WASTE AND SUSTAINABILITY IN HOSTEL

A PROJECT REPORT

Submitted by

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in partial fulfillment of requirements for the award of the course
AGB1211 – DESIGN THINKING

in

ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING

K. RAMAKRISHNAN COLLEGE OF TECHNOLOGY

(An Autonomous Institution, affiliated to Anna University Chennai and Approved by

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SAMAYAPURAM – 621 112

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K. RAMAKRISHNAN COLLEGE OF TECHNOLOGY (Autonomous)

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BONAFIDE CERTIFICATE

Certified that this project report on **"WASTE AND SUSTAINABILITY IN HOSTEL"** is the bonafide work of **S.VIDYASAAGAR (2303811714821055), J.VIGNESHWAR(2303811714821056),V.VIGNESHWARAN(2303811714821057),B.R.VIMAL AANANTH (2303811714821058)** who carried out the project work during the academic year 2024 - 2025 under my supervision.
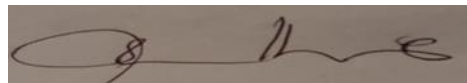
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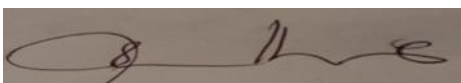
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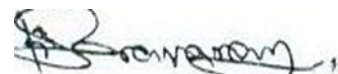Ms.S.MURUGAVALLI., M.E.,(Ph.D).,

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Submitted for the viva-voce examination held on 05.12.24

INTERNAL EXAMINER

EXTERNAL EXAMINER

DECLARATION

I declare that the project report on "**WASTE AND SUSTAINABILITY IN HOSTEL**" is the result of original work doneby us and best of our knowledge, similar work has not been submitted to "**ANNA UNIVERSITY CHENNAI**" for the requirement of Degree of **BACHELOR OF ENGINEERING**. This project report is submitted on the partial fulfillment of the requirement of the award of the **AGB1211 – DESIGN THINKING.**

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B.R.VIMAL AANANTH

Place: Samayapuram

Date: 05/12/2024

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I would like to express our sincere thanks to our beloved Executive Director, **Dr. S. KUPPUSAMY, MBA, Ph.D.,** for forwarding our project and offering an adequate duration to complete it.

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VISION OF THE INSTITUTION

To serve the society by offering top-notch technical education on par with global standards.

MISSION OF THE INSTITUTION

- Be a center of excellence for technical education in emerging technologies by exceeding the needs of industry and society.
- Be an institute with world class research facilities.
- Be an institute nurturing talent and enhancing competency of students to transform them as all- round personalities respecting moral and ethical values.

VISION AND MISSION OF THE DEPARTMENT

To become a renowned hub for AIML technologies to producing highly talented globally recognizable technocrats to meet industrial needs and societal expectation.

Mission 1: To impart advanced education in AI and Machine Learning, built upon a foundation in Computer Science and Engineering.

Mission 2: To foster experiential learning equips students with engineering skills to tackle real-world problems.

Mission 3: To promote collaborative innovation in AI, machine learning, and related research and development with industries.

Mission 4: To provide an enjoyable environment for pursuing excellence while upholding strong personal and professional values and ethics.

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

PEO 1: Excel in technical abilities to build intelligent systems in the fields of AI & ML in order to find new opportunities.

PEO 2: Embrace new technology to solve real-world problems, whether alone or as a team, while prioritizing ethics and societal benefits.

PEO 3: Accept lifelong learning to expand future opportunities in research and product development.

PROGRAM OUTCOMES

Engineering students will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO 1: Expertise in tailoring ML algorithms and models to excel in designated applications and fields.

PSO 2: Ability to conduct research, contributing to machine learning advancements and innovations that tackle emerging societal challenges.

ABSTRACT

Sustainability and effective waste management in hostels are essential for reducing environmental impact and promoting responsible practices among residents. Hostels generate various types of waste, including organic, recyclable, and non-recyclable materials, which require proper segregation to ensure efficient disposal and recycling. This paper highlights strategies to achieve sustainability in hostel settings, including the implementation of waste segregation systems, composting for organic waste, and partnerships with local recycling centers. Additionally, measures to reduce food waste, such as sharing leftover food and encouraging meal planning, are discussed. The adoption of energy-efficient appliances, water-saving fixtures, and renewable energy sources like solar panels can significantly lower resource consumption. Minimizing plastic use through reusable items and water refilling stations further enhances environmental responsibility. Promoting sustainable purchasing, such as buying local and eco-friendly products, complements waste reduction efforts. Incorporating digital tools for communication and documentation also helps reduce paper waste, supporting a shift towards a paperless system. Educational initiatives, such as workshops, posters, and campaigns, play a critical role in fostering awareness and encouraging behavioral change among residents. Upcycling old items, creating green spaces, and using eco-friendly cleaning products further reinforce the hostel's commitment to sustainability. By integrating these practices, hostels not only reduce their ecological footprint but also create a healthier living environment. These efforts inspire residents to embrace sustainable habits, making hostels a model for environmental responsibility and a stepping stone toward a greener future.

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CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

Hostels, as dynamic spaces for students and other residents, face significant challenges related to waste generation and resource usage. Poor waste management practices, such as improper segregation and excessive use of non-recyclable materials, contribute to environmental degradation. Sustainability in hostels is essential to reduce their ecological footprint, conserve resources, and create a healthy living environment. Addressing these issues requires a combination of innovative strategies, community engagement, and eco-friendly practices, transforming hostels into models of sustainability.

1.2 PROBLEM STATEMENT

Hostels often struggle with inadequate waste management systems and unsustainable practices, leading to increased pollution and resource depletion. The lack of awareness about waste segregation, excessive use of plastics, and high levels of food and energy waste are common challenges. These issues not only harm the environment but also compromise the quality of living for residents. Addressing these problems requires targeted strategies and initiatives to promote responsible waste handling and sustainability.

1.3 OBJECTIVE

The primary objective of this initiative is to develop and implement a sustainable waste management framework for hostels. Specific goals include:

- Reducing waste generation through proper segregation, recycling, and composting.

- Minimizing the use of non-recyclable materials, such as single-use plastics.
- Conserving energy and water resources through the use of efficient systems and renewable energy sources.
- Promoting awareness and behavioral change among residents through education and engagement.
- Creating a healthier and eco-friendly living environment that serves as a model for sustainable practices.

By achieving these objectives, hostels can significantly contribute to environmental conservation and install lifelong sustainable habits in their residents.

CHAPTER 2
PROJECT METHODOLOGY

2.1 BLOCK DIAGRAM
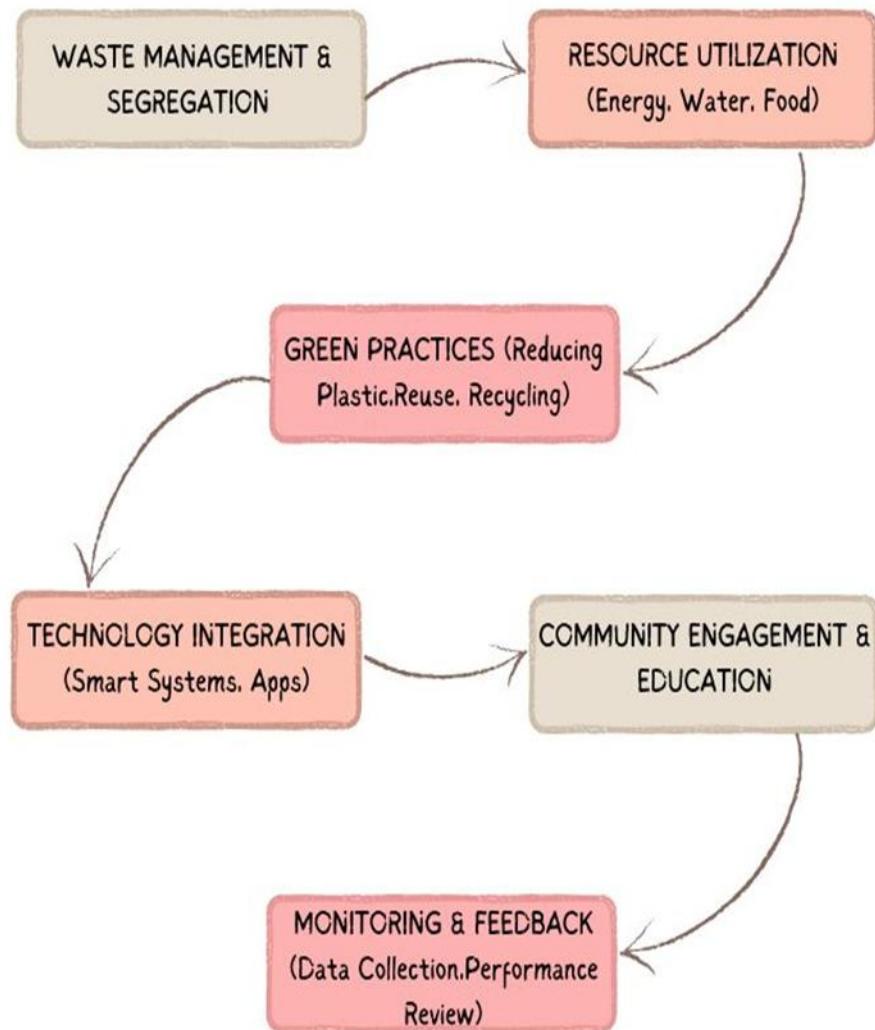
WASTE AND SUSTAINABILITY IN HOSTEL

Figure No. :2.1.1

CHAPTER 3
KEY PHASES OF DESIGN THINKING

3.1 EMPATHIZE

The Empathize phase is the first and most crucial step in the design thinking process. It involves understanding the people you are designing for, their experiences, needs, and challenges. The primary goal is to put yourself in the users' shoes to gain a deep, empathic understanding of their environment, emotions, and behaviors. This can be done through various techniques such as user interviews, observations, shadowing, and immersion. By observing users in their natural environment, designers can uncover problems and pain points that they might not have previously considered. Empathy helps to establish a foundation of user-centered insights, ensuring that the subsequent steps in the design process remain focused on the real needs and desires of the users.

3.2 DEFINE

The Define phase is where all the data collected during the Empathize phase is synthesized to identify key insights and define the core problems. During this phase, designers create a clear, actionable problem statement that outlines the user's needs and challenges. This problem statement is focused on human-centered issues rather than technical ones. It serves as a guide for the ideation phase, keeping the team aligned with the users' needs. The define phase often involves analyzing the collected data to spot patterns, making sense of user behaviors, and organizing the insights in a way that highlights the most critical issues. It sets the direction for the design process, ensuring that solutions are crafted around real-world user problems.

3.3 IDEATE

The Ideate phase is where creativity and problem-solving skills come into play. After understanding the problem and defining the core challenges, it's time to brainstorm a wide range of ideas and potential solutions. The goal of this phase is to explore many possible answers without limiting creativity. Techniques like brainstorming, mind mapping, and SCAMPER are commonly used to generate ideas. During this phase, designers are encouraged to think outside the box and embrace unconventional solutions. This phase also involves discussing and building on each other's ideas, fostering a collaborative environment. The aim is to push boundaries, generate innovative solutions, and consider a variety of approaches before narrowing down to the most promising concepts for prototyping.

3.4 PROTOTYPE

In the Prototype phase, the goal is to turn ideas into tangible, testable forms. Prototypes can vary from low-fidelity, such as sketches or paper models, to high-fidelity, such as functional products or digital interfaces. Prototyping allows the team to visualize and test ideas quickly, making it easier to spot potential issues and areas for improvement. This phase encourages experimentation and iteration, as prototypes can be refined and modified based on feedback. It's essential to remember that prototypes are not final products they are tools for learning and gathering insights. By creating prototypes, designers can interact with users and stakeholders to evaluate the feasibility of their solutions and determine which ideas should be pursued further.

3.5 TEST

The Test phase is where prototypes are evaluated and refined based on user feedback. This phase involves gathering user insights through usability testing, surveys, and direct interactions to understand how well the solution meets user needs.

It's a crucial phase for identifying any shortcomings or issues in the design. Testing often leads to new insights, which can require designers to revisit earlier phases of the design thinking process, such as redefining the problem or prototyping new solutions. Testing is not a one-time activity; it's an ongoing, iterative process where solutions are continuously improved based on real-world use. Ultimately, the goal of this phase is to validate the final design, ensuring that it effectively solves the user's problems and is ready for implementation. Each of these phases plays a crucial role in ensuring that design thinking remains user-centric and focused on solving real-world problems effectively.

CHAPTER 4
MODULE DESCRIPTION

The Waste and Sustainability in Hostel project integrates several modules aimed at addressing environmental concerns, optimizing resource use, and fostering sustainability within hostel environments. The modules include a combination of research, practical strategies, and technological tools designed to promote waste reduction, resource conservation, and eco-friendly living. These modules are designed to provide a comprehensive understanding of waste management and sustainable practices in hostels, along with actionable methods to achieve these goals. The core modules of this project include:

4.1 WASTE SEGREGATION AND MANAGEMENT

This module focuses on the importance of segregating waste into recyclable, organic, and non-recyclable categories. It provides guidelines for setting up an efficient waste sorting system and discusses methods to minimize waste generation through better practices and awareness.

4.2 SUSTAINABLE RESOURCE UTILIZATION

This module explores how hostels can reduce their resource consumption by adopting energy-efficient appliances, water-saving fixtures, and renewable energy sources. Strategies for minimizing food waste, promoting recycling, and using sustainable products are also covered.

4.3   GREEN PRACTICES AND ENVIRONMENTAL CONSERVATION

A key module focusing on eco-friendly initiatives such as reducing plastic use, promoting reusable items, and adopting sustainable alternatives for everyday hostel operations. It also covers the creation of green spaces, upcycling, and using natural cleaning products.

4.4   TECHNOLOGY INTEGRATION FOR WASTE REDUCTION

This module highlights the role of technology in improving sustainability, including smart waste management systems, digital tools for tracking resource consumption, and platforms for sharing resources within the hostel community to avoid unnecessary waste.

4.5   COMMUNITY ENGAGEMENT AND EDUCATION

Fostering a culture of sustainability within the hostel community is essential for long-term success. This module includes strategies for conducting workshops, awareness campaigns, and encouraging residents to adopt sustainable practices through education and participation.

4.6   MONITORING AND FEEDBACK SYSTEMS

This module introduces tools for tracking the success of sustainability initiatives, such as waste audits, sustainability reports, and feedback systems. It aims to create an ongoing cycle of improvement by collecting data, evaluating progress, and making necessary adjustments to strategies.

By integrating these modules, the project aims to create a comprehensive sustainability plan for hostels that is easy to implement, cost-effective, and impactful in reducing environmental footprints. The hostel environment becomes a model of sustainability and resource optimization.

CHAPTER 5
CONCLUSION

The integration of waste management and sustainability practices in hostels is essential for addressing the growing environmental challenges associated with communal living. By implementing effective waste segregation systems, adopting green practices, leveraging technology, and fostering community engagement, hostels can significantly reduce their ecological footprint. These efforts not only contribute to environmental conservation but also create healthier and more resource-efficient living spaces. Sustainability in hostels goes beyond merely reducing waste; it is about creating a self-sustaining ecosystem where resources are utilized efficiently, and waste is viewed as a resource for new opportunities. For example, composting organic waste can enrich the soil for greenery, while recycling initiatives can reduce dependency on raw materials. Such practices, when coupled with technology-driven solutions, can make the management of hostel resources more accurate, efficient, and impactful. Moreover, involving the hostel community in these initiatives ensures a shared sense of responsibility and participation. When individuals are educated about the benefits of sustainability and empowered to contribute, the impact multiplies, fostering a culture of environmental stewardship. The hostel thus becomes a living model of eco-conscious living, inspiring residents to carry these practices beyond their immediate environment. The adoption of such practices not only aligns hostels with global sustainability goals but also prepares residents to be environmentally conscious individuals, ready to contribute to a sustainable future. In conclusion, embracing sustainable waste management practices in hostels is not merely an environmental necessity but also a social and ethical responsibility. It is a step toward creating a culture of sustainability that benefits both present and future generations, demonstrating how small, collective efforts can lead to substantial and lasting environmental impact.

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   - *Waste Segregation Simplified*: https://www.youtube.com/watch?v=example2

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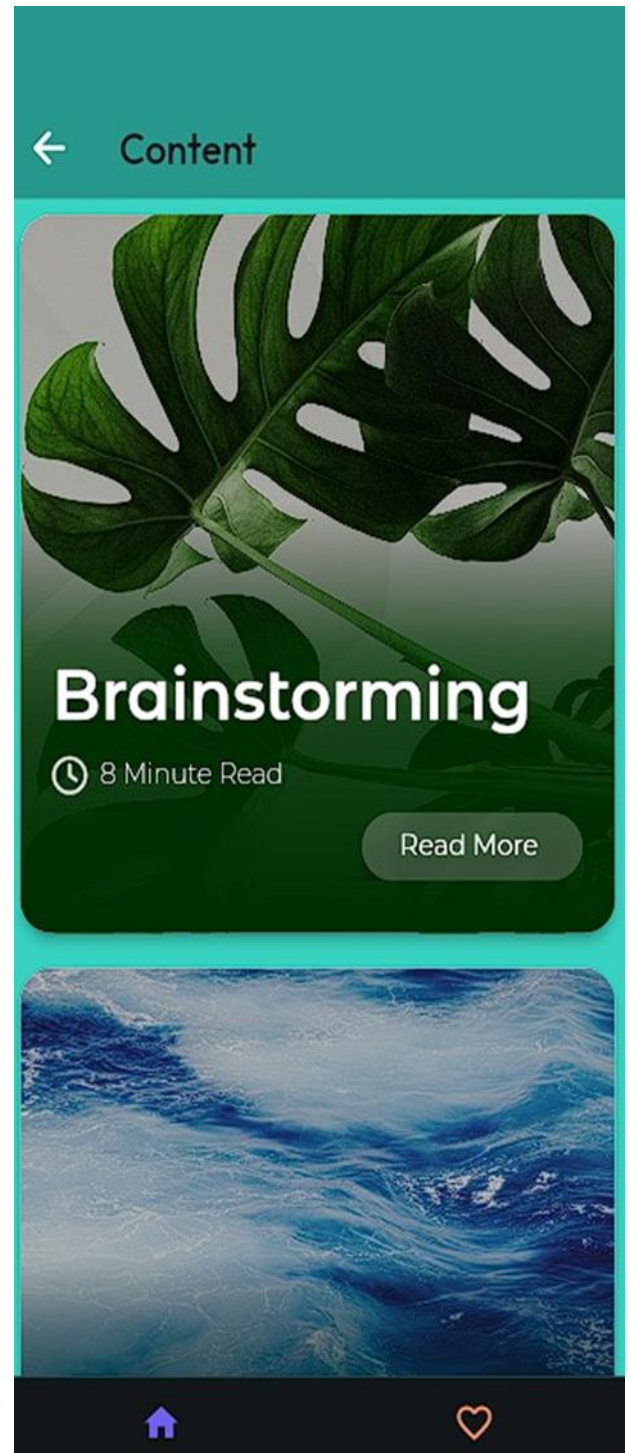
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APPENDIX A – SCREENSHOTS
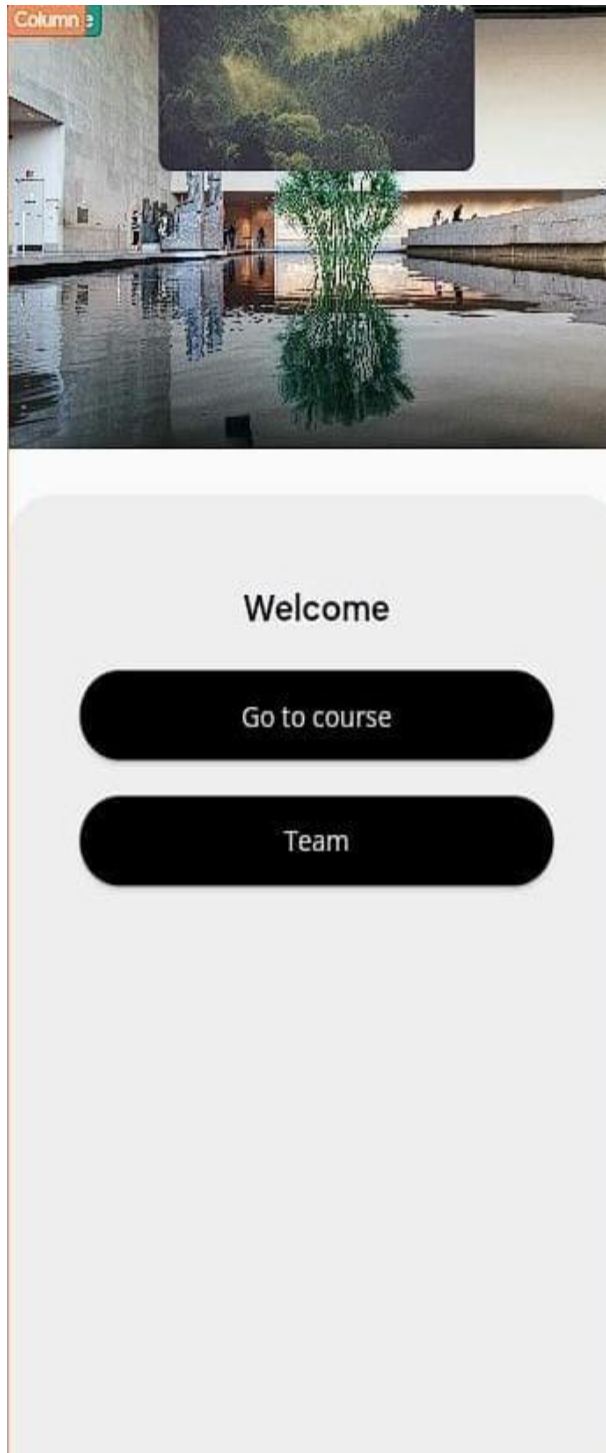
Login Page Screenshot

Figure No. : A1

Content Page Screenshot

Figure No. :A2