



Ghulam Ishaq Khan Institute (GIKI)

Blockchain Project Requirements

Subject: Blockchain	Course Code: CS - 411 – Fall - 2024
Class: BS CY Batch: Fall – 2022	Submission Deadline:
Course Instructor: Muhammad Ahmad Nawaz	Total Marks:
Course TA: NA	

Note (Read notes & instructions first)

- First, read the instructions and statements of each exercise/question carefully then write the solution.
- For Assignment:
 - Just Upload report by 1 Team member.
 - The **name of your pdf file** should contain your assignment number and your roll number as shown in following example, For Example if your roll number is 2022532 and you have done assignment number 1 then the name of file should be as ---> 2022532_1.pdf
 - Then upload that pdf file at Microsoft teams. Remember the sequence of pages should be right.
 - **Drop off** the physical copy at my office before **Tuesday, November 26, 2024**.

CHEATING/COPY CASE or **LATE SUBMISSION** will be graded as **STRAIGHT ZERO MARKS**.

Semester Project Requirements: Blockchain Technology

This document outlines the requirements for your semester project focused on blockchain technology. The project aims to help students gain a deeper understanding of blockchain concepts and their applications through a practical, real-world implementation. You are expected to address a specific problem, develop a blockchain-based solution, and evaluate its effectiveness.

Objectives

- Apply theoretical knowledge of blockchain technology to design and develop a functional solution.
- Demonstrate proficiency in blockchain fundamentals, such as decentralized ledgers, consensus mechanisms, smart contracts, and cryptographic security.
- Explore the potential and limitations of blockchain in real-world applications.

Project Workflow and Deliverables

The project will be divided into **five main phases**, each with specific deliverables and evaluation criteria.

Phase 1: Project Proposal

- **Description:**
Propose a blockchain-based solution to address a well-defined problem.
- **Deliverable:**
A proposal document and presentation (5-6 pages/slides) including:
 - a) Title and team members' details.
 - b) A concise problem statement and project objectives.
 - c) Overview of the proposed solution and its relevance to blockchain.
 - d) High-level technical approach and tools/platforms to be used.
 - e) Timeline with major milestones.

- **Evaluation Criteria:**
 - a) Relevance of the problem and solution to blockchain technology.
 - b) Feasibility of the proposed solution within the semester.
 - c) Clarity and organization of the proposal.
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Phase 2: Research and System Design

- **Description:**
Conduct a detailed study of the problem domain and design the blockchain architecture for the solution.
 - **Deliverable:**
A design document detailing:
 - a) Research insights about the problem domain and existing solutions.
 - b) Blockchain architecture: public/private blockchain, platform choice, and rationale.
 - c) Consensus mechanism (e.g., Proof of Work, Proof of Stake, etc.) and justification.
 - d) Data structures to be used (e.g., blocks, Merkle trees).
 - e) Smart contract design: purpose, functionality, and security considerations.
 - **Evaluation Criteria:**
 - a) Depth and thoroughness of research.
 - b) Innovation and creativity in the proposed design.
 - c) Technical feasibility and alignment with blockchain principles.
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Phase 3: Implementation

- **Description:**
Develop a working prototype of the proposed system, including coding smart contracts, integrating components, and deploying the solution on a blockchain platform.
 - **Deliverable:**
 - a) A functional prototype of the solution.
 - b) Annotated source code hosted on a platform like GitHub.
 - c) Deployment and setup instructions.
 - **Tools and Technologies:** Use blockchain platforms such as Ethereum, Hyperledger, Binance Smart Chain, or develop a custom blockchain using languages like Python, Solidity, or Rust.
 - **Evaluation Criteria:**
 - a) Functionality and reliability of the prototype.
 - b) Quality, readability, and documentation of the code.
 - c) Innovation in implementation.
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Phase 4: Testing and Documentation

- **Description:**
Test the solution for functionality, security, and performance, and document the findings comprehensively. Prepare end-user documentation.
- **Deliverable:**
 - a) Detailed test results, including test cases, methodologies, and logs.
 - b) User manual: clear and concise instructions for using the system.
 - c) Final technical report: summarize the design, implementation, and evaluation of the project.
- **Evaluation Criteria:**
 - a) Completeness and clarity of the documentation.
 - b) Depth of testing and results analysis.
 - c) Identification and resolution of bugs or performance issues.

Phase 5: Final Presentation and Demonstration

- **Description:**
Present the project to peers and faculty, showcasing the solution and demonstrating its functionality.
- **Deliverable:**
 - a) A 10-15 minute presentation with slides.
 - b) A live demo of the working prototype.
 - c) Discussion of challenges faced, lessons learned, and future work.
- **Evaluation Criteria:**
 - a) Clarity, structure, and effectiveness of the presentation.
 - b) Functionality and usability of the demoed solution.
 - c) Reflection on challenges and insights gained.

General Guidelines

- **Team Size:** Work individually or in teams of up to 2 members.
- **Scope:** Ensure the project is feasible within the semester timeframe while being technically challenging.
- **Originality:** Projects must be original and demonstrate your work. Any form of plagiarism will result in a failing grade.
- **Technology Stack:** Use well-established blockchain platforms or create custom solutions to meet the project requirements.

Grading Rubric

Aspect	Weightage	Assessments	Deadlines
Proposal	10%	Assignment 2	26 November, 2024
Research and System Design	20%	Assignment 3	30 November, 2024
Implementation	30%	Quiz 3	16 December, 2024
Testing and Documentation	20%	Quiz 4	18 December, 2024
Final Presentation and Demo	20%	Assignment 4	21 December, 2024

Suggested Project Ideas

- **Blockchain Voting System:** Secure, decentralized voting mechanism.
- **Supply Chain Management:** Track and verify goods using smart contracts.
- **Decentralized Identity Verification:** Blockchain-based digital identity solution.
- **Asset Tokenization Platform:** Tokenize and manage physical or digital assets.
- **Cryptocurrency Wallet:** A wallet with additional features such as analytics or staking.
- **Decentralized File Storage:** Secure file sharing with blockchain (e.g., IPFS integration).
- **Healthcare Data Exchange:** Blockchain-enabled secure and interoperable healthcare data sharing.

Remember: The primary goal of this project is to explore blockchain's potential while enhancing your technical and problem-solving skills. Regular check-ins with the instructor are encouraged to ensure alignment and progress.

Let me know if additional details are needed!