



SUMATERA UTARA UNIVERSITY LIBRARY USING TROPICAL ARCHITECTURE APPROACH

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ABSTRACT

The library, as a center for information and knowledge, plays a crucial role in supporting academic activities at the university. This thesis aims to design a university library that not only meets the information literacy needs of students but also creates a conducive atmosphere for learning and research. The research involves user needs analysis, literature review, and observation of existing libraries. The results of this study indicate that the library design must consider good lighting, optimal ventilation, and efficient space division systems. With this design, it is expected that the library can function as a space for social and academic interaction that supports the teaching and learning process at the university.

Keywords: University Library, Tropical Architecture, Library.

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1. Introduction

A university functions as a hub for research and the advancement of knowledge, with the primary goal of producing a highly skilled and knowledgeable future generation. In order to fulfill this critical mission, various facilities are needed to support academic and research activities. One of the most vital resources is the university library, which plays a key role in providing access to information, literature, and research materials. The library not only serves as a place for students to study, but also as a central resource for enhancing learning, fostering academic growth, and supporting the overall educational process. Its presence is indispensable in helping students deepen their understanding and succeed in their academic pursuits.

As an educational institution, a university requires supporting facilities and infrastructure to carry out its teaching and learning activities, which play a crucial role in achieving the goals, vision, and mission of the campus. One such facility that plays a significant role in supporting the learning and teaching processes at USU (Universitas Sumatera Utara) is the central library. The library, as a place of informal education, not only provides access to information but also facilitates the learning process, research, and academic development of students at Universitas Sumatera Utara. Its presence is essential in shaping a comprehensive academic environment that supports both intellectual growth and student success.

The presence of a well-equipped and comprehensive library on campus allows students to easily access a wide range of information and literature essential to their academic development. Moreover, the library can act as an inspiring and productive environment for students as they engage in their studies and research. Consequently, the library's role in supporting teaching and learning activities is immensely significant, providing the necessary resources and space to foster academic success.



Library is an information institution and a gateway to accessing knowledge. According to Law Number 43 of 2007 on Libraries, the library functions as a medium for education, research, preservation, information, and recreation to enhance the intelligence and empowerment of the nation. However, to attract users and transform the library into an information resource center, various strategies, supporting facilities, management, and professional services are required.

Library is a collection or a set of organized and maintained books or other materials for use or purposes (reading, consultation, studying, researching), managed by librarians and other trained staff to provide services that meet user needs (Hasugian, Jonner 2009:70).

The goal of higher education institutions is to function as providers of information services that involve the collection, preservation, management, utilization, and dissemination of information to benefit users. This entails offering facilities that cater to the information needs of the academic community, delivering a variety of information services, and improving the overall quality of higher education institutions.

The library plays a critical role in enhancing education, research, and overall campus life, making it an essential component of a thriving higher education ecosystem. By facilitating access to information and knowledge while fostering a conducive learning environment, the library helps connect academic goals with student success.

2. Literature Review

2.1 University

The academic organization of the university is systematically structured into multiple faculties, each of which represents distinct branches of knowledge, technology, and the arts. This structure not only ensures the comprehensive development of specialized disciplines but also promotes interdisciplinary integration, enabling the institution to provide a holistic educational framework that supports both intellectual advancement and professional competency..

2.2 Library

According to the Library Law in Chapter 1, Article 1, it states that a library is an institution that collects printed and recorded knowledge, manages it in a specific manner to meet the intellectual needs of its users through various means of knowledge interaction. The library is a space where various sources of information and knowledge are available. There, not only is information and knowledge collected, processed, and stored, but it is also disseminated to library users. The library serves as a place for individuals to store and retrieve diverse information with a wide scope.

2.3 Tropical Architecture

The tropical architecture approach is a way of designing buildings that take into account the climatic conditions of the tropics. In the case of Medan City with high air humidity (77% to 85%) and air temperature varying between 22.1°C to 34.5°C throughout the year, tropical architecture becomes very relevant. This approach aims to create buildings that are comfortable and efficient in dealing with typical tropical climate challenges such as heavy rain, scorching sun, high air temperature, high humidity (in humid tropical regions), and low wind speeds.

It is important to understand that tropical architecture emphasizes more on scientific and technical aspects than on cultural aspects. This means that this approach is concerned with building science and efficient construction techniques in the face of tropical climates. Although tropical architecture exists throughout countries with tropical climates, different cultures have different implementations.

3. Metode

The design method is crucial in creating a building, as it encompasses the steps involved in the design process. In designing this university library, several stages will be undertaken, including:

1. Primary data collection: conducted through observation, which involves field observations.
2. Secondary data collection: conducted by searching for literature from books, journals, articles, and other sources that contain information about designing university libraries.
3. Site selection method: contains an explanation of the considerations in choosing the site.
4. Data analysis: analyzing the necessary data such as site analysis, functional analysis, spatial analysis, form analysis, structural analysis, and utility analysis.
5. Synthesis of design concepts: integrating all the analyses obtained to formulate the design concept to be implemented.

4. Results and Discussion

4.1 Site Location

The University of North Sumatra is a state university located in Padang Bulan Village, Medan Baru District, Medan City, North Sumatra Province which has an area of 120 hectares and consists of 15 faculties.



Figure 1. Site Project

Source : Google and Personal Analysis

a) Land Condition

- Area : 30.248 m²
- Contour : Flat
- Maximum KDB : 60%
- Maximum KLB : 6%
- Maximum KDH : 20%

b) Site Achievements

This library is located at the center of the campus, carefully positioned to ensure optimal accessibility for all faculties and academic programs within the university. With its strategic location, the library becomes easily reachable by students, lecturers, and staff from various disciplines and academic backgrounds. This allows the entire campus community to make the most of the library's facilities and resource collections more effectively and efficiently, supporting teaching, learning, research, and academic discussions without the barrier of distance.

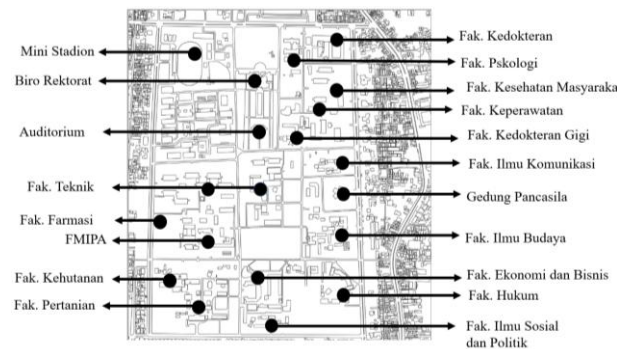


Figure 2. Building Around The Site
 Source : Personal Analysis

4.2 Theme Application of Tropical Architecture

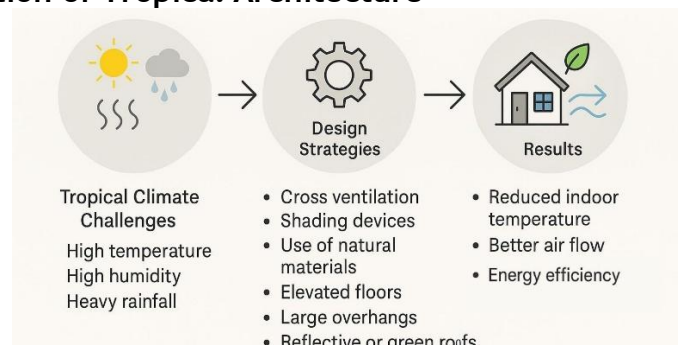


Figure 3. Theme Application Concept
 Source : Personal Analysis

The University of North Sumatera (USU) is located in Medan City, an area known for its humid tropical climate, where sunlight is abundant and rainfall occurs almost throughout the year. Climate conditions like this require building designs that can adapt to the surrounding environment, especially in terms of creating comfort indoors. Therefore, the design of this library is designed with special attention to the aspects of thermal and visual comfort in the room. One important element that is the focus is lighting, both natural and artificial lighting, which is optimized to create an environment that is not only bright but also comfortable for its users. With a carefully planned lighting design, this library is expected to be able to create an atmosphere that supports students in carrying out their various activities, from studying, reading, to discussing productively and efficiently.

Trees play a significant role in tropical buildings, particularly in creating a comfortable and sustainable environment. With their dense canopies, trees provide shade, reducing the surrounding temperature and thus lowering the need for cooling energy. Additionally, trees act as windbreakers, dust filters, and carbon dioxide absorbers, improving air quality. Their roots help manage rainwater by absorbing and reducing runoff, preventing soil erosion. Aesthetically, trees enhance the building's surroundings and offer a soothing natural ambiance, making them essential elements in tropical architecture.

4.3 The Concept of Mass Composition

The shape of the composition made has been adjusted to the shape of the site and the site analysis that has been carried out. The masses have 2 entrances, vehicles and pedestrians, making it easier for visitors to access the building. This building has a shape that can be immediately recognized in the campus area, allowing it to serve as a visual landmark and point of orientation for students, faculty, and visitors alike.

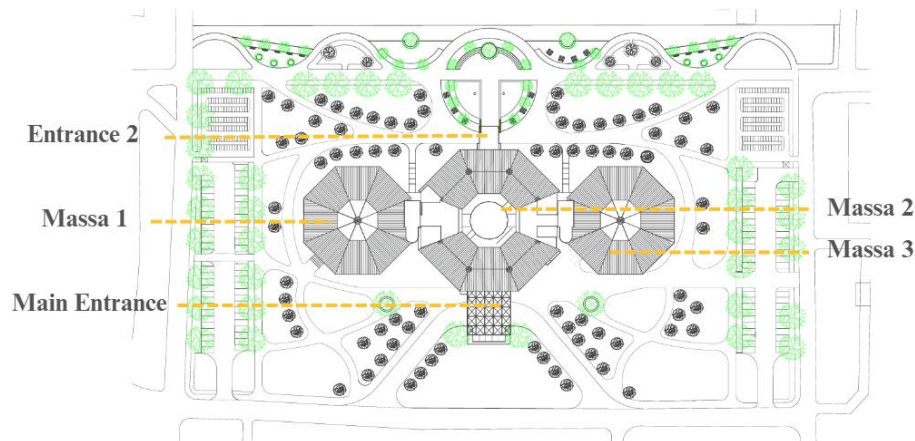


Figure 4. Concept of Mass Composition
Source : Personal Analysis

Physically, the University of North Sumatera Library boasts a unique and captivating form. The building comprises three octagonal masses, an uncommon design that makes it stand out compared to other structures on campus. This geometric shape provides a distinctive visual identity while symbolizing the library's importance as one of the key buildings at the University of North Sumatera.

4.4 Zoning Concept

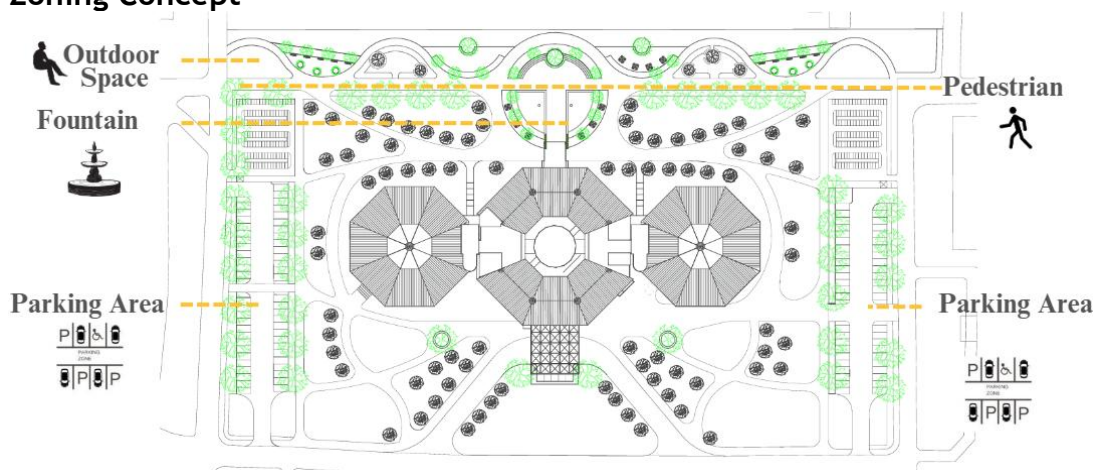


Figure 5. Zoning Concept
Source : Personal Analysis

This library is thoughtfully designed to include an outdoor area situated in the southern part of the building, which serves as a versatile space for various activities, including outdoor learning. The area is equipped with numerous seating arrangements and amphitheatres, making it an ideal location for students to gather, study, or hold discussions in a refreshing and open-air environment.

This outdoor learning space offers a valuable alternative for students who might feel uninspired or fatigued by the conventional indoor learning settings. Despite being an outdoor area, it provides a cool and comfortable atmosphere, as it is shaded by a variety of trees that not only enhance the aesthetics but also contribute to a calming natural environment. The integration of such outdoor spaces reflects a commitment to creating a dynamic and flexible learning experience that aligns with the needs and preferences of the students.

4.5 Building Façade Concept

The façade of this library building is designed with three distinct masses, each taking the shape of an octagon, with the central mass being the largest and serving as the focal point of the structure. This unique architectural arrangement not only enhances the building's visual appeal but also reflects its role as a significant hub for learning and knowledge within the campus.



Figure 6. Zoning Concept
Source : Personal Analysis

The building's aesthetic is further defined by its neutral color palette, primarily featuring clean, crisp white tones that give it a modern and timeless appearance. Complementing this, the incorporation of exposed brick elements adds warmth and texture to the design, creating a seamless blend with the surrounding natural environment. This thoughtful combination of colors and materials ensures that the building integrates harmoniously into its setting, emphasizing a connection to nature while maintaining a sophisticated and welcoming atmosphere for its users.



Figure 7. Outdoor Study area
Source : Personal Analysis

The outdoor area of this library is thoughtfully designed to provide a comfortable and inviting space, making it highly suitable for studying and engaging in various activities in an open-air setting. The area is adorned with numerous trees that not only enhance the aesthetic appeal of the surroundings but also create a cool, refreshing, and pleasant atmosphere,

allowing students to enjoy their time outdoors without feeling the discomfort of the tropical heat.



Figure 8. Outdoor Space
Source : Personal Analysis

In addition to the greenery, the outdoor space is equipped with an ample number of seating options strategically placed to maximize convenience and accessibility. The presence of an amphitheater further enriches the experience, serving as a versatile area where students can gather for group discussions, collaborative projects, or even informal events. This well-planned outdoor space encourages social interaction and fosters a sense of community among students, providing them with an alternative to traditional indoor learning environments while maintaining comfort and functionality.

4.6 Interior Concept



Figure 9. Information Center
Source : Personal Analysis

The central part of the building is dedicated to housing the library's primary information center, which serves as one of the most critical and dynamic areas within the entire structure. This space is designed to facilitate a variety of essential activities, including the return of borrowed books, the borrowing of new reading materials, and the provision of assistance and guidance to visitors seeking specific information or resources.



Figure 10. Information Center
Source : Personal Analysis

Given its vital role as a bustling hub of interaction, communication, and daily operations, the overall design and layout of this central area place strong emphasis not only on accessibility, convenience, and efficiency, but also on creating an environment that fosters user comfort, encourages engagement, and ensures that every process is carried out as seamlessly as possible to support the diverse needs of all library users.



Figure 11. Locker Area
Source : Personal Analysis

After entering the lobby area, visitors are immediately directed to the baggage storage or locker area located on the left side of the main entrance. This area is provided so that visitors can securely store their personal belongings before continuing their activities inside the library, creating a more comfortable, orderly, and distraction-free learning environment.



Figure 12. Book Collection Area
Source : Personal Analysis

The book collection area in this library is located on the 2nd to 4th floors, providing a spacious and organized environment that encourages both exploration and focused study. Within this area, visitors can find neatly arranged bookshelves that hold a wide variety of reading materials, ranging from academic references to general knowledge resources, ensuring that students and other users have access to diverse information.



Figure 13. Reading Area
Source : Personal Analysis

To support individual learning needs, the space is also equipped with individual study desks that offer privacy and quietness for concentrated work, as well as a dedicated desk for room staff who are always available to assist with book searches, guidance, and maintaining order in the space.



Figure 14. Study Area
Source : Personal Analysis

The interior design adopts a natural material concept, with light brown wooden furniture dominating the overall look, complemented by soft tones that contribute to a sense of warmth and harmony. This use of natural materials not only enhances the aesthetic value of the space but also creates a calm, inviting, and comfortable atmosphere that is conducive to studying, allowing students to feel relaxed, focused, and motivated while spending long hours in the library.



Figure 15. Discussion Rooms
Source : Personal Analysis

This library provides discussion rooms located in the postgraduate area and the lecturers' area. Each area has three discussion rooms that can accommodate 8 to 11 people. Every room is equipped with supporting facilities such as a whiteboard and a projector, making them ideal for discussions, presentations, and group work.

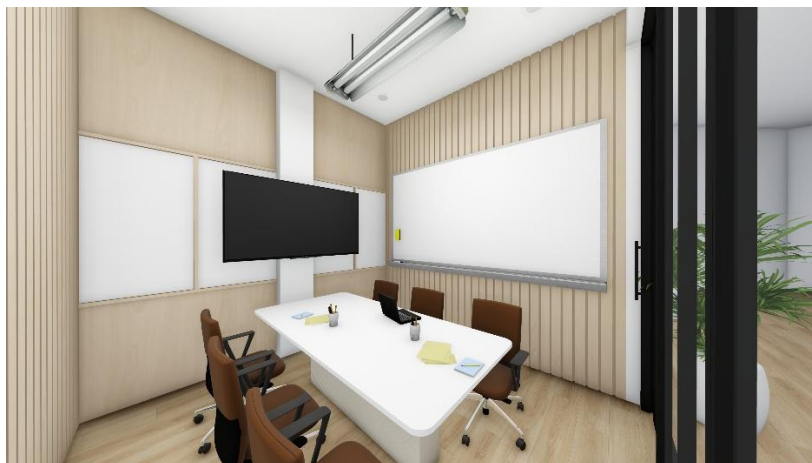


Figure 16. Discussion Room Interior
Source : Personal Analysis

5. Conclusion

The design of the University of North Sumatra Library, located at Jl. Perpustakaan No. 1, Padang Bulan, Medan Baru District, Medan City, North Sumatra, prioritizes facilities and infrastructure that support its function as a university library. The library serves not only as a storage space for books but also as a learning hub for University of North Sumatra students.

The library's central location within the university allows easy access for all students of the University of North Sumatra. This accessibility is further supported by the availability of several transportation alternatives to the library.

The design concept of the University of North Sumatra Library adopts Tropical Architecture. Given that Medan is one of Indonesia's cities with high temperatures, the tropical architectural concept is suitable for this library building. The library employs skylight roofing to maximize natural lighting during the day.

The University of North Sumatra Library comprises three octagonal masses, making the building stand out compared to others on campus. This distinctive design emphasizes the library's significance as one of the university's key Building.



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