WEST BENGAL COUNCIL OF HIGHER SECONDARY EDUCATION

SUBJECT: MODERN COMPUTER APPLICATION (COMA)

CLASS – XII **SEMESTER – IV** **FULL MARKS: 35**

Unit 1	Database Management System 15 Marks	35 HRs
	• Introduction ¬ Drawbacks of Legacy System, Advantages of DBMS, Layered Architecture of Database, Data Independence, Data Models, Schemas and Instances, Database Languages, Database Users, DBA, Data Dictionary.	3
	• Entity Relationship (ER) Modeling ¬ Entity, Attributes and Relationship, Structural Constraints, Keys (Super Key, Key, Candidate Key, Alternate Key, Primary Key), ER Diagram of Some Example Database, Weak and strong Entity Set, Specialization and Generalization, Constraints of Specialization and Generalization, Aggregation.	7
	• Relational Model ¬ Basic Concepts of Relational Model, Relational Algebra.	8
	• Integrity Constraints ¬ Domain Constraints, Referential Integrity, View.	2
	• SQL ¬ Introduction, Data Definition Language and Data Manipulation Language, Data type (char(n), varchar(n), int, float, date), constraints (not null, unique, primary key), create database, use database, show databases, drop database, show tables, create table, describe table, alter table (add and remove an attribute, add and remove primary key), drop table, insert, delete, select, operators (mathematical, relational and logical), aliasing, distinct clause, where clause, in, between, order by, meaning of null, is null, is not null, like, update command, delete command, aggregate functions (max, min, avg, sum, count), group by, having clause, joins: cartesian product on two tables, equi-join and natural join .	15
Unit 2	Data Warehousing and Data Mining 10 Marks	20 Hrs
	• Introduction: ¬ What is Data Warehouse? Data Warehouse Modelling. Data Cude and OLAP, Data Warehouse Implementation, Data Mining, what kind of data can be mined, what kind of patterns can be mined, Data cleaning, Data Transformation: Strategies, Overview.	10
	Data Mining Applications and Trends: ¬ Mining Sequence Data, Time Series, Symbolic, Biological, Statistical Data Mining, Visual and audio Data Mining, Data Mining Application, Data Mining trends.	10
Unit 3	Foundation of Artificial Intelligence (AI) 10 Marks	25 Hrs
	• Introduction to Artificial Intelligence ¬ Definition and scope of AI.	4

	• Historical overview and key milestones. • Differentiating AI from human intelligence.	
	• AI Subfields and Technologies • Machine learning: Supervised, unsupervised, and reinforcement learning. • Deep learning and neural networks. • Natural language processing (NLP) and computer vision.	10
	• Applications of AI • AI in finance: Fraud detection, algorithmic trading, and risk assessment. • AI in customer service and chatbots. • AI in education: Personalized learning and intelligent tutoring systems.	8
	• Ethical and Social Implications of AI • Bias and fairness in AI systems. • Impact of AI on employment and the workforce. • AI and social inequality.	3