleil, the windows of the court rooms are of fixed glass, but between are narrow vertical spaces containing shutters which open and close on hinges. It is noted that the orientation of the high court is such that the main facade faces North West, and this does not receive direct sunlight

The rough concrete of the building is treated in variety of manners for much of the surface including the underside of the parasol roof and the exterior side walls, the mass of sheet metal characterize the surface. In portions of the interior and on the ramps, wooden boards have been inserted within the metal forms to give the concrete surface the impress of their jointed pattern, while other surfaces, including those of massive entrance piers are finished with gunnite cement.

Le Corbusier Centre

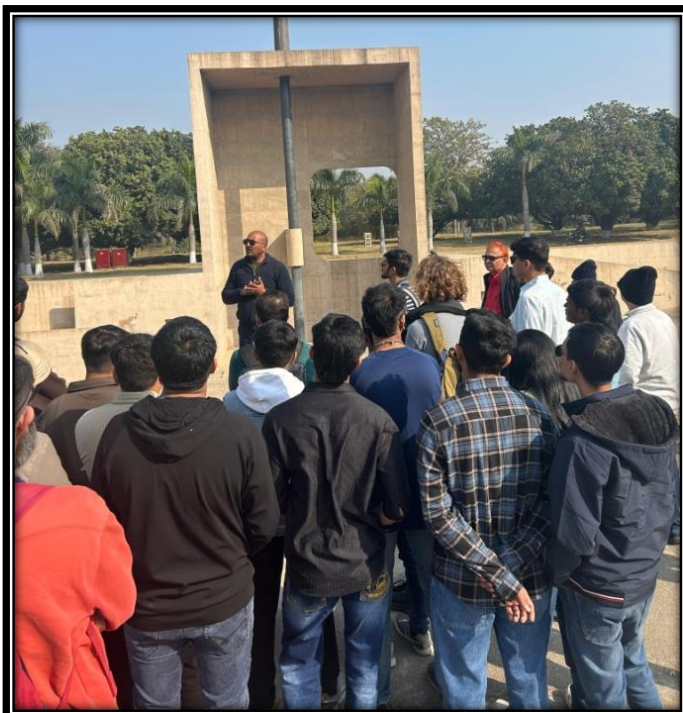
Le Corbusier Centre has been set up by the Chandigarh Administration, at the old Sector 19 office of the city's architect, Le Corbusier. The Swiss-French architect used the office while conceptualizing the city almost six decades ago.



The Centre displays and exhibits the life and works of Le Corbusier, so that tourists and future generations may be able to acquaint themselves with the rich cultural heritage of the city.

The main aim of the Centre would be preservation, interpretation, research, display of the works and legacy of Le Corbusier.

The Le Corbusier Centre and three Souvenir Shops at Sukhna Lake, Le Corbusier Center and Rock Garden, are being run successfully under STEPS (Society for Tourism and Entertainment Promotion).



2 Manali

Manali is a Valley nestled in the mountains of the Indian state of Himachal Pradesh near the northern end of the Kullu Valley, at an altitude of 2,050 m (6,726ft) in the Beas River Valley. It is located in the Kullu district, about 270 km (168mi) north of the state capital, Shimla. The small town, with a population of 8,096, is the beginning of an ancient trade route to Ladakh and from there over the Karakoram Pass on to Yarkand and Khotan in the Tarim Basin. It is a popular tourist destination and serves as the gateway to Lahaul & Spiti districts as well as Leh.

A.D. Hydro Power Plant

The ADHPL Project is located at village Prini, Tehsil Manali, District Kullu a distance of 60 kms from Bhutan airport, Kullu. It is 500 km away from Delhi by road. The project utilises water from the Hamtal and Pataori Himalayan streams, which form the Allain river, and from the the Chandar Tal glacier-fed Duhangan river. Water is transferred from separate intakes and underground headrace tunnels into a common intermediate reservoir before being discharged through a steel/concrete lined pressure shaft into the underground powerhouse at Prini village which is located near Manali town. Power is transmitted to the national grid connection point located at Nalagarh via a high voltage 175 KM long 220 KV transmission line built by the company. The ADHPL is helping to meet the shortage of power in the Northern region of India, presently estimated at some 1500 MW. The plant is operated as a peaking plant from November to May and as a base load plant during the summer and rainy season from June to October. During the peaking season, the plant operates about 4 hours per day.



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3 Some of the Glimpses for memory:-







સ્કેટ કોલજના સિવિલ એન્જિનિયરિંગ ડિપાર્ટમેન્ટના ફાઇનલ વર્ષના ૪૦ વિદ્યાર્થીઓએ સ્ટડી ટુર અંતર્ગત તા. ૧૩થી ૨૧ ડિસેમ્બર દરમિયાન અટલ ટનલ, હાઇડ્રો પાવર પ્લાન્ટ મનાલી, લી કોર્પ્યુઝિયર (ફાઇર ઓફ ટોવન પ્લાનિંગ) સેન્ટર, કેપિટલ કોમ્પ્લેક્સ, એસેમ્બલી ઓફ પંજાબ વગેરે સ્થળોની મુલાકાત લઈને સિવિલ એન્જિનિયરિંગ ડોમેન સિટી પ્લાનિંગ, પાવર પ્લાન્ટ, ટનલ પ્લાનિંગ એન્ડ કન્સ્ટ્રક્શન વગેરે બાબતોનો સઘન અભ્યાસ કર્યો હતો.

Dhabkar - 30-12-2024

સિવિલ એન્જિનિયરિંગને સ્ટુડન્ટ્સ નજીકથી જોઈ શકે તે માટે પહેલ એન્જિનિયરિંગના વિદ્યાર્થીઓએ અટલ ટનલ સહિતના પ્રોજેક્ટ્સની વિઝિટ લીધી

સિટી રિપોર્ટર : સુરત

એન્જિનિયરિંગના વિદ્યાર્થીઓને પ્રેક્ટિકલ નોલેજ મળી રહે તે માટે સાર્વજનિક કોલેજ ઓફ એન્જિનિયરિંગના સિવિલ એન્જિનિયરિંગના વિદ્યાર્થીઓને એક અઠવાડિયા માટે દેશના અન્ય રાજ્યોના પ્રોજેક્ટની સ્ટડી ટુર કરાવવામાં આવી હતી. જે અંતર્ગત સિવિલ એન્જિનિયરિંગના ફાઇનલ વર્ષના ૪૦ વિદ્યાર્થીઓએ સ્ટડી ટુર દરમિયાન અટલ ટનલ, હાઇડ્રો પાવર પ્લાન્ટ મનાલી, લી કોર્પ્યુઝિયર (ફાઇર ઓફ ટોવન પ્લાનિંગ) સેન્ટર, કેપિટલ કોમ્પ્લેક્સ, એસેમ્બલી ઓફ પંજાબ વગેરે સ્થળોની મુલાકાત લીધી



આ વિઝિટ દરમિયાન વિદ્યાર્થીઓએ દેશના જાણીતા પ્રોજેક્ટ્સ નિહાળ્યા હતા.

હતી. જેથી સિવિલ એન્જિનિયરિંગ ડોમેન જેવા સિટી પ્લાનિંગ, પાવર પ્લાન્ટ, ટનલ પ્લાનિંગ એન્ડ કન્સ્ટ્રક્શન વગેરે જેવા વિષયોને વિદ્યાર્થીઓ પોતે સમજી શકે. સાથે જ વિદ્યાર્થીઓ કીલ્ડ માટે તૈયાર

થઈ શકે. આ તમામ પ્રોજેક્ટ ઐતિહાસિક પ્રોજેક્ટ છે જેથી એન્જિનિયરિંગના આવિષ્કારોના કારણે કઈ રીતે લાખો લોકોના જીવનને સહેલું બનાવી શકાય તે પણ સમજાવવામાં આવ્યું હતું.

THANK YOU

Report by: Dr Kamlesh Dalal, Prof Chaitali Patel