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Ahmednagar Jilha Maratha Vidya Prasarak Samaj's

New Arts, Commerce, and Science College Ahmednagar (Autonomous)

(Affiliated to Savitribai Phule Pune University, Pune)

National Education Policy (NEP)
Choice Based Credit System (CBCS)

Programme Framework

BCA(Science)

Implemented from

Academic Year 2024-25

Ahmednagar Jilha Maratha Vidya Prasarak Samaj's

New Arts, Commerce and Science College, Ahmednagar (Autonomous)

Board of Studies in Computer Applications

Sr. No.	Name	Designation
1.	Prof.Arun.D.Gangarde	Chairman
2.	Prof. Priyamvada Patil	Member
3.	Dr.Shraddha Ingale	Member
4.	Dr.Mudassar Shaikh	Member
5.	Dr.Santosh Khamitkar	Academic Council Nominee
6.	Dr. Shankar Mali	Academic Council Nominee
7.	Dr.Nitin Patil	Vice-Chancellor Nominee
8.	Mr.Summit Suryawanshi	Alumni
9.	Dr.Deepak Shikarpur	Industry Expert
10.	Prof.Deepali Jagdale	Dr.Madhukar Shelar
11.	Dr.Madhukar Shelar	Dr.Madhukar Shelar

1. Prologue/ Introduction of the programme:

2. The Bachelor of Computer Applications (BCA) ia a undergraduate program of four-year that span eight semesters.
3. The course is mainly designed to bridge the gap between the study of computers and its applications.
4. This program aims to shape computer professionals with the right moral and ethical values and can prepare students to face the challenges and opportunities in the IT Industry of India by building strong foundations.
5. The syllabus focuses on the core fundamentals of computer science, but generally undergoes revision according to the industry requirement with the aim of increasing employment opportunities for students.
6. BCA graduates can seek job opportunities in fields like software development, web design, systems management, quality assurance and software testing, Data Science,Cloud Computing.
7. A BCA graduate can work in IT companies big and small in various roles.

2. Programme Outcomes (POs)

- An ability to apply knowledge of computing fundamentals for the solution of complex Problems.
- An ability to design and develop as model, component, or process to meet desired needs with in constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.
- Select and apply appropriate techniques, resources and modern IT tools, including prediction and modeling.
- An understanding of professional, social and ethical responsibility, norms of Industry practice.
- An ability to function with multi-disciplinary teams
- An ability to exhibit knowledge understanding and application management principles.

BCA(Science) Programme Framework: Credit Distribution

Level / Difficulty	Sem	Subject-1 (Selected as Major)						Subject-2		Subject-3		(SEC)	GE/OE		IKS	AEC	VEC	CC	Total
		T		P				T	P	P	T	P	T	P					
Certificate 4.5 / 100	I	02		02				02	02	02	02	-	02		02	02	02	02	22
	II	02		02				02	02	02	02	02	-	02	--	02	02	02	22
		Credits Related to Major						Selected as Minor											
		Core		Elective		VSC	FP / OJT/ CEP/RP												
		T	P	T	P	P	P	T	P	-		P	T	P	-	-	-	-	-
Diploma 5.0 / 200	III	04	02	--		02	02	02	02	-		02	02		-	02	-	02	22
	IV	04	02	--		02	02	02	02	-		02		02	--	02	-	02	22
Degree 5.5 /300	V	06	04	02	02	2	2	02	-	-		-	-		02	-	-	-	22
	VI	06	04	02	02	2	4	02	-	-		-	-		-	-	-	-	22
Total		24	16	04	04	08	10	10	08	04	04	06	08		04	08	04	08	132
6.0/400 Honours	VII	08	06	02	02	-	RM-04												22
	VIII	08	06	02	02		OJT-04												22
6.0/400 Honours with Research	VII	06	04	02	02		RM-04 RM-04												22
	VIII	06	04	02	02		RM-08												22
Total		40/36	28/24	08	08	08	18/26	10	08	04	04	06	04	04	04	08	04	08	176

BCA(Science) Programme Framework: Course Distribution

Level / Difficulty	Sem	Subject-1 (Selected as Major)						Subject-2		Subject-3		(SEC)	GE/OE		IKS	AEC	VEC	CC	Total
		T		P				T	P	P	T	P	T	P					
Certificate 4.5 / 100	I	01		01				01	01	01	01	-	01		01	01	01	01	11
	II	01		01				01	01	01	01	01	-	01	--	01	01	01	11
		Credits Related to Major						Selected as Minor											
		Core		Elective		VSC	FP / OJT/ CEP/RP												
		T	P	T	P	P	P	T	P	-		P	T	P	-	-	-	-	-
Diploma 5.0 / 200	III	02	01	--		01	FP-01	01	01	-		01	01		-	01	-	01	11
	IV	02	01	--		01	CEP-01	01	01	-		01		01	--	01	-	01	11
Degree 5.5 /300	V	03	02	01	01	01	FP-01	01	-	-		-	-		01	-	-	-	11
	VI	03	02	01	01	01	OJT-01	01	-	-		-	-		-	-	-	-	10
Total		12	08	02	02	04	04			02	02	03	04		02	04	02	04	65
6.0/400 Honours	VII	03	03	01	01	-	RM-01												09
	VIII	03	03	01	01		OJT-01												09
6.0/400 Honours with Research	VII	02	02	01	01		RM-01 RM-01												08
	VIII	02	02	01	01		RM-01												07
Total		18/16	14/12	04	04	04	06/07	06	04	02	02	03	04		02	04	02	04	83/80

BCA(Science): Credit and Course Distribution in Brackets

Level / Difficulty	Sem	Subject-1							Total
		T		P					
4.5	I	02 (01)		02 (01)					04(02)
	II	02 (01)		02 (01)					04(02)
		Credits Related to Major						IKS	
		Core		Elective		VSC	FP / OJT/ CEP		
		T	P	T	P	P	P	T	
5.0	III	04(02)	02(01)	--		02(01)	FP-02(01)		10(05)
	IV	04(02)	02(01)	--		02(01)	CEP-02(01)		10(05)
5.5	V	06(03)	04(02)	02(01)	02(01)	02(01)	FP-02(01)	02(01)	20 (10)
	VI	06(03)	04(02)	02(01)	02(01)	02(01)	OJT-04(01)		20(09)
Total		12	08	(02)	(02)	04	04	(01)	33
6.0	VII	03	03	(01)	(01)	-	RM-04(01)		22(09)
	VIII	03	03	(01)	(01)		OJT-04(01)		22(09)
6.0	VII	(02)	(02)	(01)	(01)		RM-04(01) RP-04(01)		22(08)
	VIII	(02)	(02)	(01)	(01)		RM-08(01)		22(07)
		18/16	14/12	04	04	04	06/07	(01)	51/48

Programme Framework (Courses and Credits): BCA(Science)

Sr. No.	Year	Semester	Level	Course Type	Course Code	Title	Credits
1.	I	I	4.5	DSC-01	BCA 111T-A	Fundamentals of Computers	02
2.	I	I	4.5	DSC-01	BCA 111T-B	Fundamentals of Database Management Systems	02
3.	I	I	4.5	DSC-02	BCA 112P-A	Laboratory on Fundamentals Of Computers	02
4.	I	I	4.5	DSC-02	BCA 112P-B	Laboratory on Fundamentals of Database Management Systems	02
5.	I	II	4.5	DSC-03	BCA 121T-A	Database Management Systems-I	02
6.	I	II	4.5	DSC-03	BCA 121T-B	Advance Database Management Systems	02
7.	I	II	4.5	DSC-03	BCA 121T-C	Web Technology	02
8.	I	II	4.5	DSC-03	BCA 121T-D	Digital Marketing	02

9.	I	II	4.5	DSC-04	BCA 122P-A	Laboratory on Database Management Systems-I	02
10.	I	II	4.5	DSC-04	BCA 122P-B	Laboratory on Advance Database Management Systems	02
11.	I	II	4.5	DSC-04	BCA 122P-C	Laboratory on Web Technology	02
12.	I	II	4.5	DSC-04	BCA 122P-D	Laboratory on Digital Marketing	02
13.	II	III	5.0	DSC-05	BCA 231T	Database Management Systems-II	**02**
14.	II	III	5.0	DSC-06	BCA 231T	Data Structures using C	**02**
15.	II	III	5.0	DSC-07	BCA 231P	Laboratory on Database Management Systems-II	**02**
16.	II	III	5.0	VSC-01	BCA 234P	Laboratory on Data Structures using C	**02**
17.	II	III	5.0	FP-01	BCA 235T	Field Project	**02**
18.	II	IV	5.0	DSC-08	BCA 241T	Python programming	**02**
19.	II	IV	5.0	DSC-09	BCA 242T	Core Java	**02**
20.	II	IV	5.0	DSC-10	BCA 243P	Python Lab	**02**
21.	II	IV	5.0	VSC-02	BCA 243P	Core Java Lab	**02**
22.	II	IV	5.0	CEP-01	BCA 245P	Community Engagement Project	02
23.	III	V	5.5	DSC-11	BCA 351T	DJango	02
24.	III	V	5.5	DSC-12	BCA 352T	Advance Java	02
25.	III	V	5.5	DSC-13	BCA 353T	C#	02
26.	III	V	5.5	DSC-14	BCA 354P	Laboratory on DJango	02
27.	III	V	5.5	DSC-15	BCA 355P	Laboratory on Advance Java	02
28.	III	V	5.5	DSE-01	BCA 356T	Go Lang OR Data Mining	02
29.	III	V	5.5	DSE-02	BCA 357P	Laboratory on Go Lang OR Data Mining	02
30.	III	V	5.5	VSC-03	BCA 358P	Laboratory on C#	02
31.	III	V	5.5	FP-02	BCA 359P	Field Project	02
32.	III	V	5.5	IKS-02	BCA 360T	IKS (Major Specific)	02
33.	III	VI	5.5	DSC-16	BCA 361T	Android programing	02
34.	III	VI	5.5	DSC-17	BCA 362T	Software Testing	02
35.	III	VI	5.5	DSC-18	BCA 363T	ReactJs	02
36.	III	VI	5.5	DSC-19	BCA 364P	Laboratory on Android programing	02
37.	III	VI	5.5	DSC-20	BCA 365P	Laboratory on Software Testing	02
38.	III	VI	5.5	DSE-03	BCA 366T	Internet of Things OR Cloud Computing	02
39.	III	VI	5.5	DSE-04	BCA 367P	Laboratory on	02

						Internet of Things OR Cloud Computing	
40.	III	VI	5.5	VSC-04	BCA 368P	Laboratory on ReactJs	02
41.	III	VI	5.5	OJT-01	BCA 369T	On-Job Training	04

Ahmednagar Jilha Maratha Vidya Prasarak Samaj's

New Arts, Commerce and Science College, Ahmednagar

(Autonomous)

Syllabus

BCA(Science)

Title of the Course: Fundamentals of Computers								
Year: I				**Semester: I**				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
DSC-01	BCA 111T-A	02	00	02	30	15	35	50

Learning Objectives:

1.To learn the basic components of a computer along with their functions.
2. To learn generation, classification and application of computers.
3. Knowledge of computer equipment, including both hardware and software

Course Outcomes (Cos): After completion of this course, student will be able to :-

1.Understanding the concept of input and output devices of computers and recognize the basic terminologies.
2.Familiarize operating systems, programming languages, networking, multimedia and internet.
3. Understand the basic computer organization.
4. Understand the memory and I/O organization of the computer.

Detailed Syllabus:

Unit I : Introduction to Computer System **04 hrs**

1.1 Introduction, Characteristics of Computers, Block diagram of computer
1.2. Types of computers and features- Mini Computers, Micro Computers, Mainframe Computers, Super Computers, Laptops and Tablets
1.3 Types of Programming Languages- Machine Languages, Assembly Languages, High Level Languages
1.4. Translators- Assembler, Compiler, Interpreter
1.5. Data Organization- Drives, Files, Directories

Unit II : Introduction to Computer Peripherals **04 hrs**

2.1. Primary and Secondary storage devices
2.2. Primary storage devices – RAM, ROM, PROM, EPROM
2.3. Secondary Storage Devices - CD, HD, Pen drive
2.4. I/O Devices- Scanners, Digitizers, Plotters, LCD, Plasma Display,
2.5. Pointing Devices –Mouse, Joystick, Touch Screen
2.6. Number Systems

2.7 Introduction to Binary, Octal, Hexadecimal system Conversion, Simple Addition, Subtraction, Multiplication, Division.

Unit III: Computer software and hardware 03 hrs

3.1 Introduction Meaning of computer software and hardware, difference between hardware and software,
3.2 Types of software .
3.3 Types of computer languages (low level, machine level, assembly level, high level)
3.4 Translator, assembler, compiler, interpreter

Unit IV: Operating System 04 hrs

4.1 Definition and function.
4.2 Batch processing.
4.3 Spooling.
4.4 Multiprogramming
4.5 Multiprocessing
4.6 Time sharing.
4.7 Online and real time processing.
4.8 Library and Utility program.

Unit V : Introduction to computer organization 08 hrs

5.1 Architecture of computer organization
5. 2 Block diagram of CPU
5.3 Functions of CPU
5.4 General register organization
5.5 Flags, Concept of RISC and CISC, ALU.
5.6 Organization of pipelining
5.7 Overview of super-scalar and super-pipelined organizations
5.8 Control unit operation
5.9 System buses Multi-bus organization and stack organization

Unit VI: Memory and I/O organization 07 hrs

6.1 System memory
6.2 classification of memories
6.3 Memory organization
6.4 Cache memory Types and organization
6.5 Virtual memory Meaning, implementation
6.6 Memory management unit.
6. 7 Input/output Types of I/O data transfer, Need of I/O interface, Accessing I/O devices
6.8 Direct Memory Access and DMA controller
6.9 Interrupts and Interrupt Controllers.

Suggested Readings/Material:

1. Computer Fundamental By P.K. Sinha Chapters: 1-5, 7-10, 12, 14-16.
2. Computer for Beginner By V.P. Jaggi and S. Jain. Chapters : 1, 2, 3, 5, 7
3. Computer organization - V. Carl, Zvonko G., Safwat G.Zaky, McGraw-Hill, international Edition
4. Computer organization - William Stalling, PHI, Fourth Edition3.

Ahmednagar Jilha Maratha Vidya Prasarak Samaj's

New Arts, Commerce and Science College, Ahmednagar

(Autonomous)

Syllabus

BCA(Science)

Title of the Course:Fundamentals of Database Management Systems								
Year: I				Semester: I				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
DSC-01	BCA 111T-B	02	00	02	30	15	35	50

Learning Objectives:

1. Understand the fundamental concepts of database management systems, including data models, schema, and instances.
2. Define and differentiate between various types of databases such as relational, hierarchical, network, and object-oriented.
3. Explain the importance of data independence and data integrity in database systems.

Course Outcomes (Cos):After completion of this course, student will be able to :-

1. To understand the different issues involved in the design and implementation of a database system.
2. To study the physical and logical database designs and understand, database modelling.
3. To understand and learn Structured Query language and data manipulation language.
4. To develop an understanding of essential DBMS concepts.

Detailed Syllabus:

Unit I: File Organization **05 hrs**

1.1 Introduction –Basic concept of File, File system, File operations
1.2 Physical / logical files
1.3 Record organization (fixed, variable length)
1.4 Types of file organization (heap, sorted, indexed, hashed)

Unit II: Introduction of DBMS **05 hrs**

2.1 Overview- Data, information, database, DBMS, field, record
2.2 File system Vs. DBMS
2.3 Component of database system
2.4 Describing & storing data (Data models - relational, hierarchical, network),
2.5 Levels of abstraction
2.6 Data independence
2.7 Structure of DBMS
2.8 Users of DBMS
2.9 Advantages of DBMS

Unit III: Conceptual Database Design (E-R model) 03 hrs

3.1 Overview of DB design
3.2 ER data model- E-R diagram (entities, attributes, entity sets, relations, relationship sets)
3.3 Additional constraints
(key constraints, participation constraints, strong entities, weak entities)
3.4 Additional features of database design: aggregation, generalization, specialization
3.5 Case studies

Unit IV: Structure of Relational Databases 02 hrs

4.1 Concepts of a table, a row, a relation, a tuple and a key in a relational database
4.2 Conversion of ER to Relational model
4.3 Integrity constraints
(primary key, referential integrity, Null constraint, unique constraint, check constraint)

Unit V: SQL 10 hrs

5.1 Introduction
5.2 Basic structure of SQL query
5.3 DDL commands (create, drop, alter) with examples
5.4 DML commands (insert, update, delete) with example
5.5 DCL commands (grant, revoke)
5.6 DQL commands (select)
5.7 Set operations
5.8 Aggregate functions
5.9 Null values
5.10 Nested Subqueries
5.11 Modifications to Database (with examples)
5.12 SQL mechanisms for joining relations (inner joins, outer joins and their types)
5.13 Examples on SQL (case studies)

Unit VI: Relational Database Design 05 hrs

6.1 Pitfalls in Relational-Database Design
(undesirable properties of a RDB design like repetition, inability to represent certain information)
6.2 Functional dependencies
(Basic concepts, Closure of set of functional dependencies, Closure of an Attribute set)
6.3 Concept of a Super Key and a primary key (Algorithm to derive a Primary Key for a relation)
6.4 Concept of Decomposition, Desirable Properties of Decomposition
(Lossless join and Dependency preservation)
6.5 Concept of Normalization - Normal forms (only definitions) 1NF, 2NF, 3NF, BCNF
6.6 Examples on Normalization

Suggested Readings:

1. Henry F. Korth, Abraham Silberschatz, S. Sudarshan Database System Concepts,

ISBN: 9780071289597, Tata McGraw-Hill Education

2. Korry Douglas, PostgreSQL, ISBN: 9780672327568

3. John Worsley, Joshua Drake Practical PostgreSQL (B/CD), ISBN: 9788173663925 Shroff/O'reilly

4. Joshua D. Drake, John C Worsley Practical PostgreSQL, O'Reilly

5. Richard Stones, Neil Matthew Beginning Databases with PostgreSQL, From Novice to Professional, 2nd Edition Apress

6. Elmasri and Navathe Fundamentals of Database Systems 4th Edition

7. S. K. Singh, Database Management System: Concepts, design & applications Pearson publication.

Ahmednagar Jilha Maratha Vidya Prasarak Samaj's

New Arts, Commerce and Science College, Ahmednagar

(Autonomous)

Syllabus

BCA(Science)

Title of the Course: Laboratory on Fundamentals of Computers								
Year: I				**Semester: I**				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
DSC-02	BCA 112P-A	00	02	02	60	15	35	50

Learning Objectives:

1.To learn the basic DOS Commands
2. To learn installations of operating systems.
3. learn to work in Word,excel and powerpoint

Course Outcomes (Cos): After completion of this course, student will be able to :-

1. Execute the DOS Commands
2. Create Word Documents,Excel sheets and powerpoint presentation.
3. Work in Linux Environment
4. Exceute shell commands.

Detailed Syllabus:

Assignment 1 DOS Commands

Assignment 2 Operating System Installation

Assignment 3 Microsoft Word I

Assignment 4 Microsoft Word II

Assignment 5 Spreadsheet I

Assignment 6 Spreadsheet II

Assignment 7 Microsoft PowerPoint I

Assignment 8 Microsoft PowerPoint II

Assignment 9 Linux Operating System

Assignment 10 shell commands

Suggested Readings/Material:

1. Microsoft Office Step by Step (Office 2021 and Microsoft 365) by Curtis Frye (Author), Joan Lambert (Author)
2. Learn Microsoft Office 2021 - Second Edition, by Linda Foulkes, Released July 2022 Publisher(s): Packt Publishing

3. Guide to MS-DOS Commands, Van Wolverton Microsoft Press, 1989
4. Shell Scripting: How to Automate Command Line Tasks Using Bash Scripting and Shell Programming by Jason Cannon (

Ahmednagar Jilha Maratha Vidya Prasarak Samaj's
New Arts, Commerce and Science College, Ahmednagar
(Autonomous)
Syllabus
BCA(Science)

Title of the Course: Laboratory on Fundamentals of Database Management Systems								
Year: I				Semester: I				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
DSC-02	BCA 112P-B	00	02	02	60	15	35	50

Learning Objectives:

1. Use typical data definitions and manipulation commands.
2. Design applications to test Nested and Join Queries.

Course Outcomes (Cos) On completion of the course, student will be able to–

1. Prepare E-R Diagram for the given problem statement
2. Formulate appropriate SQL DDL Queries
3. Formulate appropriate SQL DML Queries

Detailed Syllabus:

Assignment 1 Case study – ER diagram
Assignment 2 Case study – ER diagram (with generalization).
Assignment 3 Case study – ER diagram (with aggregation).
Assignment 4 Using PostgreSQL (demo of PostgreSQL).
Assignment 5 Data Definition queries (Create)
Assignment 6 Data Definition queries (Alter)
Assignment 7 Data Definition queries (Drop)
Assignment 8 Data Manipulation queries (Insert)
Assignment 9 Data Manipulation queries (Delete)
Assignment 10 Data Manipulation queries (Update)
Assignment 11 SQL DML Select queries
Assignment 12 Queries using joins

Suggested Readings:

1. Henry F. Korth, Abraham Silberschatz, S. Sudarshan Database System Concepts, ISBN: 9780071289597, Tata McGraw-Hill Education
2. Korry Douglas, PostgreSQL, ISBN: 9780672327568
3. John Worsley, Joshua Drake Practical PostgreSQL (B/CD), ISBN: 9788173663925 Shroff/O'reilly
4.Workbook Prepared by the college

SEM II

Ahmednagar Jilha Maratha Vidya Prasarak Samaj's

New Arts, Commerce and Science College, Ahmednagar

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Syllabus

BCA(Science)

Title of the Course: Database Management Systems-I								
Year: I				**Semester: II**				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
DSC-03	BCA 121T-A	02	00	02	30	15	35	50

Learning Objectives:

1. Understand the fundamental concepts of database management systems, including data models, schema, and instances.
2. Define and differentiate between various types of databases such as relational, hierarchical, network, and object-oriented.
3. Explain the importance of data independence and data integrity in database systems.

Course Outcomes (Cos):After completion of this course, student will be able to :-

1. To understand the different issues involved in the design and implementation of a database system.
2. To study the physical and logical database designs and understand, database modelling.
3. To understand and learn Structured Query language and data manipulation language.
4. To develop an understanding of essential DBMS concepts.

Detailed Syllabus:

Unit I: File Organization **05 hrs**

1.1 Introduction –Basic concept of File, File system, File operations
1.2 Physical / logical files
1.3 Record organization (fixed, variable length)
1.4 Types of file organization (heap, sorted, indexed, hashed)

Unit II: Introduction of DBMS **05 hrs**

2.1 Overview- Data, information, database, DBMS, field, record
2.2 File system Vs. DBMS
2.3 Component of database system
2.4 Describing & storing data (Data models - relational, hierarchical, network),
2.5 Levels of abstraction
2.6 Data independence
2.7 Structure of DBMS
2.8 Users of DBMS

2.9 Advantages of DBMS

Unit III: Conceptual Database Design (E-R model) 03 hrs

3.1 Overview of DB design
3.2 ER data model- E-R diagram (entities, attributes, entity sets, relations, relationship sets)
3.3 Additional constraints
(key constraints, participation constraints, strong entities, weak entities)
3.4 Additional features of database design: aggregation, generalization, specialization
3.5 Case studies

Unit IV: Structure of Relational Databases 02 hrs

4.1 Concepts of a table, a row, a relation, a tuple and a key in a relational database
4.2 Conversion of ER to Relational model
4.3 Integrity constraints
(primary key, referential integrity, Null constraint, unique constraint, check constraint)

Unit V: SQL 10 hrs

5.1 Introduction
5.2 Basic structure of SQL query
5.3 DDL commands (create, drop, alter) with examples
5.4 DML commands (insert, update, delete) with example
5.5 DCL commands (grant, revoke)
5.6 DQL commands (select)
5.7 Set operations
5.8 Aggregate functions
5.9 Null values
5.10 Nested Subqueries
5.11 Modifications to Database (with examples)
5.12 SQL mechanisms for joining relations (inner joins, outer joins and their types)
5.13 Examples on SQL (case studies)

Unit VI: Relational Database Design 05 hrs

6.1 Pitfalls in Relational-Database Design
(undesirable properties of a RDB design like repetition, inability to represent certain information)
6.2 Functional dependencies
(Basic concepts, Closure of set of functional dependencies, Closure of an Attribute set)
6.3 Concept of a Super Key and a primary key (Algorithm to derive a Primary Key for a relation)
6.4 Concept of Decomposition, Desirable Properties of Decomposition
(Lossless join and Dependency preservation)
6.5 Concept of Normalization - Normal forms (only definitions) 1NF, 2NF, 3NF, BCNF
6.6 Examples on Normalization

Suggested Readings:

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ISBN: 9780071289597, Tata McGraw-Hill Education

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3. John Worsley, Joshua Drake Practical PostgreSQL (B/CD), ISBN: 9788173663925 Shroff/O'reilly

4. Joshua D. Drake, John C Worsley Practical PostgreSQL, O'Reilly

5. Richard Stones, Neil Matthew Beginning Databases with PostgreSQL, From Novice to Professional, 2nd Edition Apress

6. Elmasri and Navathe Fundamentals of Database Systems 4th Edition

7. S. K. Singh, Database Management System: Concepts, design & applications Pearson publication.

Ahmednagar Jilha Maratha Vidya Prasarak Samaj's

New Arts, Commerce and Science College, Ahmednagar

(Autonomous)

Syllabus

BCA(Science)

Title of the Course: Advance Database Management Systems								
Year: I					**Semester: II**			
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
DSC-03	**BCA 121T - B**	02	00	02	30	15	35	50

Learning Objectives:

1. To Summarize the properties of transactions and concurrency control mechanisms
2. To outline the various storage and optimization techniques
3. To explain the different advanced databases

Course Outcomes (Cos)

On completion of the course, students will be able to–

1. Compare and contrast different concurrency control and recovery techniques.
2. Apply mechanisms for database security.
3. Analyze various database system architectures**.**

Detailed Syllabus:

Unit I: Relational Database Design **06 hrs**

1.1 PL/PostgreSQL: Language Structure
1.2 Controlling the Program Flow, Conditional Statements, Loops
1.3 Views
1.4 Functions
1.5 Handling Errors and Exceptions
1.6 Cursors
1.7 Triggers

Unit II: Transaction Concepts **03 hrs**

2.1 Transaction, Properties of Transaction, States of Transactions
2.2 Concurrent Execution of Transactions and Conflicting Operations
2.3 Schedules, Types of Schedules
2.4 Concept of Serializability, Precedence Graph for Serializability

Unit III: Concurrency Control **08 hrs**

3.1 Ensuring Serializability by Locks, Different Lock Modes 2PL And Its Variations Multiple Granularity Locking Protocol
3.2 Basic Timestamp Method for Concurrency, Thomas Write Rule
3.3 Locks with Multiple Granularity, Dynamic Database Concurrency (Phantom Problem)
3.4 Timestamps versus Locking
3.5 Optimistic Concurrency Control Algorithm, Multi Version Concurrency Control

3.6 Deadlock Handling Methods –
Detection And Recovery (Wait For Graph).
Prevention Algorithms (Wound-Wait, Wait-Die)
Deadlock Recovery Techniques (Selection of Victim, Starvation, Rollback**)**

Unit IV: Crash Recovery **08 hrs**

4.1 Transaction Failure Classification
4.2 Recovery Concepts
4.3 Checkpoints
4.4 Recovery with Concurrent Transactions (Rollback, Checkpoints, Commit)
4.5 Log Base Recovery Techniques (Deferred and Immediate Update)
4.6 Buffer Management
4.7 Database Backup and Recovery from Catastrophic Failures
4.8 Shadow Paging

Unit V: Database Security **05 hrs**

5.1 Introduction to Database Security Concepts
5.2 Methods for Database Security
5.3 Discretionary Access Control Method
5.4 Mandatory Access Control and Role Based Access Control for MultilevelSecurity
5.5 Use of Views in Security Enforcement

Unit VI : Database System Architectures **05 hrs**

6.1 Centralized and Client – Server Architectures
6.2 Server System Architectures
6.3 Introduction to Parallel Systems
6.4 Introduction to Distributed Systems
6.5 Introduction to Object Based Databases
6.6 Introduction to Web based databases

Suggested Readings/Material:

1.Fundamentals of Database Systems- Ramez Elmasri, Shamkant B. Navathe, 6th edition– Pearson.
2.Database Management Systems -Raghu Ramakrishnan, Johanne Gehrke, 3rd edition, TataMcGraw Hill
3.Introduction to Database Management System- Bipin Desai, 3rd edition, Galgotia Publication.
4.An Introduction to Database Systems - C.J. Date, 7 th edition, Addison-Wesley
5.Practical PostgreSQL- Joshua D. Drake, John C Worsley, O'Reilly Publications

New Arts, Commerce and Science College, Ahmednagar
(Autonomous)
Syllabus

BCA(Science)

Title of the Course: Web Technology								
Year: I				Semester: II				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
DSC-03	BCA 121T-C	02	00	02	30	15	35	50

Learning Objectives:
1.To learn HTML tags and JavaScript Language programming concepts and techniques.
2.To develop the ability to logically plan and develop web pages.
3.To learn to write, test, and debug web pages using HTML and JavaScript

Course Outcomes (Cos):
After successfully completing this course, a student should be able to:
1. Support the development of web pages
2. Write scripts using JavaScript in a web page
3. To learn and understand the basic concepts of the fundamentals of the web applications.
4. Understand various languages to write the codes for the web pages.

Detailed Syllabus:

UNIT I Web Fundamentals 05 Hrs.
1.1 Introduction to WWW: Protocols and programs, secure connections, application and development tools, the web browser, what is server, Client Server Architecture, dynamic and Static
1.2 Web Design: Web site design principles, planning the site and navigation.

UNIT II HTML 06 Hrs.
2.1 Introduction to HTML, What is HTML, HTML Documents, Basic structure of an HTML document, Creating an HTML document, Mark up Tags Heading-Paragraphs, Line Breaks, HTML Tags.
2.2 Elements of HTML,, Introduction to elements of HTML, Working with Text, Working with Lists, Tables and Frames, Working with Hyperlinks, Images and Multimedia, Working with Forms and controls.

UNIT III CSS 07 Hrs.
3.1 Style sheets: Need for CSS, introduction to CSS, basic syntax and structure
3.2 Using CSS change background images, colors and properties, manipulating texts, using fonts, borders and boxes, margins, padding lists, positioning using CSS, CSS2

Unit IV Javascript 06 Hrs.
4.1 Javascript: Client side scripting, What is Javascript

4.2 How to develop Javascript, simple Javascript, variables, Operators, functions, conditions, loops and repetition

Unit V XML and Advanced tools 06 Hrs.

5.1 XML: Introduction to XML, uses of XML, simple XML, XML key components, DTD and Schemas, Well formed, using XML with application

5.2 Advances in Web Design, Hosting Website, Introduction to Web Design Tools, Introduction to Google Site

Suggested Readings/Material:

1. HTML & CSS: design and build websites (Vol. 15), Duckett, J, (2011). Indianapolis, IN: Wiley
2. Learning web design: A beginner's guide to HTML, CSS, JavaScript, and web graphics, Robbins, J. N., 2 (2012). " O'Reilly Media, Inc.".
3. https://www.w3schools.com

Ahmednagar Jilha Maratha Vidya Prasarak Samaj's
New Arts, Commerce and Science College, Ahmednagar
(Autonomous)
Syllabus
BCA(Science)

Title of the Course: Digital Marketing								
Year: I				**Semester: II**				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
DSC-03	**BCA 121T-D**	02	00	02	30	15	35	50

Learning Objectives:

In this course the students will learn comprehensive overview of the latest digital marketing strategies and techniques, including search engines optimization, social media marketing, content marketing, email marketing and more.

Course Outcomes (Cos) –

After learning this course students will be able to -

1. Understand the concept of Digital Marketing.
2. Learn various tools for Digital Marketing and Search Engines Optimization.
3. Knowledge of Social Media Marketing and Search Engine Management.

Detailed Syllabus:

UNIT I – Introduction to Digital marketing **08**

1.1 Understanding Internet marketing
1.2 Search Engine Optimization
1.3 Search Engine Marketing
1.4 Email Marketing
1.5 Introduction to Digital marketing- Definition and Concept
1.6 Importance and Features of Digital Marketing
1.7 Digital VS Real marketing

UNIT II – Creating Initial Marketing Plan and Web Technology in Digital Marketing 09

2.1 Content Management
2.2 SWOT Analysis
2.3 Target Group Analysis
2.4 Marketing using Websites
2.5 Introduction and Definition of Website
2.6 Importance of Website in Marketing and Promotion

2.7 Types of Websites- Static, Dynamic, freemium, E-commerce, Contextual, Subscription
2.8 Domain name – Definition, Types based on Organization types

UNIT III – Search Engine Optimization (SEO) 09

3.1 Definition and Importance of SEO
3.2 Writing the SEO content
3.2 Understanding Social Media Marketing
3.3 Social Networking (Facebook, LinkedIn, Twitter etc)
3.4 Social Media (Blogging, Video sharing – YouTube, Photo sharing – Instagram, Podcast)
3.5 Web analytics – levels

UNIT IV – Social Media Marketing (SMM) 09

4.1 Introduction and Importance of SMM
4.2 Facebook marketing – Creating Facebook page, Visual identity page, Types of publications, Facebook ads, Creating Facebook Ads, Ads visibility
4.3 Email Marketing – Building Email lists, Crafting an Email, Email marketing plan
4.4 Instagram Marketing – Business strategy, Posting and Engagement, Fine tuning the content

Suggested Readings/Material:

1. Digital Marketing for Dummies – Ryan Deiss and Russ Hennesberry
2. Beginners Guide to Digital marketing (2015)- Romuald Andrade
3. Advertising Management _ Rajeev Batra, John G. Myers, David A. Aaker
4. Web Designing And Publishing – Prof. Satish Jain and M. Geethalyer

Ahmednagar Jilha Maratha Vidya Prasarak Samaj's

New Arts, Commerce and Science College, Ahmednagar

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Syllabus

BCA(Science)

Title of the Course: Laboratory on Database Management Systems-I								
Year: I				**Semester: II**				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
DSC-04	**BCA 122P-A**	00	02	02	60	15	35	50

Learning Objectives:

1. Use typical data definitions and manipulation commands.
2. Design applications to test Nested and Join Queries.

Course Outcomes (Cos) On completion of the course, student will be able to–

1. Prepare E-R Diagram for the given problem statement
2. Formulate appropriate SQL DDL Queries
3. Formulate appropriate SQL DML Queries

Detailed Syllabus:

Assignment 1 Case study – ER diagram
Assignment 2 Case study – ER diagram (with generalization).
Assignment 3 Case study – ER diagram (with aggregation).
Assignment 4 Using PostgreSQL (demo of PostgreSQL).
Assignment 5 Data Definition queries (Create)
Assignment 6 Data Definition queries (Alter)
Assignment 7 Data Definition queries (Drop)
Assignment 8 Data Manipulation queries (Insert)
Assignment 9 Data Manipulation queries (Delete)
Assignment 10 Data Manipulation queries (Update)
Assignment 11 SQL DML Select queries
Assignment 12 Queries using joins

Suggested Readings:

1. Henry F. Korth, Abraham Silberschatz, S. Sudarshan Database System Concepts,

ISBN: 9780071289597, Tata McGraw-Hill Education

2. Korry Douglas, PostgreSQL, ISBN: 9780672327568

3. John Worsley, Joshua Drake Practical PostgreSQL (B/CD), ISBN: 9788173663925

Shroff/O'reilly

4.Workbook Prepared by the college

Ahmednagar Jilha Maratha Vidya Prasarak Samaj's

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Syllabus

BCA(Science)

Title of the Course: Laboratory on Advance Database Management Systems								
Year: I				**Semester: II**				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
DSC-04	BCA 122P-B	00	02	02	60	15	35	50

Learning Objectives:

1. Implement simple applications that use Views.
2. Critically analyze the use of Tables, Views, Functions and Procedures**.**

Course Outcomes (Cos)

On completion of the course, students will be able to–

1. Formulate SQL queries using advanced features
2. Write stored procedures, cursors and triggers using PL/PostgreSQL.
3. Design a database using database normalization technique

Detailed Syllabus:

SECTION I

Assignment 1: Designing a Database using normalization theory for given application/database design

Assignment 2: Simple and Nested Queries

Assignment 3: Views Creation

Assignment 4: Stored Functions

A Simple Stored Function

A Stored Function that returns

A Stored Function recursive

Assignment 5: Cursors

Simple Cursor

Parameterize Cursor

Assignment 6: Error and Exception handling

Simple Exception- Raise Debug Level Messages

Simple Exception- Raise Notice Level Messages

Simple Exception- Raise Exception Level Messages

Suggested Readings/Material:

1.Fundamentals of Database Systems- Ramez Elmasri, Shamkant B. Navathe, 6th edition– Pearson.

2.Database Management Systems -Raghu Ramakrishnan, Johanne Gehrke, 3rd edition, TataMcGraw Hill

3.Introduction to Database Management System- Bipin Desai, 3rd edition, Galgotia Publication.

4.An Introduction to Database Systems - C.J. Date, 7 th edition, Addison-Wesley

5.Practical PostgreSQL- Joshua D. Drake, John C Worsley, O'Reilly Publications

6. Workbook preparedby the college

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Syllabus

BCA(Science)

Title of the Course: Laboratory on Web Technology								
Year: I				**Semester: II**				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
DSC-04	BCA 122P-C	00	02	02	60	15	35	50

Learning Objectives:

1.To learn HTML tags and JavaScript Language programming concepts and techniques.
2.To develop the ability to logically plan and develop web pages.
3.To learn to write, test, and debug web pages using HTML and JavaScript

Course Outcomes (Cos):

After successfully completing this course, a student should be able to:
1. Support the development of web pages
2. Write scripts using JavaScript in a web page
3. To learn and understand the basic concepts of the fundamentals of the web applications.
4. Understand various languages to write the codes for the web pages. List of Assignments to be conducted in practical sessions

Detailed Syllabus:

Assignment 1. Introduction to HTML. Create a basic HTML file0

Assignment 2. Create a static webpage using table tags of HTML

Assignment 3. Create a static web page which defines all text formatting tags of HTML in tabular format

Assignment 4. Create webpage using list tags of HTML

Assignment 5. Create webpage to include image using HTML tag

Assignment 6. Create your class timetable using table tag.

Assignment 7. Create user Student feedback form (use textbox, text area , checkbox, radio button, select box etc.)

Assignment 8. Create employee registration webpage using HTML form objectsWrite html code to develop a webpage having two frames that divide the webpage into two equal rows and then divide the row into equal columns fill each frame with a different background color.

Assignment 9. Create your resume using HTML tags also experiment with colors, text , link , size and also other tags you studied.

SECTION II : CSS

Assignment 1: Apply style sheet in Web page. [inline, embedded and linked]

Assignment 2 :Design a web page of your home town with an attractive background color, text color, an Image, font etc. (use internal CSS).

Assignment 3 :Use Inline CSS to format your resume that you created.

Assignment 4: Use External CSS to format your class timetable as you created.

Assignment 5: Use External, Internal, and Inline CSS to format college web page that you created.

SECTION III :JavaScript

Assignment 1:Develop a JavaScript to display today's date.

Assignment 2: Develop simple calculator for addition, subtraction, multiplication and divisionoperation using JavaScript

Assignment 3 : Create HTML Page with JavaScript which takes Integer number as input and tells whether the number is ODD or EVEN.

Assignment 4: Create HTML Page that contains form with fields Name, Email, Mobile No , Gender , Favorite Color and a button now write a JavaScript code to combine and display the information in textbox when the button is clicked.

Assignment 5: Create simple site by using any tool

Suggested Readings/Material:

1. HTML & CSS: design and build websites (Vol. 15), Duckett, J, (2011). Indianapolis, IN: Wiley
2. Learning web design: A beginner's guide to HTML, CSS, JavaScript, and web graphics, Robbins, J. N., 2 (2012). " O'Reilly Media, Inc.".
3. https://www.w3schools.com

Ahmednagar Jilha Maratha Vidya Prasarak Samaj's

New Arts, Commerce and Science College, Ahmednagar

(Autonomous)

Syllabus

BCA(Science)

Title of the Course: Laboratory on Digital Marketing								
Year: I				**Semester: II**				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
DSC-04	BCA 122P-D	00	02	02	60	15	35	50

Learning Objectives:

In this course the students will learn comprehensive overview of the latest digital marketing strategies and techniques, including search engines optimization, social media marketing, content marketing, email marketing and more.

Course Outcomes (Cos) –

After learning this course students will be able to -

1. Understand the concept of Digital Marketing.
2. Learn various tools for Digital Marketing and Search Engines Optimization.
3. Knowledge of Social Media Marketing and Search Engine Management.

Detailed Syllabus:

Assignments – (Any two)

1. Create your personal blog and create content for a blog.
2. Design content for a website for any hospitality of your choice
3. Draft an emailer for promotion of your brand

Suggested Readings/Material:

1. Digital Marketing for Dummies – Ryan Deiss and Russ Hennesberry
2. Beginners Guide to Digital marketing (2015)- Romuald Andrade
3. Advertising Management _ Rajeev Batra, John G. Myers, David A. Aaker
4. Web Designing And Publishing – Prof. Satish Jain and M. Geethalyer