

THIRD SEMESTER

Programme: Bachelor of Computer Application		Year: II		Semester: III	
Course Name: Object Oriented Programming Using C++		Course Code: B030301T			
Core/Elective/ Co-curricular/ Vocational: Core					
Credits: 4	Total No. of Lectures: 60 Lecture-Tutorial-Practical (in hours/week) L-T-P: 4 - 0 - 0				
Evaluation Spread	Internal Continuous	25	End Term Exam		75
Course Objective	1. To learn object-oriented programming paradigms and structure of C++. 2. To learn & implement various programming problems in C++. 3. To learn & implement advanced programming concepts in C++ 4. To learn error handling technique in C++ and improve problem solving ability.				
Course Outcome	After the completion of this course, a student will able: - Know basic knowledge of object-oriented modelling, structure of object-oriented programming language using C++ and its application in computer science. - Understand basic concepts & Design and develop various programming problems using basic concepts of C++. - Learn and implement advance programming concepts of C++ like Inheritance, operator overloading, etc. - Learn and implement exception handling mechanism for debugging in C++				
Pedagogy	Demonstrations, Art Excursion, Interactive and activity-based class sessions, skills-based activities				
Internal Evaluation Mode	Mid-term Examination: 10 Marks Quiz/ CARE: 05 Marks Assignment: 05 Marks Presentation: 05 Marks				
UNIT	Topic				No. of Lectures
I	Introduction to OOP: Basic concept of OOP, Comparison of Procedural Programming and OOP, Object-Oriented Programming (OOP) concepts: Abstraction, Encapsulation, Inheritance, Polymorphism, Benefits of OOP, Application of OOP.				4
II	Introduction to C++: Structure of C++ Program, Tokens and identifiers: Character set and symbols, Keywords, C++ identifiers; Variables and Constants: Integer, character and symbolic constants; Dynamic initialization of variables, Reference variables, Basic data types in C++.				6
III	Operators and Expressions in C++: Operators and Manipulators Operators, Types of operators in C++, Scope resolution operator, Memory Management Operators, Manipulators, Type cast operators, Expressions.				6
IV	Decision and Control Structures: if statement, if-else statement, switch statement, Loop: while, do-while, for; Jump statements: break, continue, go to. Functions in C++: The main () function, Function Prototyping, call by reference, Return by reference, Inline function, Function Overloading.				8
V	Classes and Objects: Defining classes and objects, Defining member Functions, Encapsulation and Information Hiding, Private member functions, Memory Allocation for Objects, Static Data members, Static Member Functions, Arrays within a Class, Arrays of Objects, Objects as Function Arguments, Friendly Functions.				10
VI	Constructors and Pointers: Constructors, Parameterized Constructors, Multiple Constructors in a class, Copy constructor, Destructors. Operator overloading Defining Operator Overloading, Overloading Unary Operators, Overloading Binary Operators, Type				10

	Conversions, Declaration and initializing Pointers, Manipulation of pointers, Pointer Arithmetic, Pointers to objects, this pointer.	
VII	Inheritance and Polymorphism: Introduction, Defining Derived Classes, Single inheritance, Multiple inheritance, Hierarchical inheritance, Multilevel inheritance, Hybrid inheritance, Polymorphism, static and dynamic binding.	8
VIII	Virtual Functions: Virtual function, this pointer, Virtual Base Classes, Pure Virtual Functions, Abstract class, Function overriding. Error Handling: Try –Catch Block, Finally, Throws.	8
Suggested Readings: 1. E. Balagurusamy, “Object oriented programming in C++”, TMH, 2020. 2. A.R. Venugopal, Rajkumar, T. Ravishanker “Mastering C++”, TMH, 1997. 3. S.B. Lippman & J. Lajoie, “ C++ Primer”, 3rd Edition, Addison Wesley, 2000. 4. D. Parsons, “Object Oriented Programming using C++”, BPB Publication.		

UNITS	MAPPED CO
I	CO1
II	CO1
III	CO1, CO2
IV	CO2,CO3
V	CO2,CO3
VI	CO2,CO3
VII	CO2,CO3
VIII	CO3, CO4

MAPPED CO's WITH PO's & PSO's

Mapped CO's with PO's and PSO's												
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO 1	PSO2	PSO3	PSO4
CO1	✓	✓	✓	✓					✓	✓		
CO2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CO3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CO4	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓

Course created by: Dr. Mohd Haleem
Signature:

Approved by:
Signature:

ERA UNIVERSITY
Department of Computer Science
Course Outline
Academic Year: 2026-27

Programme: Bachelor of Computer Application		Year: II		Semester: III	
Course Name: Object Oriented Programming Using C++ Lab		Course Code: B030306P			
Co-curricular/Vocational/Core/Elective: Core					
Credits: 2	Total No. of Practical: 60 Lecture-Tutorial-Practical (in hours/week) L-T-P: 0-0-4				
Evaluation Spread	Internal Continuous	25	End Term Exam		75
Course Objective	1. To learn object-oriented programming paradigms and structure of C++. 2. To learn & implement various programming problems in C++. 3. To learn & implement advanced programming concepts in C++ 4. To learn error handling technique in C++ and improve problem solving ability.				
Course Outcome	CO1: To understand object-oriented modelling, structure of object-oriented programming language using C++ and its application in computer science CO2: Perform data manipulation operations (insert, update, delete). CO2: Design and develop various programming problems using basic concepts of C++. CO3: Implement advance programming concepts of C++ like Inheritance, operator overloading, etc. CO4: Demonstrate exception handling mechanism for debugging in C++.				
Pedagogy	Demonstrations, Art Excursion, Interactive and activity-based class sessions, skills-based activities				
Internal Evaluation Mode	Mid-term Practical Examination:	10 Marks			
	Viva Voce	05 Marks			
	Practical File	05 Marks			
	Attendance	05 Marks			
UNIT	Topic				Contact Hours
I	1. Program to display the structure of a C++ program. 2. Program illustrating input/ output functions. 3. Program to demonstrate use of variables and constants. 4. Program to demonstrate dynamic initialization of variables				8
II	1. Program using reference variables. 2. Program to display sizes of basic data types in C++. 3. Program demonstrating operators. 4. Program using manipulators.				6
III	1. Program demonstrating type casting. 2. Program demonstrating Decision and Control Structures. 3. Program illustrating Classes and Objects. 4. Program demonstrating member functions inside and outside class.				8
IV	1. Program illustrating use of Function, Inline Function. 2. Program illustrating Static Member functions & Friend function. 3. Program illustrating use of Function Overloading. 4. Program illustrating use of Constructor and types of Constructors.				8
V	1. Program illustrating Constructor Overloading. 2. Program illustrating Simple Array.				8

	3. Program illustrating 1-D & 2-D Array. 4. Program illustrating Pointers.	
VI	1. Program illustrating pointers to objects. 2. Program illustrating Inheritance and types of Inheritance. 3. Program illustrating use of Virtual functions. 4. Program demonstrating pure virtual functions.	8
VII	1. Program to create an abstract class. 2. Program demonstrating function overriding. 3. Program demonstrating virtual base classes	8
VIII	1. Program illustrating Exception Handling. 2. Program implementing Search algorithms.	6
Suggested Readings: 1. E. Balagurusamy, "Object oriented programming in C++", TMH, 2020. 2. A.R. Venugopal, Rajkumar, T. Ravishanker "Mastering C++", TMH, 1997. 3. S.B. Lippman & J. Lajoie, "C++ Primer", 3rd Edition, Addison Wesley, 2000. 4. D. Parsons, "Object Oriented Programming using C++", BPB Publication.		

UNITS	MAPPED CO
I	CO1
II	CO1
III	CO1, CO2
IV	CO2,CO3
V	CO2,CO3
VI	CO2,CO3
VII	CO2,CO3
VIII	CO3, CO4

MAPPED CO's WITH PO's & PSO's

Mapped CO's with PO's and PSO's												
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO 1	PSO2	PSO3	PSO4
CO1	✓	✓	✓	✓					✓	✓		
CO2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CO3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CO4	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓

Course created by: Dr. Mohd Haleem

Signature:

Approved by:

Signature:



ERA UNIVERSITY
Department of Computer Science
Course Outline
Academic Year: 2026-27

Programme: Bachelor of Computer Application		Year: II		Semester: III	
Course Name: Database Management System		Course Code: B030302T			
Core/Elective/ Co-curricular/ Vocational: Core					
Credits: 4	Total No. of Lectures: 60 Lecture-Tutorial-Practical (in hours/week) L-T-P: 4-0-0				
Evaluation Spread	Internal Continuous	25	End Term Exam		75
Course Objective	1. To learn the basic knowledge of Database Management System and various types of data models. 2. To learn the concept and syntax of ER Diagram and the extended ER features. 3. To learn various constraints and writing SQL queries and Normalization. 4. To learn the various issues in transaction processing.				
Course Outcome	CO1: Understanding database concepts and database management system software. CO2: Understanding major DBMS components and their functions. CO3: Model an application’s data requirements using conceptual modeling tools like ER diagrams and design database schemas based on the conceptual model. CO4: Write SQL commands to create tables and indexes, insert/update/delete data, and query data in a relational DBMS.				
Pedagogy	Interactive Discussions, Visual Aids, Problem-Based Learning, Collaborative Learning				
Internal Evaluation Mode	Mid-term Examination: 10 Marks Quiz/Test: 05Marks Assignment: 05 Marks Presentation: 05 Marks				
UNIT	Topic				No. of Lectures
I	Introduction to Databases and Database System Concepts: Definition and Purpose of DBMS, Database System versus File System, Components of Database System, Advantages of DBMS, Characteristics of Database Approach, Data Models, Schemas and Instances, Database Users and DBA, Applications of DBMS				06
II	Architecture and Classification of DBMS: Database System Architecture, Three-Schema Architecture and Data Independence, Classification of DBMS, Centralized and Distributed DBMS, Client-Server Architecture, Introduction to Cloud Databases and NoSQL Databases				08
III	Entity-Relationship Model: Basic Concepts, Constraints, Keys (Primary Key, Super Key, Candidate Key, Foreign Key), Entity Types, Entity Sets, Weak Entity Sets, ER Diagram, Relationship Types, Roles and Structural Constraints, Enhanced ER Model, Specialization and Generalization				08
IV	Introduction to the Relational Model: Relations and Relational Database, Relational Data Model Concepts, Attributes, Tuples and Domains, Integrity Constraints, Introduction to Relational Algebra and Relational Calculus,				08

V	SQL: Introduction to SQL and its types(DDL, DML, DCL, TCL), Schema Changes in SQL, SQL Data Types, SQL Constraints, Data Definition and Data Manipulation Statements (CREATE, ALTER, DROP, INSERT, DELETE, UPDATE), Basic SQL Queries, Clauses in SQL Queries, Joins & Aggregate Functions	09
VI	Data Normalization: Introduction and Need of Normalization, Functional Dependencies, Anomalies in Unnormalized Data, Decomposition of Relations, Normal Form Concepts and Types: First Normal Form (1NF), Second Normal Form (2NF), Third Normal Form (3NF), Boyce-Codd Normal Form (BCNF) and Fourth Normal Form (4NF)	08
VII	Transaction Processing: System, Transaction Concepts, States and ACID Properties, Transaction Execution and Related Problems, Schedules and Serializability, Deadlock Handling	06
VIII	Concurrency Control: Concurrent Transactions and their Issues, Need for Concurrency Control, Concurrency Control Techniques - Locking, Time Stamp and Validation based Protocol, Introduction to Database Security: Authentication, Authorization and Access Control	07
Suggested Readings: 1. Database System Concepts by Abraham Silberschatz and S Sudarshan 2. Introduction to Database Management Systems by Kahate. " 3. An Introduction to Database Systems" by Bipin Desai. 4. Fundamentals of Database Systems by R Elmasri and S Navathe.		

UNITS	MAPPED CO
I	CO1
II	CO1
III	CO1, CO2
IV	CO2,CO3
V	CO2,CO3
VI	CO2,CO3
VII	CO2,CO3
VIII	CO3, CO4

MAPPED CO's WITH PO's & PSO's

Mapped CO's with PO's and PSO's												
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO 1	PSO2	PSO3	PSO4
CO1	✓	✓	✓	✓					✓	✓		
CO2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CO3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CO4	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓

Course created by: Mrs. Alfiya Mahmood
Signature:

Approved by: Prof. (Dr.) Santosh Kumar
Signature:



ERA UNIVERSITY
Department of Computer Science
Course Outline
Academic Year: 2026-27

Programme: Bachelor of Computer Application		Year: II		Semester: III	
Course Name: Database Management System Lab		Course Code: B030307P			
Co-curricular/Vocational/Core/Elective: Core					
Credits: 2	Total No. of Lectures: 60 Lecture-Tutorial-Practical (in hours/week) L-T-P: 0-0-4				
Evaluation Spread	Internal Continuous		25	End Term Exam	75
Course Objective	1. To provide practical knowledge of relational database concepts through structured query language (SQL). 2. To enable students to design and create relational databases using DDL and DML commands. 3. To develop skills for writing queries to retrieve and manipulate data efficiently. 4. To understand and implement database constraints, joins, aggregate functions, and views for effective data handling.				
Course Outcome	CO1: Create and manage databases and tables using SQL. CO2: Perform data manipulation operations (insert, update, delete). CO3: Retrieve data using queries including filters, sorting, grouping, and joins. CO4: Apply aggregate functions and constraints to maintain data integrity.				
Pedagogy	Demonstrations, Art Excursion, Interactive and activity based class sessions, skills-based activities				
Internal Evaluation Mode	Mid-term Practical Examination: 10 Marks Viva Voce 05 Marks Practical File 05 Marks Attendance 05 Marks				
I	Introduction to SQL and DBMS Softwares: a. Introduction to DBMS softwares, Installation and configuration of DBMS software b. Creating and managing databases c. Creating tables using DDL commands (CREATE, ALTER, DROP) d. Describing table structure				08
II	Data Manipulation using SQL: a. Inserting records using INSERT statement, Single-row and multi-row insertion b. Updating records using UPDATE statement c. Deleting records using DELETE statement d. Using COMMIT and ROLLBACK commands				07
III	Data Retrieval using SQL Queries: a. Retrieving records using SELECT statement b. Filtering records using WHERE clause c. Sorting data using ORDER BY clause d. Eliminating duplicate records using DISTINCT clause e. Using Operators (LIKE, BETWEEN, IN, NOT IN), Working with NULL values				08
IV	Aggregate Functions and Grouping: a. Using Aggregate Functions (COUNT, SUM, AVG, MIN, MAX)				07

	b. Grouping records using GROUP BY clause c. Filtering grouped data using HAVING clause d. Generating summary reports using SQL queries	
V	Constraints and Keys: a. Applying Constraints while creating tables b. Implementation of Primary Key, Foreign Key, Candidate Key, Unique Key, Check Constraint and NOT NULL Constraint c. Maintaining Referential Integrity between tables	08
VI	SQL Joins: a. Combining data from multiple tables using JOINS b. Implementation of Inner Join, Left Join, Right Join and Self Join c. Query writing using multiple tables and aliases	08
VII	Nested Queries and Subqueries: a. Creating nested queries using SELECT statements b. Single-row and multi-row subqueries, Correlated and non-correlated subqueries c. Using subqueries with INSERT, UPDATE and DELETE statements	07
VIII	Views, Sequences and Indexes: a. Creating and using Views b. Creating Sequences for automatic numbering c. Creating Indexes for faster data retrieval d. Basic database backup and export operations	07
Suggested Readings: 1. Database System Concepts by Abraham Silberschatz and S. Sudarshan 2. Introduction to Database Management Systems by Kahate 3. An Introduction to Database Systems by Bipin Desai 4. Fundamentals of Database Systems by R. Elmasri and S. Navathe		

UNITS	MAPPED CO
I	CO1
II	CO1
III	CO1, CO2
IV	CO2, CO3
V	CO2, CO3
VI	CO2, CO3
VII	CO2, CO3
VIII	CO3, CO4

MAPPED CO's WITH PO's & PSO's

Mapped CO's with PO's and PSO's												
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4
CO1	✓	✓	✓	✓					✓	✓		
CO2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CO3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CO4	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓

Course created by: Mrs. Alfiya Mahmood
Signature:

Approved by: Prof. (Dr.) Santosh Kumar
Signature:

Programme: Bachelor of Computer Application		Year: II		Semester: III	
Course Name: Basics of Software Engineering		Course Code: B030303T			
Minor Multidisciplinary (Any Faculty)					
Credits: 3	Total No. of Lectures: 45 Lecture-Tutorial-Practical (in hours/week) L-T-P: 3-0-0				
Evaluation Spread	Internal Continuous	25	End Term Exam		75
Course Objective	To introduce students to the fundamental principles, processes and practices of software engineering, including requirements analysis, design, development methodologies, testing, version control, ethical responsibilities and professional practices in software development.				
Course Outcome	CO1: Understand the fundamentals of software engineering and development life cycles. CO2: Compare and use common development methodologies (Waterfall, Spiral model etc.). CO3: Recognize ethical and professional issues in software engineering. CO4: Develop teamwork and project management & technical skills through group projects.				
Pedagogy	Demonstrations, Art Excursion, Interactive and activity based class sessions, skills-based activities				
Internal Evaluation Mode	Mid-term Examination: 10 Marks Quiz/Test: 05Marks Assignment: 05 Marks Presentation: 05 Marks				
UNITS	Topic				No. of Lectures
I	Introduction: Definition and scope of Software Engineering, Software characteristics, Software process & process models (Waterfall Model, Prototype Model, Iterative Model, Evolutionary Model and Spiral Model).				6
II	Software Development Life Cycles Models: The basics of SDLC model, Phases of SDLC model (Requirement Gathering and Analysis, System Design, Implementation/Coding, Testing, Deployment, Maintenance), Benefits of SDLC.				6
III	Requirements & Specification: Purpose of requirement & specification, value of a good SRS, Requirement process, Requirement specification, Desirable characteristics of SRS. Components of SRS.				6
IV	Software Design Principles: The concepts and principles of design, Characteristics of a good software design, technique of design (Cohesion, Coupling, Function- oriented vs. object-oriented design approach), Data Flow Diagram (DFD).				6
V	Software Testing: The testing concept, Testing Process, Types of testing: Unit testing, Integration testing, System testing, Black Boxtesting and White Box Testing.				5
VI	Software Maintenance: Concept of Software Maintenance, Management of Maintenance, Types of Maintenance, Reverse Engineering and Re-				5

	engineering, Cost estimation models (COCOMO), Risk Management.	
VII	Software Project Management: Definition of SPM, objectives and importance, Characteristics of a software project, Software project management activities, Role of a Project Manager.	5
VIII	Software Quality Assurance: The concept of software quality assurance, Software quality assurance, Software quality and ISO/CMMI standards.	6

Suggested Readings:

1. *Software Engineering: A Practitioner's Approach* – Roger S. Pressman & Bruce R. Maxim.
2. *Software Project Management* – Bob Hughes & Mike Cotterell.
3. *Software Engineering* – Ian Sommerville
4. *Fundamentals of Software Engineering* - Rajib Mall.

UNITS	MAPPED CO
I	CO1
II	CO1
III	CO1, CO2
IV	CO2, CO3
V	CO2, CO3
VI	CO2, CO3
VII	CO2, CO3
VIII	CO3, CO4

MAPPED CO's WITH PO's & PSO's

Mapped CO's with PO's and PSO's												
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4
CO1	✓	✓	✓	✓					✓	✓		
CO2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CO3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CO4	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓

Course created by: Dr. Mohammad Islam
Signature:

Approved by:
Signature:

Programme: Bachelor of Computer Application		Year: II		Semester: III	
Course Name: Fundamental of E commerce		Course Code B030305H			
Minor (Co-curricular Ability/Enhancement Course (AEC))					
Credits: 2	Total No. of Lectures: 30 Lecture-Tutorial-Practical (in hours/week) L-T-P: 2-0-0				
Evaluation Spread	Internal Continuous	25	End Term Exam		75
Course Objective	1. Understand the evolution, scope, and models of E-Commerce. 2. Analyze electronic payment methods and security mechanisms. 3. Explore legal and ethical issues in E-Commerce. 4. Evaluate recent trends and technologies in E-Commerce applications.				
Course Outcome	CO1: Gain knowledge of e-commerce with its technology, benefits, limitations, impacts on business. CO2: Identify and compare different types of E-Commerce business models and revenue generation strategies. CO3: Explain the technical infrastructure required for implementing and operating an E-Commerce platform. CO4: Evaluate recent technological advancements and trends in E-Commerce using real-world case studies.				
Pedagogy	Demonstrations, Art Excursion, Interactive and activity based class sessions, skills-based activities				
Internal Evaluation Mode	Mid-term Examination: 10 Marks Quiz/Test: 05Marks Assignment: 05 Marks Presentation: 05 Marks				
UNIT	Topic				No. of Lectures
I	Introduction to E-Commerce: Definition of E-Commerce, Scope of E-Commerce, Issues in implementing E-Commerce, E-Commerce Applications, Advantage- Business & Customer, Disadvantages , Framework for understanding e- business, Classification of E-commerce, Electronic Market , Benefits and Limitation of E-Commerce, produce generic Framework for E-commerce, Architectural Frame work of E-commerce.				8
II	Business Models in E-Commerce: B2B, B2C, C2C, C2B, B2G Electronic Data Interchange (EDI): Concept, Components, Differences between traditional EDI & Paper EDI, Advantages of EDI, Business Application of EDI, EDI Communication Process, EDI Security. Electronic payment system Study and examine EPS and protocol used EDI Standards EDI Security				7
III	E-Commerce Infrastructure: Hardware, Software, Web Servers, Payment Gateways. Setting up an E-Commerce Website: Domain Registration, Hosting, CMS (WordPress, Shopify). Logistics and Supply Chain in E-Commerce				8
IV	Electronic Payment Systems, Types of E-Payment Systems: Credit Cards, Debit Cards, E-Wallets. Mobile Payments (UPI, QR, NFC). Digital Cash and Cryptocurrency (Intro). Payment Gateways and Security Standards (PCI-DSS)				7

	Benefits of Digital Economy Methods of payment on net electronic Advantage and Disadvantage of Digital payment. Threats in E-Commerce: Hacking, Phishing, Malware. Encryption, Digital Signatures, and SSL Secure Electronic Transaction (SET). Firewalls and Cybersecurity Practices.	
Suggested Readings: 1. E-Commerce -- CSV Murthy 2. E-Commerce - Ritendra Goyal 3. E-Commerce – Bharat Bhaskar		

UNITS	MAPPED CO
I	CO1
II	CO1
III	CO1, CO2
IV	CO2,CO3

MAPPED CO's WITH PO's & P

Mapped CO's with PO's and PSO's												
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO 1	PSO2	PSO3	PSO4
CO1	✓	✓	✓	✓					✓	✓		
CO2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CO3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CO4	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓

Course created by:
Signature:

Approved by:
Signature:

ERA UNIVERSITY
Department of Computer Science
Course Outline
Academic Year: 2026-27

Programme: Bachelor of Computer Application		Year: II		Semester: III	
Course Name: Data Analytics		Course Code: B030304I			
Minor (Vocational Skill Enhancement Course (SEC))					
Credits: 3 (T+P: 1+2)	Total No. of Lectures: 75 (prorated for 15 theory + 60 practical hours) Lecture-Tutorial-Practical (in hours/week) L-T-P: 1:0:2				
Evaluation Spread	Internal Continuous	-	End Term Exam		Theory-40 Marks Practical-60 Mark
Course Objective	1. To provide a fundamental understanding of data analytics concepts and techniques. 2. To familiarize students with various tools and methods for data processing, analysis, and visualization. 3. To develop practical skills in data manipulation and interpretation using MS Excel. 4. To apply analytics techniques on real-world datasets to derive insights and drive decision-making.				
Course Outcome	CO1: Learn to use excel functions to get statistical and financial results. CO2: Learn to use intelligent functions in excel like lookups and conditional calculations. CO3: To develop the ability to analyze data using PivotTables, statistical tools, and scenario analysis techniques, supporting informed decision-making. CO4: .To enhance skills in visualizing data through charts, and conditional formatting, promoting clear and effective data communication.				
Pedagogy	Demonstrations, Art Excursion, Interactive and activity based class sessions, skills-based activities				
Internal Evaluation Mode	NA				
UNIT	Topic				No. of Lectures
I	Introduction to Data Analytics and Data Collection using Excel Overview of Data Analytics: Importance in business and decision-making, Types of Data: Structured vs. Unstructured, Big Data, Real-Time Data. Data Analytics Lifecycle: Data Collection, Cleaning, Transformation, Exploration, and Interpretation, MS Excel for Data Collection: Manual Data Entry, Data Import from Text/CSV, Excel/Access databases.				10
II	Introduction to Excel Basics: Concepts of Workbook and worksheet, Performing basic worksheet operations. Illustration of autofill and formatting data in the cells. Use of simple arithmetic operations. Working with excel ranges and tables. Demonstration of formatting worksheets. Conditional Formatting & Sorting. Working with Formulas and Functions: Understanding formula basics, Using formulas for common mathematical operations, Using text functions to manipulate text. Use of cell references in formulas: relative, absolute, and mixed references, referencing cells outside the worksheet.				15
III	Logical Functions: IF, IFS, AND, OR, NOT. Date & Time Functions: TODAY, NOW, DATEDIF, EDATE Perform conditional calculations: COUNTA, SUMIF, COUNTIF, AVERAGEIF, SUMIFS, COUNTIFS, AVERAGEIFS.				13

	Importance of Data Quality: Handling missing data, duplicates, and outliers in Excel.	
IV	Data Cleaning Techniques: Use of Excel Functions: IFERROR, ISBLANK. Removing duplicates, replacing values, filtering data, Feature Engineering: Creating new columns/features using Excel formulas. Using formulas for Matching and Lookups: VLOOKUP, HLOOKUP, INDEX, and MATCH.	8
V	Data Analysis and Descriptive Statistics: Mean, Variance, and Standard Deviation using Excel, MEDIAN, MODE, MAX, MIN, QUARTILES, PERCENTILE, FREQUENCY, RANK, RAND.	8
VI	Time Series Analysis: FORECAST, GROWTH, and TREND.	7
VII	Basic Data Visualization and Interpretation Introduction to Data Visualization: What is data visualization and why is it important? Types of Charts: Bar charts, line charts, pie charts, and histograms, when and how to use them, Understanding Charts: How to read and interpret simple charts and graphs.	7
VIII	Advanced Visualizations: Creating Pivot Tables and Pivot Charts. Data Storytelling Basics: Using visuals to explain data trends and summaries.	7
Suggested Readings: 1. "Data Science for Business", Foster Provost & Tom Fawcett, O'Reilly Media. 2. Excel Data Analysis Modeling and Simulation., Hector, G., Springer. 3. Microsoft Excel data analysis and business modelling, Winston, W., Microsoft press., O'Reilly Media.		

UNITS	MAPPED CO
I	CO1
II	CO1
III	CO1, CO2
IV	CO2, CO3
V	CO2, CO3
VI	CO2, CO3
VII	CO2, CO3
VIII	CO3, CO4

MAPPED CO's WITH PO's & PSO's

Mapped CO's with PO's and PSO's												
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4
CO1	✓	✓	✓	✓					✓	✓		
CO2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
CO3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CO4	✓	✓	✓	✓		✓	✓		✓	✓	✓	✓

Course created by:
Signature:

Approved by:
Signature: