



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Computer Application

Choice Based Credit System (CBCS) in the light of NEP-2020

MCA (Artificial Intelligence and Machine Learning)

SEMESTER-I (2026-28)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
MCA101	AEC	Programming with C Language	Max	60	20	20	30	20	3	0	4	5
			Min	24	16		13.5	9				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

1. To familiarize the students with programming and to encourage them to develop their logic.
2. To make students well versed with C language to solve problems efficiently.
3. Using simple and well drawn illustrations develop their programming skills using modular programming.
4. To make the students well versed with the knowledge of pointer and structure.

COURSE ALIGNMENT WITH UNSDG:

The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education)** and **SDG 9 (Industry, Innovation and Infrastructure)**.

COURSE OUTCOMES:

After completion of the course, the student will be able to:

- CO1 Develop algorithms for problems.
- CO2 Apply the programming concepts to solve the given problems.
- CO3 Write the programs using modular programming.
- CO4 Write the programs using pointers and to manage memory.

TEACHING PEDAGOGY:

- T1 Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching
- T2 ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination

ASSESSMENT TOOLS:

- ATL1 Quiz
- ATL2 Activity Based Learning
- ATL3 Midterm Exams
- ATL4 Flip Class
- ATL5 Seminar Presentation
- ATL6 Assignments

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ATL7 Poster

ATL8 Oral Viva-voce examination

PREREQUISITES:

Basic Computer Knowledge

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	Concept of problem solving , Problem definition, Flowcharting, Decision table, Algorithm. Characteristics of a good program - accuracy, simplicity, robustness, portability, minimum resource and time requirement, modularization; Categories of Programming Languages, Programming Paradigms: monolithic, Procedural, structured, Non Procedural. Type of errors in programming.	9	ATL1 ATL3 ATL6
II	Overview of C: Features of C, Structure of C program. Elements of C: C character set, identifiers and keywords, data types: primitive and user defined. Operators and Expressions, Type modifiers and type casting. Control Structures. Input/ Output: Unformatted and Formatted I/O functions in C.	9	ATL3 ATL6
III	Functions: Definition, prototype, Function call, parameters passing – call by value and call by reference. Return value. Storage Classes in C: auto, extern, register and static, their scope, Recursion, Recursion v/s Iteration, types of recursion. Special constructs – Break, continue, exit(), goto and labels. Arrays: Definition, Access of Elements, initialization; Multidimensional arrays, character arrays.	9	ATL6
IV	Pointer: address and dereferencing operators, declaration, assignment, initialization. pointer to pointer. pointer and arrays, Array of pointers and its limitation, Function returning pointers; Pointer to function, Function as parameter. Dynamic memory management using functions like malloc(),	9	ATL3 ATL6

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	calloc(), realloc(), free() etc. Structure: Structure –basic, declaration, membership operator, structure within structure, array in structure, array of structure.		
V	Pre-processor directives: #include, #define, #undef, #if, #ifdef, #ifndef, #else, #elif, #endif, #error, #pragma. Predefined macros. Command line arguments. Variable argument list functions.	9	ATL6
	Total Hours	45	

SUGGESTED READINGS:

Textbooks

1. Kanitkar Yashwant, Let us C", Edition 16th 2017, BPB, New-Delhi.
2. Bala Guruswami, Ansi C, McGraw Hill Education; Eighth edition 2019, TMH, New-Delhi.
3. Kernighan & Ritchie "The C programming language", Pearson Education India; 2 edition (2015), PHI.
4. Schildt "C: The Complete reference" McGraw Hill Education; 4th ed TMH, 2017.
5. Byron S. Gottfried, "Programming with C", Schaum's Outline Series McGraw –Hill, II-Ed.
6. Concepts of Programming Languages Robert.W. Sebesta 8/e, Pearson Education, 2008.
7. Programming Language Design Concepts, D. A. Watt, Wiley dreamtech, rp-2007.

Suggested e- resources (Websites/e- books)

- 1 <https://www.learn-c.org>
- 2 <https://www.programiz.com/c-programming/online-compiler/>

LIST OF PRACTICAL

	Title	CO Mapping
1.	Define an algorithm and flowchart. Draw algorithm and flow chart for a program that converts an input Fahrenheit degree into Celsius equivalent.	CO1
2.	Write an algorithm and a C program to find the greatest among three numbers.	CO1
3.	WAP to print an input string in lower case, upper case and mixed case using library function.	CO1
4.	WAP a C program to reserve an input number.	CO2

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5.	Draw a flow chart to find prime number from 1 to 100.	CO2
6.	Write a C program to obtain the sum of first n terms of the following series: $X - X^3/3! + X^5/5! - X^7/7! + \dots$	CO2
7.	WAP to calculate factorial of a number using different loops.	CO2
8.	WAP to calculate factorial of a number using recursion.	CO2
9.	WAP in C to generate Fibonacci series.	CO3
10.	WAP in C to generate Pascal triangle.	CO3
11.	WAP in C to swap value and address of two variables.	CO3
12.	WAP in C to search a given element in an array using linear and binary search.	CO3
13.	WAP to sort an integer array in ascending and descending order according to user's choice.	CO4
14.	Write a menu driven program to perform matrix addition, subtraction and multiplication.	CO4
15.	Write a program to sum diagonal elements of two matrices.	CO4
16.	WAP a C program to reverse a string by recursion.	CO4
17.	WAP using structure in C to generate student mark-sheet for 3 students with student details name, course, and semester and with marks in 5 subjects, assume max mark in each subject as 100 and passing marks as 35.	CO4

COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcomes	Correlation with POs												Correlation with PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	2	1	1	–	–	–	–	–	–	2			
CO2	3	3	2	1	2	–	–	–	–	–	–	2			
CO3	3	2	3	1	2	–	–	–	1	1	–	2			
CO4	3	3	2	1	2	–	–	–	–	–	–	2			

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COURSE OBJECTIVES:

The student will have ability to:

1. an understanding of basic principles of Python Programming.
2. an understanding of coding rules and develop logics.
3. a basic understanding on OOPS concepts and data handling.

COURSE ALIGNMENT WITH UNSDG:

The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education)** and **SDG 9 (Industry, Innovation and Infrastructure)**.

COURSE OUTCOMES:

After completion of the course, the student will be able to:

- CO1 Apply the principles python programming.
- CO2 Write clear and effective python code.
- CO3 Create applications using python programming.
- CO4 Apply Object oriented programming concepts.
- CO5 Apply file management and data handling.

TEACHING PEDAGOGY:

- T1 Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching
- T2 ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination

ASSESSMENT TOOLS:

- ATL1 Quiz
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ATL6	Assignments
ATL7	Poster
ATL8	Oral Viva-voce examination

PREREQUISITES:

Basic Computer Knowledge

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	Introduction Basic Concept of python, its characteristics, Features, Names of popular application in python, various flavours of python, limitations of python, versions of python, Python-2 and Python-3 differences. Identifiers, keywords, datatypes, use of comments in python, variables and constants, various operators used in python.	9	ATL3 ATL5 ATL6
II	Input-output and Conditional statements Input and output statements and basic simple programs using it. Decision Making statements: if statement, if-else statement and nested if statement. Iterative and Transfer Statements: Iterative statements: For Loop, While loop, nested loops. Transfer statement: break and continue statement.	9	ATL3 ATL6
III	Strings Used in Python Programming Definition, accessing characters or values of a String, Updating Strings, String Special Operators, String Formatting Operator. List, Tuples, Functions, Introductory concept of Python Lists and Python Tuples, list Vs tuples, Basic concept of python functions.	9	ATL6
IV	Python File Handling and user defined functions concept and types of files used in Python Programming language. Operations like opening and closing a file with various modes, deleting a file. User defined Functions and Modules in Python.	9	ATL3 ATL6
V	Introduction of Python OOPs Concepts Introduction of Class and Object,	9	ATL5

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	creating class and its instance, constructor (Parameterized Constructor and Non-Parameterized Constructor), destructors, polymorphism, inheritance (Multilevel and multiple), definition of data abstraction.		
	Total Hours	45	

ADDITIONAL RESOURCES

A. Value addition to course content/ Skill enhancement content:

<https://www.redhat.com/en/services/training/rh124-red-hat-system-administration-i>

B. Remedial classes for slow learners:

As per the AUMP SOP for slow and fast learners.

SUGGESTED READINGS:

Textbooks

1. Pratiyush Guleria,” Basics of Python Programming, BPB Publications, March 2020.
2. Jason Cannon” Python programming for beginners, Kindle book, 2020
3. Paul Deitel and Harvey Deitel, “Python for Programmers with Big Data and Artificial Intelligence Case Studies” Deitel Developer Series, April 2019.
4. Ryan Turner, “Python Programming: 3 Books in 1: Ultimate Beginner”’s, Intermediate & Advanced Guide to Learn Python Step-by-Step”, Kindle Edition, 2018.
5. Martin Brown, “Python: The Complete Reference”, Mc-Graw-Hill, 2018.

Suggested e- resources (Websites/e- books)

- 1 <https://aifortechies.in/>
- 2 <https://www.python.org>

LIST OF PRACTICAL

	Title	CO Mapping
1.	Write python program to print Hello World.	CO1

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2.	Write a program to perform different Arithmetic Operations on numbers in Python.	CO1
3.	Write python program to Hello World using string variable.	CO1
4.	Write python program to show use of conditional statement.	CO2
5.	Write a python program to find largest of three numbers.	CO2
6.	Write a Python program to convert temperatures to and from Celsius, Fahrenheit. [Formula : $c = (f-32)/1.8$]	CO2
7.	Write python program to store data in list and then try to print them.	CO2
8.	Write python program to print list of numbers using for loop.	CO2
9.	Write a python program to find factorial of a number using loop.	CO3
10.	Write python program to store strings in list and then print them.	CO3
11.	Write a program to create, append, and remove lists in python.	CO3
12.	Write a program to demonstrate working with tuples in python.	CO3
13.	Write a program to demonstrate working with dictionaries in python.	CO4
14.	Write python program to let user enter some data in string and then verify data and print welcome to user.	CO4
15.	Write python program in which a function is defined and calling that function prints Hello World.	CO4
16.	Write python program in which a function(with single string parameter) is defined and calling that function prints the string parameters given to function.	CO4
17.	Write python program in which a class is define, then create object of that class and call simple print function define in class.	CO5
18.	Write a python program to define a module to find Fibonacci Numbers and import the module to another program.	CO5
19.	Write a python program to define a module and import a specific function in that module to another program.	CO5
20.	Write a script named copyfile.py. This script should prompt the user for the names of two text files. The contents of the first file should be input and written to the second file.	CO5
21.	Write a program that inputs a text file. The program should print all of the unique words in the file in alphabetical order.	CO5

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Course Outcome s	Correlation with POs												Correlation with PSOs		
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CO1	3	2	2	1	3	-	-	-	-	1	-	2			
CO2	2	3	2	1	3	-	-	1	1	2	-	2			
CO3	2	3	3	2	3	-	-	-	1	1	1	2			
CO4	2	2	3	1	3	-	-	-	1	1	-	2			
CO5	2	3	2	2	3	-	-	-	-	1	-	2			

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COURSE OBJECTIVES:

The student will have ability to:

5. Provide an introduction to the fundamental concepts of HTML, CSS, XML, Javascript
6. Learn CSS Grid Layout
7. Develop basic programming skills using Javascript
8. Develop skills in analyzing the usability of a website.
9. Understand the principles of creating an effective Web Page.

COURSE ALIGNMENT WITH UNSDG:

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COURSE OUTCOMES:

After completion of the course, the student will be able to:

- CO1** Develop algorithms for problems.
- CO2** Define the basics of JavaScript.
- CO3** Visualize the basic concept of HTML.
- CO4** Recognize the elements of HTML.
- CO5** Introduce basics concept of CSS.
- CO6** Develop the concept of XML, XSLT, DTD and XPath.

TEACHING PEDAGOGY:

- T1** Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching
- T2** ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination

ASSESSMENT TOOLS:

- ATL1** Quiz
- ATL2** Activity Based Learning
- ATL3** Midterm Exams
- ATL4** Flip Class
- ATL5** Seminar Presentation

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Choice Based Credit System (CBCS) in the light of NEP-2020

MCA (Artificial Intelligence and Machine Learning)

SEMESTER-I (2026-28)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
MCA102N	DCC	Python for AI ML	Max	60	20	20	30	20	3	0	2	4
			Min	24	16		13.5	9				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

ATL6 Assignments

ATL7 Poster

ATL8 Oral Viva-voce examination

PREREQUISITES:

Basic Computer Knowledge

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	Java Methodology: Classes, Objects, Method, Inheritance, Packages, Abstract Classes, Interfaces, Exception Handling, A brief introduction to Applets.	6	ATL3 ATL5 ATL6
II	HTML: Introduction to HTML, HTML Documents structure tags, Text Formatting Tags, Inserting Special Characters, Anchor Tags, List Tags, Tables, Frames and Floating Frames, Developing Forms, Adding Images and Sound.	6	ATL1 ATL6
III	CSS: Concept of CSS, Creating Style Sheet, CSS Properties, CSS Styling (Background, Text Format, Controlling Fonts), Working with block elements and objects, Working with Lists and Tables.	6	ATL2
IV	XML: Creating XML documents, overview of working with elements and attributes	6	ATL2 ATL6
V	JavaScript: Introduction to JavaScript, Identifier and Operator, Control Structure, Functions DOM, Numbers and String Functions, Arrays and Event handling in JavaScript, Bootstrapping.	6	ATL2 ATL6
Total Hours		30	

ADDITIONAL RESOURCES

A. <https://www.halvorsen.blog/documents/programming/web/resources/>

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B. Remedial classes for slow learners:

As per the AUMP SOP for slow and fast learners.

SUGGESTED READINGS:

Textbooks

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2. Doug Tidwell, ”XSLT: Mastering XML Transformations”,2nd Edition, Oreilly, June 2009
3. Jon Duckett,”Javascript and JQuery:Interactive Front-End Web Development”,1stEdition,Wiley,July 2014

Suggested e- resources (Websites/e- books)

- 1 <https://naoshekpam.wordpress.com/>

LIST OF PRACTICAL

	Title	CO Mapping
1.	Develop a webpage using Form tag.	CO1
2.	Develop a webpage using different HTML tags.	CO1
3.	Develop a webpage using Table tag.	CO1
4.	Develop a webpage using Frame tag	CO2
5.	Develop a static website using HTML tags.	CO2,3
6.	Creating XML documents	CO2,3
7.	Creating DTD to validate XML documents.	CO3
8.	Creating XSLT Stylesheet for formatting data.	CO5
9.	Develop a Javascript Form.	CO3
10.	Creating a Javascript POPUP Message.	CO5
11.	Change Link colors using CSS	CO5
12.	Create a TextBox using CSS	CO5
13.	Center-Align elements using CSS	CO6

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COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcomes	Correlation with POs												Correlation with PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO 3
CO1	3	3	2	1	2	–	–	–	–	–	–	1			
CO2	2	2	2	–	3	–	–	–	–	1	–	1			
CO3	2	1	2	–	3	–	–	–	–	1	–	1			
CO4	2	1	2	–	3	–	–	–	–	1	–	1			
CO5	2	1	3	–	3	–	–	–	–	1	–	1			
CO6	2	2	2	1	3	–	–	–	–	1	–	2			

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				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
MCA103	SEC	Internet Web Programming	Max	60	20	20	30	20	3	0	4	5
			Min	24	16		13.5	9				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

10. Provide an introduction to the fundamental concepts of HTML, CSS, XML, Javascript
11. Learn CSS Grid Layout
12. Develop basic programming skills using Javascript
13. Develop skills in analyzing the usability of a website.
14. Understand the principles of creating an effective Web Page.

COURSE ALIGNMENT WITH UNSDG:

The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education)** and **SDG 9 (Industry, Innovation and Infrastructure)**.

COURSE OUTCOMES:

After completion of the course, the student will be able to:

- CO1** Develop algorithms for problems.
- CO2** Define the basics of JavaScript.
- CO3** Visualize the basic concept of HTML.
- CO4** Recognize the elements of HTML.
- CO5** Introduce basics concept of CSS.
- CO6** Develop the concept of XML, XSLT, DTD and XPath.

TEACHING PEDAGOGY:

- T1** Classroom teaching (white board), Power Point Presentations, Interactive lectures, Inquiry-based teaching
- T2** ABL activities, Assignments, Flip Class/ Seminars, Quizzes, Oral Viva-voce examination

ASSESSMENT TOOLS:

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ATL6 Assignments

ATL7 Poster

ATL8 Oral Viva-voce examination

PREREQUISITES:

Basic Computer Knowledge

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
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IV	XML: Creating XML documents, overview of working with elements and attributes	9	ATL2 ATL6
V	JavaScript: Introduction to JavaScript, Identifier and Operator, Control Structure, Functions DOM, Numbers and String Functions, Arrays and Event handling in JavaScript, Bootstrapping.	9	ATL2 ATL6
Total Hours		45	

ADDITIONAL RESOURCES

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4.	Develop a webpage using Frame tag	CO2
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9.	Develop a Javascript Form.	CO3
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MCA103	SEC	Internet Web Programming	Max	60	20	20	30	20	3	0	4	5
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COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcomes	Correlation with POs												Correlation with PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	3	3	2	1	2	–	–	–	–	–	–	1			
CO2	2	2	2	–	3	–	–	–	–	1	–	1			
CO3	2	1	2	–	3	–	–	–	–	1	–	1			
CO4	2	1	2	–	3	–	–	–	–	1	–	1			
CO5	2	1	3	–	3	–	–	–	–	1	–	1			
CO6	2	2	2	1	3	–	–	–	–	1	–	2			

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MCA203	DCC	Data Base Management System	Max	60	20	20	30	20	3	0	2	4
			Min	24	16		13.5	9				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

15. To provide students with basic concepts in information system and the benefits of these systems
16. To provide the knowledge of systems definition, systems requirements and information needed by the decision maker
17. To understand the role, requirement and operations that an analyst needed to analyse, design, and implement the systems Develop skills in analysing the usability of a website.
18. To identify several methods to enhance and develop information systems and to manage the information system recourses.
19. To explain several ethical issues in information system.
20. To provide the knowledge of business data modelling for the designing of efficient information systems.
21. To explain the various issues related with Data Security.

COURSE ALIGNMENT WITH UNSDG:

The Course aims to fulfill the United Nations Sustainable Development Goals, **SDG 4 (Quality Education)** and **SDG 9 (Industry, Innovation and Infrastructure)**.

COURSE OUTCOMES:

After completion of the course, the student will be able to:

- CO1** To differentiate between data, information, and knowledge.
- CO2** Create, maintain and manipulate a relational database using SQL.
- CO3** Design and build a simple database system and demonstrate competence with the fundamental tasks involved with modelling, designing, and implementing an information system.
- CO4** Describe the characteristics of database transactions.
- CO5** Understand the transaction processing system and functional area information system.

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ASSESSMENT TOOLS:

ATL1 Quiz

ATL2 Activity Based Learning

ATL3 Midterm Exams

ATL4 Flip Class

ATL5 Seminar Presentation

ATL6 Assignments

ATL7 Poster

ATL8 Oral Viva-voce examination

PREREQUISITES:

Basic Computer Knowledge

SYLLABUS:

Module	Descriptors/Topics	Hours	Assessment Tools
I	Introduction: Introduction to Databases and Transactions, Purpose of Database System- Database System, Database system Vs file system, Database System concepts and architecture, Advantage of DBMS approach, various view of data, data independence, schema and subschema and instances, primary Database languages, Database administrator and users, data dictionary.	9	ATL3 ATL6 ATL 3 ATL6
II	Concepts of data models, ER model: basic concepts, notation for ER diagram, design issues, mapping constraint, Concepts of keys: super, candidate, primary, alternate, foreign, weak and strong entity sets,	9	ATL3 ATL6

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	specialization and generalization, aggregation, inheritance, design of ER schema, reduction of ER schema to tables, reduction of ER diagrams to tables, extended ER model, relationships of higher degree.		
III	Relational data Model and Language: Relational Algebra: concepts, domains, relations, kind of relations, relational database, integrity constraints: entity integrity, referential integrity, Keys constraints, Domain constraints, The structure, relational algebra with extended operations, modifications of Database. Relational Calculus: idea of relational calculus, tuple and domain calculus, Domain relational Calculus, calculus Vs algebra, computational capabilities.	9	ATL3 ATL5 ATL6
IV	Relational Database Design: basic concepts and definitions, trivial and non-trivial dependencies, closure set of dependencies and of attributes, irreducible set of dependencies, Canonical Cover. Normalization: Introduction, non-loss decomposition, FD diagram, first, second, third Normal forms, dependency preservation, BCNF, multi valued dependencies and fourth normal form, Join dependency and fifth normal form. Codd's rules, Relational Schemas, Introduction to UML, Alternative approaches to database design.	9	ATL3 ATL6
V	SQL: Introduction, basic structure of SQL, Characteristics and Advantage of SQL set operations, aggregate functions, null values, SQL data types and literals. SQL operators, Types of SQL commands. Nested sub queries, derived relations, modification of Database, Aggregate functions. Insert, update and delete operations. Triggers in SQL. Views: Introduction to views, data independence, security, updates on views, comparison between tables and views Distributed Database: basic idea, distributed data storage. Concepts of Transaction, concurrency and Recovery: basic concepts, ACID properties, Transaction states, Implementation of atomicity and durability, concurrent executions.	9	ATL6
Total Hours		45	

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SEMESTER-I (2026-28)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME						L	T	P	CREDITS
			Marks	THEORY			PRACTICAL					
				END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
MCA203	DCC	Data Base Management System	Max	60	20	20	30	20	3	0	2	4
			Min	24	16		13.5	9				

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit; *Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

SUGGESTED READINGS:

Textbooks

1. A Silberschatz, H.F Korth, Sudersan, "Database System Concepts", 6th Edition, MGH Publication 2013.
2. C.J. Date, "An introduction to Database Systems", 6th Edition, Pearson 2003.
3. Elmasri & Navathe, "Fundamentals of Database systems", 7th Edition, Pearson 2015.
4. B.C. Desai, "An introduction to Database systems", BPB.
5. Raghu Ramakrishnan, "Database Management Systems", 3rd Edition, TMH 2014.

Suggested e- resources (Websites/e- books)

1. <https://ebooks.schandgroup.com/>
2. <https://www.geeksforgeeks.org/dbms/dbms/>

LIST OF PRACTICAL

	Title	CO Mapping
1.	To study Basic SQL commands (create database, create table, use, drop, insert) and execute the following queries using these commands: • Create a database named 'Employee'. • Use the database 'Employee' and create a table 'Emp' with attributes 'ename', 'ecity', 'salary', 'enumber', 'eaddress', 'deptname'. • Create another table 'Company' with attributes 'cname', 'ccity', 'empnumber' in the database 'Employee'.	CO2
2.	To study the viewing commands (select , update) and execute the following queries using these commands: • Find the names of all employees who live in Delhi. • Increase the salary of all employees by Rs. 5,000. • Find the company names where the number of employees is greater than 10,000. • Change the Company City to Gurgaon where the Company name is 'TCS'.	CO2,3
3.	To study the commands to modify the structure of table (alter, delete) and execute the following queries using these commands: • Add an attribute named 'Designation' to the	CO8

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	table 'Emp'. • Modify the table 'Emp', Change the datatype of 'salary' attribute to float. • Drop the attribute 'deptname' from the table 'emp'. • Delete the entries from the table 'Company' where the number of employees are less than 500.	
4.	To use (and, or, in , not in, between , not between , like , not like) in compound conditions and execute the following queries using them: • Find the names of all employees who live in 'Gurgaon' and whose salary is between Rs. 20,000 and Rs. 30,000. • Find the names of all employees whose names begin with either letter 'A' or 'B'. • Find the company names where the company city is 'Delhi' and the number of employees is not between 5000 and 10,000. • Find the names of all companies that do not end with letter 'A'.	CO8,9
5.	Using aggregate functions execute the following queries: • Find the sum and average of salaries of all employees in computer science department. • Find the number of all employees who live in Delhi. • Find the maximum and the minimum salary in the HR department.	CO6,7
6.	. To execute the following queries using study the grouping commands (group by, order by) List all employee names in descending order. • Find number of employees in each department where number of employees is greater than 5. • List all the department names where average salary of a department is Rs.10,000.	CO 9,10
7.	To write SQL queries Alter table 'Emp' and make 'enumber' as the primary key. • Alter table 'Company' and add the foreign key constraint. • Add a check constraint in the table 'Emp' such that salary has the value between 0 and Rs.1,00,000. • Alter table 'Company' and add unique constraint to column cname. • Add a default constraint to column ccity of table company with the value 'Delhi'. • Rename the name of database to 'Employee1'. • Rename the name of table 'Emp' to 'Emp1'. • Change the name of the attribute 'ename' to 'empname'.	CO10,11
8.	. To execute following queries using appropriate Retrieve the complete record of an employee and its company from both the table using joins. • List all the employees working in the company 'TCS'.	CO7,8
9.	To study the various set operations and execute the following queries using these commands: • List the enumber of all employees who live in Delhi and whose company is in Gurgaon or if both conditions are true. • List the enumber of all employees who live in Delhi but whose	CO9,10

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	company is not in Gurgaon.	
10.	To study the various scalar functions and string functions (power, square, substring, reverse, upper, lower, concatenation) and execute the following queries using these commands: • Reverse the names of all employees. • Change the names of company cities to uppercase. To study the various scalar functions and string functions (power, square, substring, reverse, upper, lower, concatenation) and execute the following queries using these commands: • Reverse the names of all employees. • Change the names of company cities to uppercase.	CO10,11
11.	To study the commands for views and execute the following queries using these commands: • Create a view having ename and ecity. • In the above view change the ecity to 'Delhi' where ename is 'John'. • Create a view having attributes from both the tables. • Update the above view and increase the salary of all employees of IT department by Rs.1000.	CO11
12.	To study the commands involving indexes and executes the following queries: • Create an index with attribute ename on the table employee. • Create a composite index with attributes cname and ccity on table, company. • Drop all indexes created on table, company.	CO11

COURSE ARTICULATION MATRIX (MAPPING OF COs WITH POs)

Course Outcomes	Correlation with POs												Correlation with PSOs		
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	3	2	1	-	-	-	-	-	-	1	-	2			
CO2	3	3	2	2	3	-	-	-	1	1	1	2			
CO3	3	3	3	2	3	-	-	-	1	2	2	2			
CO4	2	2	1	2	2	-	-	-	-	1	1	2			
CO5	2	2	2	1	2	1	-	-	1	1	2	2			

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