

Maulana Abul Kalam Azad University of Technology, WB
(Formerly known as West Bengal University of Technology)
Syllabus of B.Sc. in Computer Science
Effective from academic session 2023-24

Semester-VIII

Paper Name: Cloud Computing/ Cloud Computing Lab

Code: CS 801/ CS 891

Contacts: 3L + 2P

Course Objectives:

1. To gain knowledge of Cloud Computing and its Basics.
2. To gain knowledge on use of Platforms in Cloud Computing
3. To gain knowledge of cloud Infrastructure.
4. To understand the concepts of Services and Applications.

Unit 1: Definition of Cloud Computing: [5L]

Defining a Cloud and characteristics of cloud computing, Cloud Types – NIST model, Cloud Cube model, Deployment models (Public, Private, Hybrid and Community Clouds), Service models – Infrastructure as a Service, Platform as a Service, Software as a Service with examples of services/ service providers

Unit 2: Services and Applications by Type: [8L]

IaaS – Basic concept, Workload, partitioning of virtual private server instances, Pods, aggregations, silos PaaS – Basic concept, tools and development environment with examples SaaS - Basic concept and characteristics, Open SaaS and SOA, examples of SaaS platform Identity as a Service (IDaaS) Compliance as a Service (CaaS)

Unit 3: Concepts of Abstraction and Virtualization technologies: [6L]

Introduction of virtualization, Virtualization reference model, Types of virtualization (storage, network, desktop, application server), VM ware: full virtualization reference model, definition and life cycle of VM

Unit 4: Cloud storage, monitoring and management: [8L]

Cloud storage system architecture, Cloud file system (google file system, components, features, advantage and dis-advantage), Use of Google Web Services Discussion of Google Applications Portfolio – Indexed search, Dark Web, Aggregation and disintermediation, Productivity applications and service, Adwords, Google Analytics, Google Translate, a brief discussion on Google Toolkit (including introduction of Google APIs in brief), major features of Google App Engine service.

Unit 5: Cloud Infrastructure and Security: [6L]

Lifecycle management of cloud services (six stages of lifecycle), Concept of Cloud Security: Cloud security concerns, Security boundary, Security service boundary Overview of security mapping Security of data: Brokered cloud storage access, Storage location and tenancy, encryption, and auditing and compliance Identity management (awareness of Identity protocol standards)

Unit 6: Concepts of Services and Applications: [5L]

Service Oriented Architecture: Basic concepts of message-based transactions, Protocol stack for an SOA architecture, Event-driven SOA, Enterprise Service Bus, Service catalogs, Applications in the Cloud: Concepts of cloud transactions, functionality mapping, Application attributes, and Cloud

Maulana Abul Kalam Azad University of Technology, WB
(Formerly known as West Bengal University of Technology)
Syllabus of B.Sc. in Computer Science
Effective from academic session 2023-24

service attributes

Laboratory

Practical: Based on Theory

Books/ References

- 1) Cloud Computing Bible by Barrie Sosinsky, Wiley India Pvt. Ltd, 2013
- 2) Mastering Cloud Computing by Rajkumar Buyya, Christian Vecchiola, S. Thamarai Selvi, McGraw Hill Education(India) Private Limited, 2013
- 3) Cloud computing: A practical approach, Anthony T. Velte, Tata Mcgraw-Hill
- 4) Cloud Computing, Miller, Pearson
- 5) Building applications in cloud: Concept, Patterns and Projects, Moyer, Pearson
- 6) Cloud Computing – Second Edition by Dr. Kumar Saurabh, Wiley India

Paper Name: Web Technology/ Web Technology Lab

Code: CS 802/ CS 892

Contacts: 3L + 2P

Course Objectives:

1. To comprehend the basic idea behind web architecture and the internet
2. To become proficient in the design and development of client side apps utilizing HTML,CSS and JavaScript
3. To understand and grow using XML Technologies

Unit 1: Introduction : [5L]

Concept of WWW, Internet and WWW, HTTP Protocol : Request and Response, Web browser and Web servers

Unit 2: Web Design: [7L]

Concepts of effective web design, Web design issues including Browser, Display resolution, Look and Feel of the Website, Page Layout and linking, User centric design, Sitemap, Planning and publishing website, Designing effective navigation

Unit3: HTML : [6L]

Basics of HTML, formatting and fonts, commenting code, color, hyperlink, lists, tables, images, forms, XHTML, Meta tags, Character entities, frames and frame sets, Browser architecture and Web site structure. Overview and features of HTML5

Maulana Abul Kalam Azad University of Technology, WB
(Formerly known as West Bengal University of Technology)
Syllabus of B.Sc. in Computer Science
Effective from academic session 2023-24

Unit 4: Style sheets : [7L]

Need for CSS, introduction to CSS, basic syntax and structure, using CSS, background images, colors and properties, manipulating texts, using fonts, borders and boxes, margins, padding lists, positioning using CSS, CSS2, Overview and features of CSS3

Unit 5: JavaScript : [8L]

Client side scripting with JavaScript, variables, functions, conditions, loops and repetition, Pop up boxes, Advance JavaScript: Javascript and objects, JavaScript own objects, the DOM and web browser environments, Manipulation using DOM, forms and validations, DHTML : Combining HTML, CSS and Javascript, Events and buttons

Unit 6: XML : [4L]

Introduction to XML, uses of XML, simple XML, XML key components

Web Technology Laboratory

Practical: Based on Theory

Ex: Webpage is implemented by HTML, CSS, Bootstrap and JavaScript

Books/ References

1. Developing Web Applications, Ralph Moseley and M. T. Savaliya, Wiley-India
2. Web Technologies, Black Book, dreamtech Press
3. HTML 5, Black Book, dreamtech Press
4. Web Design, Joel Sklar, Cengage Learning
5. Internet and World Wide Web How to program, P.J. Deitel & H.M. Deitel, Pearson

Paper Name: Block Chain Technology

Code: CS 803

Contacts: 3L+1T

Course Objectives:

1. Comprehend the basics of blockchain technology.
2. Understand the logic of application types
3. Explore the architecture of smart contract
4. Analyze the contemporary blockchain decentralized application

Maulana Abul Kalam Azad University of Technology, WB
(Formerly known as West Bengal University of Technology)
Syllabus of B.Sc. in Computer Science
Effective from academic session 2023-24

Unit 1: Introduction: [5L]

Blockchain Technology: Growth of blockchain technology, Distributed systems, History of blockchain, Types of blockchain.

Decentralization: Methods of decentralization, Routes of decentralization, Blockchain and full ecosystem decentralization, Smart contracts, Decentralized organizations and platforms for decentralization.

Unit 2: Blockchain Application: [7L]

Components: Node, transaction, block, chain, distributed ledger, consensus mechanism, cryptography, smart contracts, Design methodology: Analyze the industry and identify a problem, define concept and strategy, choose a platform, design solution architecture, develop smart contracts and backend, testing and deployment, Templates: Supply Chain Management, Financial Services/Payments, Healthcare.

Unit 3: Blockchain Architecture: [6L]

Versions, Variants, Use cases, Life use cases of blockchain, Blockchain vs shared Database.

Unit 4: Ethereum Blockchain: [6L]

Developments tools, Ethereum clients, Ethereum languages, Ethereum network, Ethereum ecosystem: key, address, transaction, message, Ethereum virtual machine.

Unit 5: Decentralization: [5L]

Methods of decentralization, Routes of decentralization, Blockchain and full ecosystem decentralization, Smart contracts, Decentralized organizations and platforms for decentralization.

Unit 6: Crypto-currencies: [4L]

Introduction to cryptocurrencies, Types, Applications, limitation.

Unit 7: Blockchain mining: [4L]

Consensus, mining, block validation, setting up a mining node.

Books/ References

1. Blockchain Applications: Arshdeep Bahga, Vijay Madisetti.
2. Mastering Blockchain: Imran bashir, Distributed ledger technology, decentralization, and smart contracts explained

Paper Name: Management Information System

Code: CS 804

Maulana Abul Kalam Azad University of Technology, WB
(Formerly known as West Bengal University of Technology)
Syllabus of B.Sc. in Computer Science
Effective from academic session 2023-24

Contacts: 3L+1T

Course Objectives:

1. Information system new approaches to improve the efficiency of business model.
2. To learn the role, advantages and components and Information System.
3. To understand the skills to analyses design and implement effective and information system to support the organization process.

Unit 1: [4L]

Introduction: evolution and goals of MIS system, MIS function in an organization, Limitation of MIS, Data, Information and Knowledge.

Unit 2: [6L]

Information Technology - Concept, Features and Components, Information Systems - Concept and types of Information Systems, Architecture and design of information system: centralize and decentralize Information Systems, factors of success and failure, value and risk of Information Systems.

Unit 3: [6L]

Enterprise resource planning- Definition, features, scope, advantages and disadvantages of ERP, challenges in implementation.

Customer Relationship Management- why CRM, Scope, advantage and disadvantages of CRM.

Unit 4: [5L]

Decision support system- Definition, Architecture, Characteristics, components, types, classification, Executive support system.

Unit 5: [5L]

System Development Life Cycle: Sequential Process of software development; Waterfall model.

Unit 6: [6L]

Development and Management of Data Bases: Relation databases, DDL, DCL, DML, Data Base

Management Systems (DBMS) and their components, Concept of entity and relationships, ER Diagram,

Data Model, Data dictionary.

Unit 7: [4L]

Maulana Abul Kalam Azad University of Technology, WB
(Formerly known as West Bengal University of Technology)
Syllabus of B.Sc. in Computer Science
Effective from academic session 2023-24

Data Communication and Networking: Uses of computer networks, types of networks, network Topologies, Network Devices, Intranets, Internet and Extranet.

Paper Name: Major Project

Code: SEC 881

Contacts: 4P

Course Objectives:

1. Problem solving: To apply theoretical knowledge gain in courses to solved a practical, real world problem.
2. Design and validation: To design, develop and validate the result of a new concept process or system.
3. Innovation and creativity: To foster creative thinking and encourage innovative solution to engineering or technical challenges.
4. Project management: To plan and execute a project by managing resources, timelines and budget effectively.
5. Team work: To function effectively as an individual and as a leader with a diverse team environment.
6. Communication: To organize and communication project finding effectively through written technical report and oral presentation.

Maulana Abul Kalam Azad University of Technology, WB
(Formerly known as West Bengal University of Technology)
Syllabus of B.Sc. in Computer Science
Effective from academic session 2023-24

SAMPLE FORMAT OF PROJECT REPORT

How to write a Project Report:

GENERAL INSTRUCTIONS

The project report can be prepared according to the following guidelines:

- **Finalization of the Project Report** - Student should obtain clearance from their respective guide before final printing of the final project report.
- **Paper Size:** A4 (210x297)
- **Font Type:** New Times Roman

Maulana Abul Kalam Azad University of Technology, WB
(Formerly known as West Bengal University of Technology)
Syllabus of B.Sc. in Computer Science
Effective from academic session 2023-24

- **Front Size:** 12
- **Line Spacing:** 1.5 lines throughout the text.
- **Margin:** Left 1.5^{//}, right 1^{//}, top 1^{//}, and bottom 1^{//}.
- **Numbering:** Page number can be put at the bottom of the page. Tables and other Illustrations must be referring in the text with suitable number.
- **Binding of the report** - The project should be hard bound with suitable embossing.

COVER PAGE

A Project
on

“.....Title of the Project.....”

Submitted by
Name of Student

Maulana Abul Kalam Azad University of Technology, WB
(Formerly known as West Bengal University of Technology)
Syllabus of B.Sc. in Computer Science
Effective from academic session 2023-24

Roll no.

Under the Supervision of “Name of the Guide, Designation, and Department”

Submitted to

(.....College name.....), West Bengal in partial fulfillment of the
requirement for the award of

“BSc in Computer Science.....”

Batch 20xx-20xx.

Maulana Abul Kalam Azad University of Technology, WB
(Formerly known as West Bengal University of Technology)
Syllabus of B.Sc. in Computer Science
Effective from academic session 2023-24

(1ST PAGE OF THE PROJECT)

A Project
on

“.....Title of the Project.....”

Submitted by
Name of Student

Roll no.

Under the Supervision of “Name of the Guide, Designation, and Department”

Submitted to

(.....College name.....), West Bengal in partial fulfillment of the
requirement for the award of

“BSc in Computer Science.....”

Batch 20xx-20xx.

Maulana Abul Kalam Azad University of Technology, WB
(Formerly known as West Bengal University of Technology)
Syllabus of B.Sc. in Computer Science
Effective from academic session 2023-24

DECLARATION

I, ...(name of the Student)....., hereby declare that the Project Report titled “_____” submitted to (.....College name.....), West Bengal in partial fulfillment of the requirement for the award of the degree(course name)..... is my original work. The findings and conclusions are based on data collected and analyzed by me and have not been submitted elsewhere for any degree.

Date:

Signature

Place:

Name of the student

Roll no.

Maulana Abul Kalam Azad University of Technology, WB
(Formerly known as West Bengal University of Technology)
Syllabus of B.Sc. in Computer Science
Effective from academic session 2023-24

NO-PLAGIARISM DECLARATION

Title of the Project:

Name(s) of the learner:

PRN:

Name of Project Supervisor:

I declare that this Project Report is the result of my independent work. All sources of information have been duly acknowledged. No portion of this work has been copied or reproduced from any other project or publication. I understand that plagiarism is a serious offence and may result in rejection of my work and appropriate action against me.

Signature of Student

Date:

Place:

Maulana Abul Kalam Azad University of Technology, WB
(Formerly known as West Bengal University of Technology)
Syllabus of B.Sc. in Computer Science
Effective from academic session 2023-24

CERTIFICATE FROM SUPERVISOR

Date:

(Sample)

This is to certify that the Project Report titled “_____” submitted by..... (Student Name, Roll No.).....is an original work carried out under my direct supervision in partial Fulfillment of the requirements for the degree at....., (College Name), West Bengal.

To the best of my knowledge, this report has not been submitted for any other award. The student's performance during the project period has been satisfactory.

Signature

(Name, Designation, Institution)

Maulana Abul Kalam Azad University of Technology, WB
(Formerly known as West Bengal University of Technology)
Syllabus of B.Sc. in Computer Science
Effective from academic session 2023-24

ACKNOWLEDGEMENTS

I extend my sincere gratitude to my guide,(Guide Name), for her continuous support, guidance, and valuable feedback throughout the project. I also thank the faculty members and laboratory staff for providing the resources necessary for the successful completion of this project. Finally, I thank my family and friends for their constant encouragement.

Signature

Name of the student

Maulana Abul Kalam Azad University of Technology, WB
(Formerly known as West Bengal University of Technology)
Syllabus of B.Sc. in Computer Science
Effective from academic session 2023-24

CONTENT

Sr. no.	Content	Page no.
1	Certificate(ref 2 in Arrangement)	
2	Student's declaration	
3	No-Plagiarism Declaration	
4	Certificate from Supervisor	
5	Content	
6	List of Illustrations	
7	Abstract	
8	Introduction	
9	Objectives of the study	
10	Problem statement	
11	Methodology	
12	Data Analysis & Interpretation	
13	Discussion and Results	
14	Conclusion	
15	Recommendations & Suggestions	

Maulana Abul Kalam Azad University of Technology, WB
(Formerly known as West Bengal University of Technology)
Syllabus of B.Sc. in Computer Science
Effective from academic session 2023-24

16	Bibliography/References	
17	Appendices/Annexures	

Maulana Abul Kalam Azad University of Technology, WB
(Formerly known as West Bengal University of Technology)
Syllabus of B.Sc. in Computer Science
Effective from academic session 2023-24

SIZE OF PROJECT REPORT

The size of project report should not exceed **80 (should be between 50-80)** pages of typed matter reckoned from the first page of Chapter 1 to the last page.

ARRANGEMENT OF CONTENTS OF PROJECT REPORT

The sequence in which the project report material should be arranged and bound should be as follows :

- 1. Title page**
- 2. Certificate** (in case of summer training to different organization certificate from that organization and certificate from Institutional Faculty should be there)
- 3. Student's declaration**
- 4. No-Plagiarism Declaration**
- 5. Certificate from Supervisor**
- 6. Content**
- 7. List of Illustrations**
- 8. Abstract**
- 9. Introduction:** (Rationale of the Study, Industry/Company Profile (if applicable), Overview of the Topic, and literature review.
- 10. Objective of the study:** Objectives should be very specific and it should be followed by different sub-objectives which should be explored/ clarified in order to solve the main problem.
- 11. Problem statement:** It should be supported by objectives of the study. i.e., in order to attain objectives the researcher has to solve the problems.
- 12. Methodology:** What are the methods to be followed in order to study the topic (Research Design, Data collection Method, Data collection tool, Sampling Size & Methods, and Analytical Tools Used)
- 13. Data Analysis & Interpretation:** Tables, Graphs, Charts, and Statistical Findings.
- 14. Discussion and Results**
- 15. Conclusion and Future work**
- 16. References / Bibliography**

Maulana Abul Kalam Azad University of Technology, WB
(Formerly known as West Bengal University of Technology)
Syllabus of B.Sc. in Computer Science
Effective from academic session 2023-24

17. Appendices/Annexure

Paper Name: Research Project / Dissertation

Code: SEC 882

Contacts: 12P

Course Objectives:

1. Application of knowledge: To provide an opportunity for students to apply the knowledge and skills from their coursework to a real-world or academic problem.
2. Research skill development: To teach students how to formulate research questions, design an appropriate study, and apply various methods for data collection and analysis.
3. Critical thinking and analysis: To develop the ability to critically analyze information, evaluate research findings, and synthesize data to draw meaningful conclusions.
4. Independent work and problem-solving: To foster independent learning, self-management, and the ability to work through challenges in a research context.
5. Communication and presentation: To train students in academic writing and professional presentation, enabling them to document and defend their work effectively.

CHAPTER 1: INTRODUCTION

1.0 Introduction

The Introduction lays the foundation for the entire research. It explains the motivation, topic background, and the purpose of the study, setting the stage for deeper investigation.

1.1 Background of the Study

This subsection presents the broader context of the research area, technological developments, and current trends related to the selected topic.

1.2 Problem Statement

Defines the core issue that the research intends to solve and highlights the gaps in existing systems, methods, or technologies.

1.3 Objectives of the Study

General Objective: A broad aim summarizing the purpose of the research.

Specific Objectives: Actionable and measurable research goals.

1.4 Research Questions

Lists the key questions the study aims to answer.

Maulana Abul Kalam Azad University of Technology, WB
(Formerly known as West Bengal University of Technology)
Syllabus of B.Sc. in Computer Science
Effective from academic session 2023-24

1.5 Significance of the Study

Explains how the research contributes to IT, industry, academics, or society.

1.6 Scope of the Study

Defines boundaries, covered areas, and aspects excluded from the research.

1.7 Limitations

States constraints such as dataset size, time, and technical restrictions.

1.8 Organization of the Study

Provides a chapter-wise summary of the dissertation structure.

CHAPTER 2: LITERATURE REVIEW

2.0 Introduction

Explains the purpose of reviewing literature and the structure of the chapter.

2.1 Theoretical Framework

Describes essential theories, algorithms, models, or concepts underpinning the research.

2.2 Conceptual Framework

Presents a diagrammatic or descriptive flow of how various variables, concepts, or system components interact.

2.3 Review of Related Studies (Global & Local)

Summarizes previous studies, methodologies, and findings relevant to the chosen research.

2.4 Critical Review & Research Gap

Highlights contradictions, weaknesses, and missing areas in earlier research, establishing the need for the current study.

2.5 Summary

Provides a short recap linking the review to the next chapter.

CHAPTER 3: METHODOLOGY

3.0 Introduction

Outlines the purpose and structure of the methodology chapter.

3.1 Research Design

Specifies whether the study is experimental, descriptive, exploratory, or prototype-based.

3.2 Data Collection Methods

Describes how data was gathered—surveys, datasets, interviews, system logs, or simulations.

3.3 Tools, Technologies, and Instruments

Lists software, programming languages, frameworks, APIs, and hardware used.

3.4 System Architecture / Workflow Model

Maulana Abul Kalam Azad University of Technology, WB
(Formerly known as West Bengal University of Technology)
Syllabus of B.Sc. in Computer Science
Effective from academic session 2023-24

Presents diagrams such as flowcharts, UML diagrams, data flow diagrams, or system architecture.

3.5 Model Development / Experimental Procedure

Details step-by-step procedures for model building, system design, algorithm development, data preprocessing, feature engineering, and testing.

3.6 Evaluation Metrics

Explains metrics such as confusion matrix, classification report, accuracy, precision, recall, ROC-AUC, RMSE, or latency.

3.7 Summary

Briefly concludes the methodology chapter.

CHAPTER 4: RESULTS AND ANALYSIS

4.0 Introduction

Briefly describes the goal of the results and analysis chapter.

4.1 Presentation of Results

Presents results using tables, graphs, charts, screenshots, and performance figures.

4.2 Data Analysis & Interpretation

Explains observed patterns, trends, behaviors, and system responses based on results.

4.3 Model / System Evaluation

Evaluates model or system performance using comparative tests, benchmarks, or user testing.

4.4 Comparison with Existing Systems

Highlights improvements, differences, or advantages of the proposed model/system.

4.5 Summary

Summarizes important findings before the discussion chapter.

CHAPTER 5: DISCUSSION

5.0 Introduction

Explains what the discussion chapter covers.

5.1 Discussion of Findings

Interprets the meaning and relevance of results and how they respond to research objectives.

5.2 Comparison with Literature

Shows how current findings align with or differ from previous studies.

5.3 Implications of the Study

Explains practical, theoretical, technical, or social implications of the findings.

5.4 Limitations

Acknowledges limitations that may have influenced findings.

Maulana Abul Kalam Azad University of Technology, WB
(Formerly known as West Bengal University of Technology)
Syllabus of B.Sc. in Computer Science
Effective from academic session 2023-24

5.5 Summary

Concludes the chapter and connects it to the final chapter.

CHAPTER 6: CONCLUSIONS AND FUTURE WORK

6.0 Introduction

Introduces the concluding purpose of the dissertation.

6.1 Conclusions

Summarizes major findings, achievements, and outcomes.

6.2 Recommendations

Provides actionable suggestions for industry, researchers, or system developers.

6.3 Suggestions for Future Research

Identifies areas for further enhancement, extension, or investigation.

6.4 Final Remarks

Offers a strong concluding statement reflecting the study's overall value.

***** Plagiarism Declaration** must be included within the project report. (Plagiarism Declaration format already given) *******