Pelan Pengurusan Projek Perisian

Web-based System for Nano Material Repository

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ISI KANDUNGAN

BAB 1

PENGENALAN

1.1 Project Overview

The "Web-Based Nano-Material Repository System" project is a dynamic initiative aimed at creating a digital platform for the efficient management and sharing of critical research data, primarily focusing on nano-materials, including materials like zinc oxide. The project has four key objectives: first, to develop a user-friendly data management interface for stakeholders to input and manage data from journal articles and their own experiments, covering various experiment types; second, to foster collaboration and accessibility among authorized users, enabling the exchange of research findings; third, to uphold data integrity through quality assurance measures and access controls; and fourth, to establish a centralized hub for nano-material research data, encouraging knowledge dissemination and progress within the institution and the wider scientific community. This project overview serves as the foundation for proposal, emphasizing the importance of digital innovation and collaboration in advancing the field of nano-material research [6].

1.2 Problem Statement

The problem at hand is the absence of a centralized and efficient system for managing and sharing crucial research data related to nano-materials, particularly focusing on materials such as zinc oxide. This deficiency hampers the research and development process, hindering data accessibility, collaboration, and quality assurance within our institution and among our stakeholders.

In an ideal situation, envision a sophisticated and user-friendly digital platform that streamlines the management of nano-material research data. Such a system would foster a collaborative research environment, facilitate easy data input, ensure data integrity, and support knowledge dissemination. With this system, researchers would have quick access to data from journal articles and their experiments, thereby accelerating advancements in the field.

Currently, the management of nano-material research data is fragmented, leading to inefficient data handling, limited accessibility, and a lack of standardized quality assurance protocols. Stakeholders often face challenges in inputting, accessing, and sharing research findings, resulting in wasted time and effort. Furthermore, there is a pronounced absence of a central repository that hinders knowledge exchange and collaboration, limiting the potential for breakthroughs in nano-material research.

The consequences of this problem are substantial. Moreover, the lack of a standardized

quality assurance framework raises concerns about the reliability and credibility of the data. By not having a streamlined system, estimate that significant research opportunities are being missed, potentially delaying breakthroughs in the field of nano-materials [2].

1.3 Objective

The first objective is to conduct a thorough analysis of existing research data and data management challenges within the institution. This analysis will involve an in-depth examination of the current state of data storage, access, and collaboration. By identifying the specific pain points and inefficiencies, we can lay the groundwork for the design phase.

To Design an Integrated Web-Based Repository System: Building upon the insights gained from the analysis, the second objective is to design a comprehensive, user-friendly web-based repository system. This system will address the identified challenges by streamlining data input, ensuring data integrity, and promoting collaboration. The design phase will encompass user interface design, database architecture, and access control mechanisms, all tailored to meet the needs of researchers and stakeholders.

To Develop and Implement the Web-Based System: The third objective is the development and implementation of the designed web-based repository system. This involves building the platform, integrating data input and retrieval functionalities, and setting up quality assurance measures. The system will be thoroughly tested and refined to ensure its reliability and effectiveness. Once developed, it will be deployed for use by researchers and staff, transforming the institution's data management and facilitating knowledge dissemination.

1.4 Scope

1.4.1 System Scope

- What exactly is being delivered (or in scope)?

  1. Web-Based Nano-Material Repository System: The central component of this project is the development and deployment of a web-based system designed to manage and share research data related to nano-materials, with a primary focus on materials such as zinc oxide.

  2. Data Input and Management: The system will provide a user-friendly interface for authorized stakeholders, including students and staff, to input, manage, and organize data from journal articles and their own experiments. This includes data related to experiments such as morphology, X-Ray Diffraction (XRD), I-V Characteristic, and UV-Vis Spectra.

  3. Collaboration Features: The system will facilitate collaboration among researchers by enabling them to share and update their research findings. Collaboration features will include version control and commenting mechanisms to promote knowledge exchange.

- What isn't being provided (or out of scope)?

  1. Data Creation and Research Experiments: The project does not involve conducting or managing the actual research experiments. It focuses solely on the management and sharing of data generated from experiments [4].

2. Training and User Education: While the system will be designed for user-friendliness, specific training and user education programs for system users are considered out of scope. These may be addressed as separate initiatives.

1.4.2 System Coverage

- Location or area of the user

  The "Web-Based Nano-Material Repository System" provides location independence, allowing users to access the system from any location with an internet connection. This ensures that researchers and students, regardless of their physical location, can contribute, collaborate, and access valuable research data. Whether they are in the same institution or on the other side of the world, the system facilitates remote research collaboration, fostering a culture of knowledge sharing and global research advancement.

- Language of the system

  The "Web-Based Nano-Material Repository System" is designed to be exclusively in the English language. This means that the user interface and all data descriptions within the system will be available in English only. This choice simplifies system development and usage by eliminating the need for multilingual support, ensuring a consistent and unilingual experience for all users

- Users of the system

  The system caters to students, academic staff, and administrators, each with specific roles and privileges. Students can input and access research data, collaborate, while academic staff share similar functionalities. Administrators have elevated privileges, including user account and data management. This diversity accommodates various stakeholders in the academic and research community, promoting collaboration and efficient data management.

BAB 2

PREVIOUS STUDIES

Comparing "Web-Based Nano-Material Repository System" to the three suggested websites (ResearchGate, Mendeley, and GitHub)

1. Work that proposes a different method to solve the same problem:

   ResearchGate: ResearchGate focuses on sharing research papers and publications. While it involves data sharing and collaboration, it differs in scope as it's primarily for sharing research articles and papers, not specific to nanomaterial experiments [7].

   Mendeley: Mendeley serves as a reference management tool and academic network. It allows researchers to manage research papers and collaborate, but it doesn't focus on the storage and management of experimental data like your project [3].

   GitHub: GitHub is a platform for version control and collaboration on code and software development projects. It's not tailored for scientific experiments, making it distinct from your project's focus.

2. Work that uses the same proposed method to solve a different problem [5].

   ResearchGate: ResearchGate uses a somewhat similar method of data sharing and collaboration, but it addresses the dissemination of research articles rather than experimental data related to nanomaterials.

   Mendeley: Mendeley's method of managing and collaborating on academic literature and research publications can be related in terms of user collaboration but doesn't address the same problem domain as your project.

   GitHub: While it employs a similar method of collaboration and version control, GitHub is mainly focused on software development and code management, differing from your project's specific research data management.

3. A method that is similar to your method that solves a relatively similar problem.

   ResearchGate: ResearchGate's approach to data sharing and collaboration within the academic and research community shares similarities with your project's goals. It focuses on research data, but not necessarily nanomaterial-specific data.

   Mendeley: Mendeley's method for managing research literature and facilitating academic collaboration has similarities, but the focus is on publications rather than nanomaterial experiments.

GitHub: GitHub's method of version control and collaborative tools can be related in terms of managing and sharing data, but it's specific to code and software development.

4. A discussion of a set of related problems that covers your problem domain.

   ResearchGate: While it addresses challenges in research data sharing and collaboration, it may not delve into the specific domain of nanomaterial research, including the unique challenges associated with nanomaterial experiments.

   Mendeley: Mendeley addresses challenges in reference management and academic collaboration, which may have some overlap in terms of data management but doesn't explore the intricacies of nanomaterial research.

   GitHub: GitHub doesn't directly align with the problem domain of nanomaterial research and may not discuss challenges related to this specific field.

2.1 System I

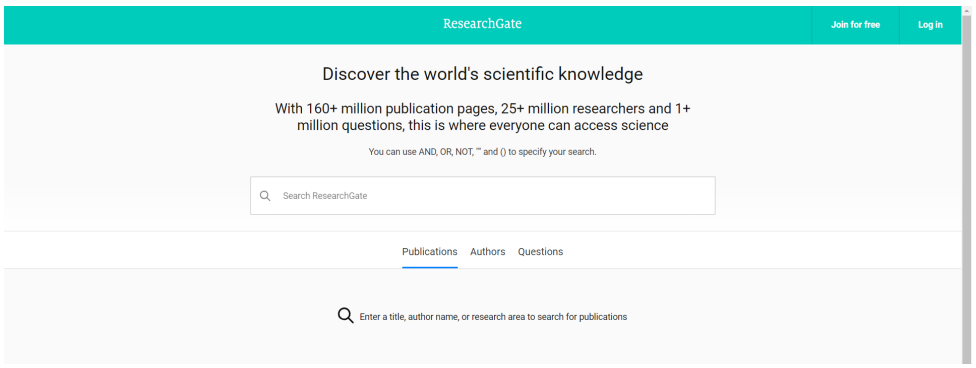
This section discusses how ResearchGate compares to your "Web-Based Nano-Material Repository System." It highlights that while ResearchGate shares similarities, it primarily focuses on sharing research articles and papers, not nanomaterial experiments. Your project's specialization in nanomaterial research sets it apart.

2.2 System II

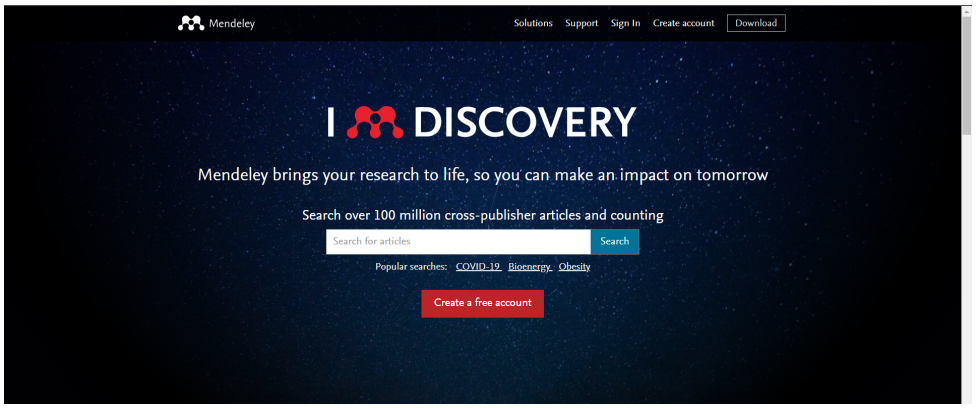
In this section, you emphasize your project's uniqueness and how it differs from Mendeley. Mendeley serves as a reference management tool and academic network, primarily for publications, while your system caters to the specific data management needs of nanomaterial researchers.

2.3 System III

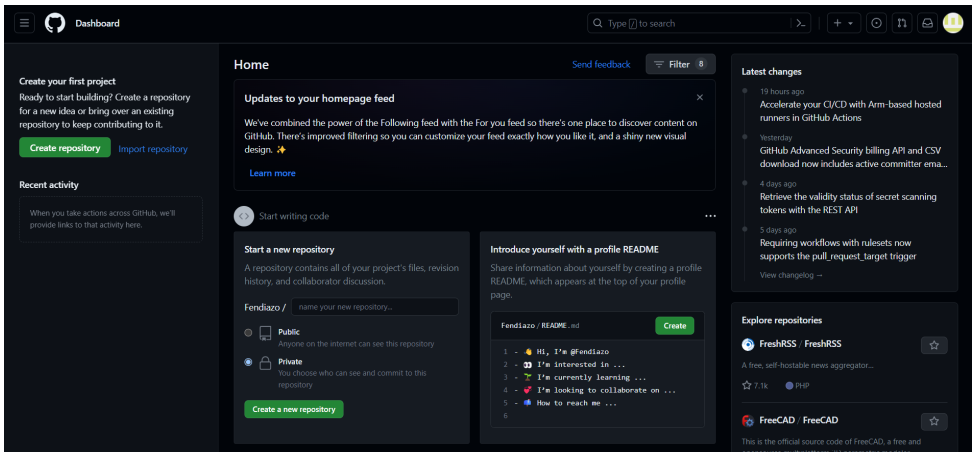
This section discusses how GitHub aligns with or differs from your "Web-Based Nano-Material Repository System." GitHub primarily serves version control and collaboration for code and software, whereas your project focuses on research data, specifically nanomaterial experiments.



Rajah 2.1: Researchgate Homepage



Rajah 2.2: Mendeley Homepage



Rajah 2.3: GitHub Homepage

2.4 Conclusion

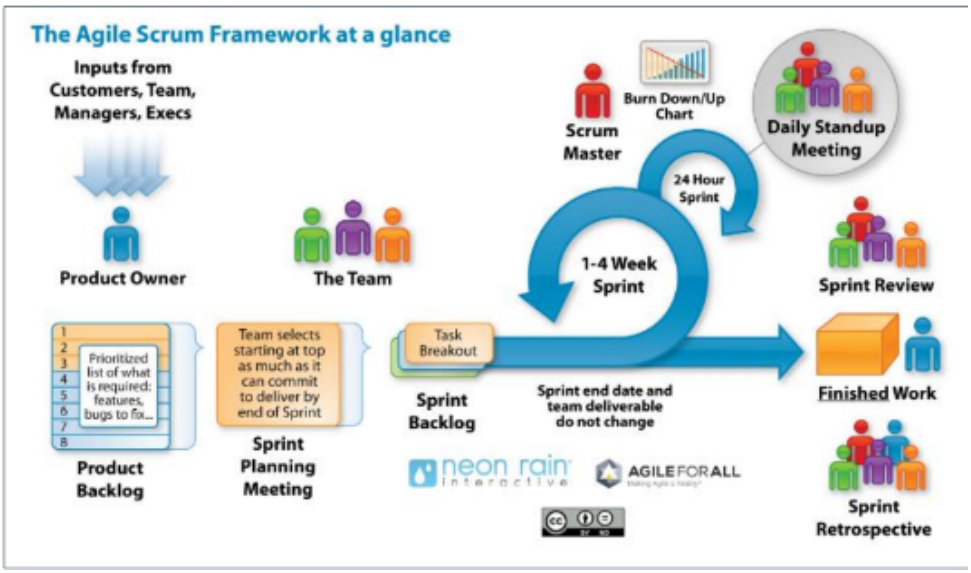
In summary, ResearchGate primarily focuses on research articles, Mendeley serves as a reference management tool, and GitHub specializes in code version control. In contrast, our "Web-Based Nano-Material Repository System" caters to the unique data management and collaboration needs of nanomaterial researchers, addressing the specific challenges within this domain.

BAB 3

METHODOLOGI

3.1 Software Model

The Agile SDLC is the recommended model for "Web-Based Nano-Material Repository System." It offers flexibility, iterative development, stakeholder collaboration, and adaptability to evolving research needs, providing a structured yet agile framework for the project [1].



Rajah 3.1: Agile Method

3.2 Hardware and Software Specifications

Listed below are minimum system requirements required to install and run Web-Based System for Nano Material Repository .

Jadual 3.1: Software Specifications

Item	Specification
Operating System	Windows 10
Tools	Netbean IDE 8.0
	JDK 18
	Xampp 8.2.4
	Tomcat 7.0
Bowser	Google
	Microsoft Edge
	Mozilla Firefox

Jadual 3.2: Hardware Specifications

Item	Spesification
Computer and processor	Intel Pentium 4 or later, 4 GHz minimum, multi-core processor
Memory	4GB
Hard disk	128GB
Display PC	1280x1024
Graphics	Similar to intel HD Graphics 4000 or better

BAB 4

PELAN PENGURUSAN PROJEK

4.1 Tanda Aras Projek

A project milestone is a management tool that is used to delineate a point in a project schedule. These points can note the start and finish of a project, and mark the completion of a major phase of work. Complete this template in Table 4.1 for your FYP project milestone.

Jadual 4.1: Milestone for ...

Milestone No.	Description	Start Date	End Date
1	Project Title Approval	9 October 2023	27 October 2022
2	Submission of SPMP	22 October 2023	18 January 2024
3	Submission of SRS	5 November 2023	18 January 2024
4	Submission of SDD	19 November 2023	18 January 2024
5	Project Prototype	4 January 2024	30 May 2024
6	Submission of Thesis	21 January 2024	25 January 2023

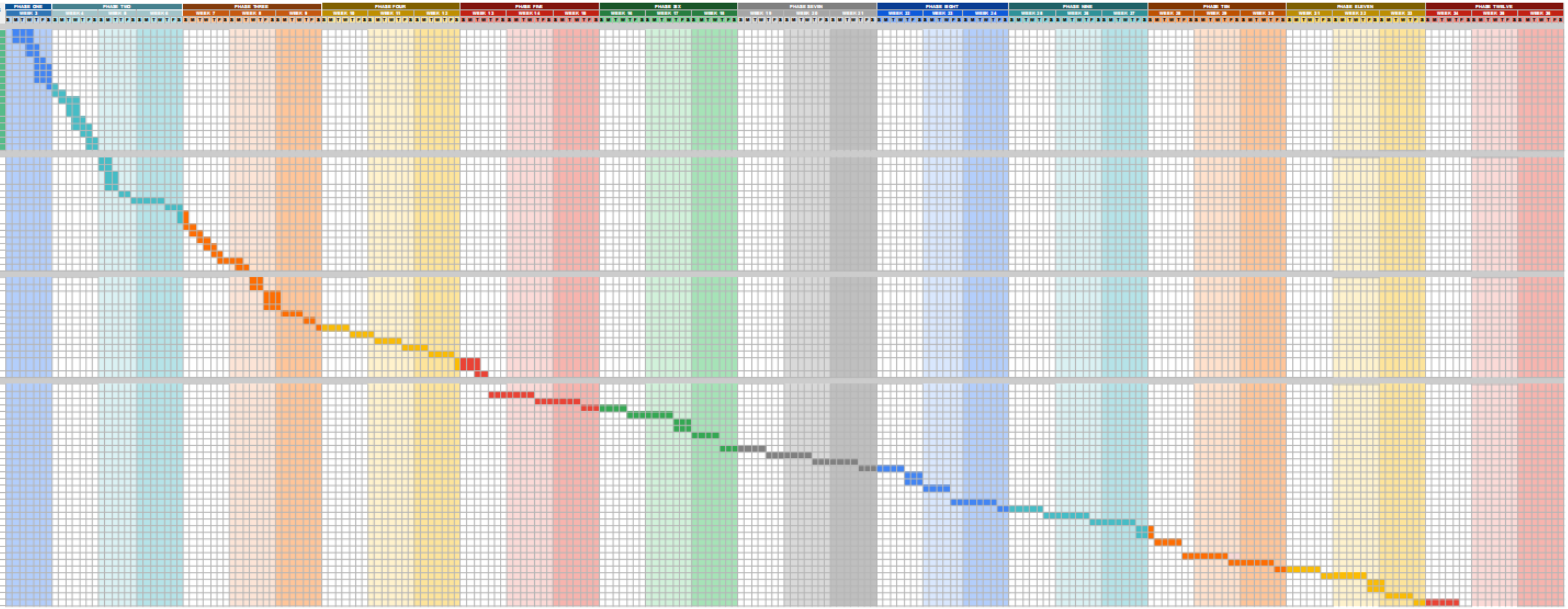
4.2 Carta Gantt Projek

GANTT CHART

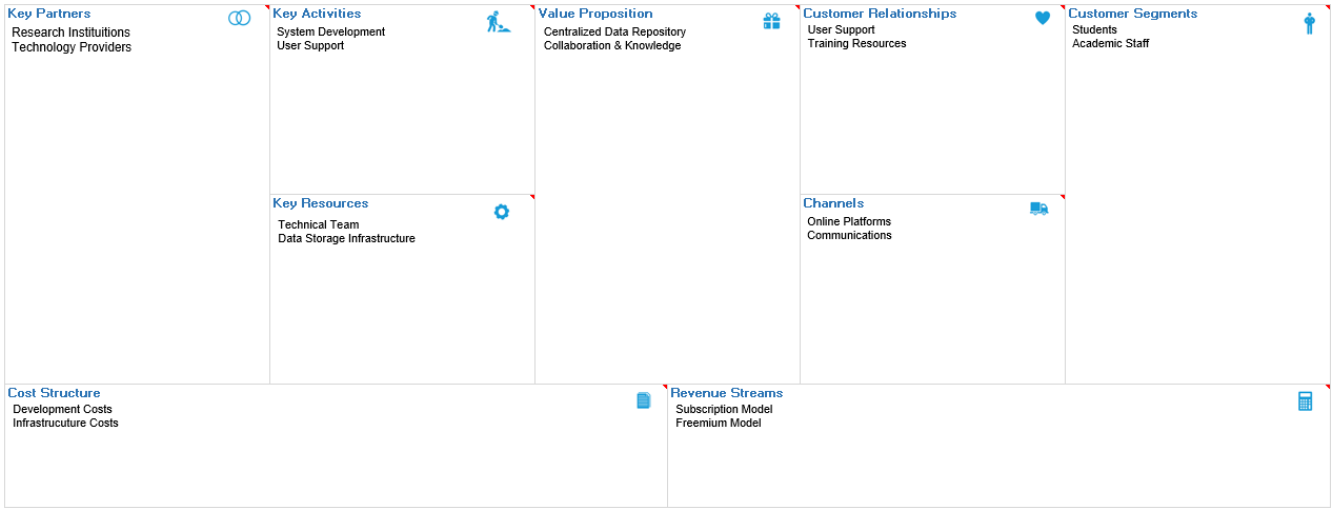
PROJECT TITLE: WEB-BASED SYSTEM FOR NANO MATERIAL REPOSITORY
NAME: MUHAMMAD EFFENDI BIN MD NOR KAMAL
MATRIC NUMBER: S61970

SUPERVISOR: TS. MOHAMMAD AZAT BIN BASIR
CO-SUPERVISOR: TS. DR. ENGKU ABDUL GHAPUR BIN CHE ENGKU ALI

WBS NUMBER	TASK TITLE	START DATE	DUE DATE	DURATION	PCT OF TASK COMPLETE
	Planning				
1.1	Project Overview	23/10/23	25/10/23	2	100%
1.2	Problem Statement	23/10/23	25/10/23	2	100%
1.3	Problem Solution	25/10/23	26/10/23	1	100%
1.4	Objectives	25/10/23	26/10/23	2	100%
1.5	Scopes	26/10/23	27/10/23	1	100%
1.6	System I	26/10/23	28/10/23	2	100%
1.7	System II	26/10/23	28/10/23	2	100%
1.8	System III	26/10/23	28/10/23	2	100%
1.9	Comparison Table	28/10/23	29/10/23	1	100%
2	Summary	29/10/23	30/10/23	1	100%
2.1	Software Model	30/10/23	01/11/23	1	100%
2.2	Software & Hardware Specification	31/10/23	01/11/23	1	100%
2.3	Project Milestone	01/11/23	02/11/23	1	100%
2.4	Project Gantt Chart	01/11/23	03/11/23	2	100%
2.5	Business Model	02/11/23	03/11/23	1	100%
2.6	Expected Outcome	03/11/23	04/11/23	1	100%
2.7	Conclusion	03/11/23	04/11/23	1	100%
	Requirements				
1.1	Purpose	05/11/23	06/11/23	1	0%
1.2	Scope	05/11/23	06/11/23	1	0%
1.3	Definition, Acronyms and Abbreviations	06/11/23	07/11/23	1	0%
1.4	Overview	06/11/23	07/11/23	1	0%
1.5	Requirement Sources	08/11/23	10/11/23	2	0%
1.6	Requirement Technique	11/11/23	15/11/23	4	0%
1.7	Functional Requiremenet	16/11/23	18/11/23	2	0%
1.8	Non-functional Requirement	18/11/23	19/11/23	1	0%
1.9	Use Case Diagram	19/11/23	20/11/23	1	0%
2	Use Case Description	20/11/23	21/11/23	1	0%
2.1	Activity Diagrams	21/11/23	22/11/23	1	0%
2.2	Class Diagrams	22/11/23	23/11/23	1	0%
2.3	Sequence Diagrams	23/11/23	24/11/23	1	0%
2.4	CRUD Matrix	24/11/23	27/11/23	3	0%
2.5	Summary	27/11/23	28/11/23	1	0%
	Analysis & Design				
1.1	Purpose	29/11/23	30/11/23	1	0%
1.2	Scopes	29/11/23	30/11/23	1	0%
1.3	Definition, Acronyms and Abbreviations	01/12/23	03/12/23	2	0%
1.4	Overview	01/12/23	03/12/23	2	0%
1.5	Architectural Design	04/12/23	06/12/23	2	0%
1.6	Design Rationale	07/12/23	08/12/23	1	0%
1.7	Normalization	09/12/23	13/12/23	4	0%
1.8	Entity Relational Diagram	14/12/23	17/12/23	3	0%
1.9	Data Dictionary	18/12/23	21/12/23	3	0%
2	Overview of User Interface	22/12/23	25/12/23	3	0%
2.1	Screen Images	26/12/23	29/12/23	3	0%
2.2	Screen Objects and Actions	30/12/23	02/01/24	2	0%
2.3	Conclusion	02/01/24	03/01/24	1	0%
	Implementation & Maintenance				
1	Phase 1:				
1.1	Module 1	04/01/24	10/01/24	6	0%
1.2	Module 2	11/01/24	17/01/24	6	0%
1.3	Module 3	18/01/24	24/01/24	6	0%
1.4	Module 4	25/01/24	31/01/24	6	0%
1.5	Unit Testing 1	01/02/24	03/02/24	2	0%
1.6	Component Testing 1	01/02/24	03/02/24	2	0%
1.7	Intergration Testing 1	04/02/24	07/02/24	3	0%
2	Phase 2:				
2.1	Module 1	08/02/24	14/02/24	6	0%
2.2	Module 2	15/02/24	21/02/24	6	0%
2.3	Module 3	22/02/24	28/02/24	6	0%
2.4	Module 4	29/02/24	06/03/24	6	0%
2.5	Unit Testing 2	07/03/24	09/03/24	2	0%
2.6	Component Testing 2	07/03/24	09/03/24	2	0%
2.7	Intergration Testing 2	10/03/24	13/03/24	3	0%
3	Phase 3:				
3.1	Module 1	14/03/24	20/03/24	6	0%
3.2	Module 2	21/03/24	27/03/24	6	0%
3.3	Module 3	28/03/24	04/04/24	6	0%
3.4	Module 4	05/04/24	11/04/24	6	0%
3.5	Unit Testing 3	12/04/24	14/04/24	2	0%
3.6	Component Testing 3	12/04/24	14/04/24	2	0%
3.7	Intergration Testing 3	15/04/24	18/04/24	3	0%
4	Phase 4:				
4.1	Module 1	19/04/24	25/04/24	6	0%
4.2	Module 2	26/04/24	02/05/24	6	0%
4.3	Module 3	03/05/24	09/05/24	6	0%
4.4	Module 4	10/05/24	16/05/24	6	0%
4.5	Unit Testing 4	17/05/24	19/05/24	2	0%
4.6	Component Testing 4	17/05/24	19/05/24	2	0%
4.7	Intergration Testing 4	20/05/24	23/05/24	3	0%
5	Acceptance Testing	24/05/24	30/05/24	6	0%



4.3 Model Perniagaan



BAB 5

CONCLUSION

5.1 Expected Result

The foremost objective of the "Web-Based Nano-Material Repository System" is to revolutionize the way data pertaining to nanomaterial experiments is managed. It aspires to provide researchers with a user-friendly platform for storing, organizing, and retrieving data, simplifying the often intricate process of data management in nanomaterial research.

This project's vision extends beyond merely creating a digital platform. It seeks to establish a thriving ecosystem where students, academic staff, and administrators can readily collaborate and share their research findings. By doing so, the project anticipates nurturing a culture of knowledge exchange that enhances the collective understanding of nanomaterial research.

The ultimate goal is to contribute significantly to the advancement of nanomaterial research. The "Web-Based Nano-Material Repository System" is envisaged as a catalyst for discoveries and progress in this field. Its expected result is that it will serve as an invaluable resource, enabling researchers to access and disseminate vital data, thereby propelling the field forward.

5.2 Conclusion

The "Web-Based Nano-Material Repository System" represents a pioneering initiative in the realm of nanomaterial research. With a steadfast focus on elevating data management, enabling collaboration, and advancing the field, this project has the potential to reshape how researchers approach and benefit from nanomaterial experiments. By providing a user-friendly platform for efficient data management and promoting a culture of knowledge exchange, the project is poised to be a catalyst for research advancements in nanomaterials. The anticipated outcomes, including streamlined data access and preservation of data integrity, underscore the commitment to delivering a credible repository that serves as an invaluable resource for researchers.

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[1] Bose, B., Khan, N. T., Ashreen, S., Shuvo, F. A., Mazid-Ul-Haque, M., and Bhowmik, A. Hybrid scrum-xp: A proposed model based on effectiveness of agile model on varieties of software companies in bangladesh. *AIUB Journal of Science and Engineering (AJSE) 22*, 1 (2023), 35–44.

[2] Ismail, B., Abaab, M., and Rezig, B. Structural and electrical properties of zno films prepared by screen printing technique. *Thin solid films 383*, 1-2 (2001), 92–94.

[3] Kalansooriya, J. The evolution and implications of the elsevier logo: An examination of logo modifications and their impact on scholarly perception and transparency. *homepage: https://saspublishers. com/ 9*, 8 (2023), 145–154.

[4] Kamaruddin, S. A., Chan, K.-Y., Yow, H.-K., Zainizan Sahdan, M., Saim, H., and Knipp, D. Zinc oxide films prepared by sol–gel spin coating technique. *Applied Physics A 104* (2011), 263–268.

[5] KC, K. Developing and implementing web components.

[6] Mishra, P., Shukla, P., and Srivastava, O. Study of modular pec solar cells for photoelectrochemical splitting of water employing nanostructured tio2 photoelectrodes. *International Journal of Hydrogen Energy 32*, 12 (2007), 1680–1685.

[7] O'Brien, K. Researchgate. *Journal of the Medical Library Association: JMLA 107*, 2 (2019), 284.