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 Skeleton and Syllabus of
B.Sc. Computer Science (Major) - II Year

Implemented from

Academic Year 2024-25

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Credit Distribution: B.Sc. Computer Science (Major) including Minor and OE and other courses.

	Type of Courses	III Yr	IV Yrs (Honours)	IV Yrs Research
Major Marathi	Discipline-Specific Courses (DSC)	46	74	66
	Discipline Specific Elective (DSE)	08	16	16
	Skill Enhancement Courses (SEC)	06	06	06
	Vocational Skill Courses (VSC)	08	08	08
	On-Job Training (OJT)	04	08	04
	Field Project (FP)	04	04	04
	Community Engagement and Service (CEP)	02	02	02
	Research project	00	00	12
	Research Methodology	00	04	04
	Indian Knowledge System	02	02	02
	Total (I, II and III Year)	80	124	124
Minor	Minor	20	20	20
Other Courses	Open Elective (OE)/ Multidisciplinary Courses	12	12	12
	Co-Curricular Courses	08	08	08
	Ability Enhancement Courses	08	08	08
	Value Education Courses	04	04	04
	Total	132	176	176

B. Sc. Programme Framework: Credit Distribution

Year	Semester	Level	Major											Minor	OE	CC	AEC	VEC	Total
			DSC		DSE		SEC		VSC		FP/OJT /IN/CEP		IKS						
I	I	4.5	T	P	T	P	T	P	T	P	T	P		T/P	-	-	-	-	-
I	II	4.5	4	2	-	-	-	2	-	-	-	-	2	03	3	2	2	2	22
			6	-	-	-		2	-	2	-	-		03	3	2	2	2	22
Exit Option: Award of UG Certificate in Major with 44 credits and an additional 4 credit core NSQF course /Internship or Continue with Major and Minor																			
II	III	5.0	6	2	-	-		2	-	-	-	2		03	3	2	2	-	22
II	IV	5.0	6	2	-	-		-	-	2	-	2		03	3	2	2	-	22
Exit Option: Award of UG Diploma in Major with 88 credits and an additional 4 credit core NSQF course /Internship or Continue with major and minor																			
III	V	5.5	8	2	2	2	-	-	-	2		2		04	- -	-	-	-	22
III	VI	5.5	6	2	2	2	-	-	-	2		4		04	- -	-	-	-	22

Exit Option: Award of UG Degree in Major and Minor with 132 credits or continue with Major for a 4-year Degree																					
IV	VII	6.0	8	6	2	2	RM-4		-	-	-	-		-	-	-	-	-	-	-	22
IV	VIII	6.0	8	6	2	2	-	-	-	-	-	4		-	-	-	-	-	-	-	22
Four Year UG Degree(Honours) with Major and Minor with 176 credits																					
IV	VII	6.0	6	4	2	2	RM-4		-	-	-	4		-	-	-	-	-	-	-	22
IV	VIII	6.0	6	4	2	2	-	-	0	-	-	8		-	-	-	-	-	-	-	22
Four Year UG Degree (Honours with Research) with Major and Minor with 176 credits																					

B. Sc. Programme Framework: Course Distribution

Year	Semester	Level	Major											Minor		OE	CC	AEC	VEC	Total
			DSC		DSE		SEC		VSC		FP/OJT/IN/CEP		IKS							
I	-	-	T	P	T	P	T	P	T	P	T	P		T	P	-	-	-	-	-
I	I	4.5	**2**	**1**	-	-	-	1	-	-	-	-	1	1		1	1	1	1	10
	II	4.5	**2**	-	-	-		1	-	**1**	-	-		1		1	1	1	1	09
Exit Option: Award of UG Certificate in Major with 44 credits and an additional 4 credit core NSQF course /Internship or Continue with major and minor																				
II	III	5.0	**2**	**1**	-	-		**1**	-	-	-	**1**		1		1	1	1	-	09
II	IV	5.0	**2**	**1**	-	-		-	-	**1**	-	**1**		1		1	1	1	-	09
Exit Option: Award of UG Diploma in Major with 88 credits and an \additional 4 credit core NSQF course /Internship or Continue with major and minor																				
III	V	5.5	**2**	**1**	**1**	**1**	-	-	-	**1**		**1**		1		-	-	-	-	08
III	VI	5.5	**2**	**1**	**1**	**1**	-	-	-	**1**		**1**		1		-	-	-	-	08
Exit Option: Award of UG Degree in Major and Minor with 132 credits or continue with Major for a 4-year Degree																				

IV	VII	6. 0	3	3	1	1	0	1	-	-	-	-		-	-	-		-	-	-	09
IV	VII I	6. 0	3	3	1	1	-	-	-	-	-	1		-	-	-	-	-	-	-	09
Four Year UG Degree(Honours) with Major and Minor with 176 credits																					
IV	VII	6. 0	2	2	1	1	0	1	-	-	-	1		-	-	-	-	-	-	-	08
IV	VII I	6. 0	2	2	1	1	-	-	-	-	-	1		-	-	-	-	-	-	-	07
Four Year UG Degree (Honours with Research) with Major and Minor with 176 credits																					

Programme Framework (Course Distribution): B.Sc. Computer Science (Major)

Year	Semester	Level	Major											Total	
			DSC		DSE		SEC		VSC		FP/OJT /IN/CEP/PR		IKS		
			T	P	T	P	T	P	T	P	T	P	T	T	P/PR
I	I	4.5	2	1	-	-	-	1	-	-	-	-	01	03	02
I	II	4.5	2	-	-	-		1	-	1	-	-		02	02
II	III	5.0	2	1	-	-		1	-	-	-	1		02	03
II	IV	5.0	2	1	-	-		-	-	1	-	1		02	03
III	V	5.5	2	1	1	1	-	-	-	1		1		03	04
III	VI	5.5	2	1	1	1	-	-	-	1		1		03	04
B.Sc. Honours															
IV	VII	6.0	3	3	1	1	RM-1		-	-	-	-		05	04
IV	VIII	6.0	3	3	1	1	-	-	-	-	-	1		04	05
B.Sc. Honours with Research															
IV	VII	6.0	2	2	1	1	RM-1		-	-	-	1		04	04
IV	VIII	6.0	2	2	1	1	-	-	-	-	-	1		03	04

Programme Framework (Credit Distribution): B.Sc. Computer Science (Major)

Year	Semeste	Level	Major	Tot

			DSC		DSE		SEC		VSC		FP/OJT /IN/CEP/RP		IKS	
			T	P	T	P	T	P	T	P	T	P	**T**	
I	I	4.5	4	2	-	-	-	2	-	-	-	-	02	10
I	II	4.5	6	-	-	-		2	-	2	-	-		10
II	III	5.0	6	2	-	-		2	-	-	-	2		12
II	IV	5.0	6	2	-	-		-	-	2	-	2		12
III	V	5.5	8	2	2	2	-	-	-	2		2		18
III	VI	5.5	6	2	2	2	-	-	-	2		4		18
IV	VII	6.0	8	6	2	2	RM-4		-	-	-	-		22
IV	VIII	6.0	8	6	2	2	-	-	-	-	-	4		22
IV	VII	6.0	6	4	2	2	RM-4	-	-	-	-	4		22
IV	VIII	6.0	6	4	2	2	-	-	-	-	-	8		22

Programme Framework (Courses and Credits): B.Sc. Computer Science (Major)

Sr. No.	Year	Semester	Level	Course Type	Course Code	Title	Credits
1.	I	I	4.5	DSC-1	BS-CS111T	Problem Solving using Computer and ‘C’ Programming	02
2.	I	I	4.5	DSC-2	BS- CS112T	Database Management Systems	02
3.	I	I	4.5	DSC-3	BS- CS113P	Lab Course on C Programming & DBMS	**02**
4.	I	I	4.5	SEC-1	BS- CS114T	Analog Electronics	02
5.	I	I	4.5	IKS-1	BS- CS115T	Science and Technology in Ancient India	**02**
6.	I	II	4.5	DSC-4	BS-CS121T	Advanced 'C' Programming	**03**
7.	I	II	4.5	DSC-5	BS- CS122T	Relational Database Management Systems	**03**
8.	I	II	4.5	SEC-2	BS- CS123P	Lab Course on Advanced	02

						C Programming & RDBMS	
9.	I	II	4.5	VSC-1	BS- CS124 T	Digital Electronics	02
10.	II	III	5.0	DSC-6	BS- CS 231T	Data Structures and Algorithms	03
11.	II	III	5.0	DSC-7	BS-CS232T	NoSQL	03
12.	II	III	5.0	DSC-8	BS-CS233P	Lab Course on Data Structure and Algorithms	02
13.	II	III	5.0	SEC-3	BS-CS234P	Lab Course on NoSQL	02
14.	II	III	5.0	FP-01	BS-CS235P	Field Project using Software Engineering Concepts	02
15.	II	IV	5.0	DSC-9	BS-CS241T	Object Oriented Concepts using C++	03
16.	II	IV	5.0	DSC-10	BS-CS242T	Core Python	03
17.	II	IV	5.0	DSC-11	BS-CS243P	Lab Course on Object Oriented Concepts using C++	02
18.	II	IV	5.0	VSC-2	BS-CS244P	Lab Course on Core Python	02
19.	II	IV	5.0	CEP-01	BS-CS245P	Project	02
20.	III	V	5.5	DSC-12	BS- CS351T	Operating System	04
21.	III	V	5.5	DSC-13	BS- CS352T	Web Tech	04
22.	III	V	5.5	DSC-14	BS- CS353P	Lab Course on Operating System & Web Tech	02
23.	III	V	5.5	DSE-01	BS- CS355T	Computer Network	02
24.	III	V	5.5	DSE-02	BS- CS356P	Lab Course on Computer Network	**02**
25.	III	V	5.5	VSC-3	BS- CS357P	Lab Course on Web Tech	02

26.	III	V	5.5	FP-02	BS- CS358P	Project	02
27.	III	VI	5.5	DSC-15	BS- CS361T	Foundation of Data Science	03
28.	III	VI	5.5	DSC-16	BS- CS362T	Object Oriented Programming using Java	03
29.	III	VI	5.5	DSC-17	BS- CS363P	Lab Course on Foundation of Data Science	**02**
30.	III	VI	5.5	DSE-03	BS- CS364T	Python Programming	02
31.	III	VI	5.5	DSE-04	BS- CS365P	Lab Course on Object Oriented Programming using Java	02
32.	III	VI	5.5	VSC-4	BS- CS366P	Lab Course on Python Programming	02
33.	III	VI	5.5	OJT-01	BS- CS367P	Project	04

B.Sc. Computer Science (Major with Honours)

34.	IV	VII	6.0	DSC-18	BS- CS471T	Paradigm of Programming Languages	03
35.	IV	VII	6.0	DSC-19	BS- CS472T	Database Technologies	03
36.	IV	VII	6.0	DSC-20	BS- CS473T	Artificial Intelligence	02
37.	IV	VII	6.0	DSC-21	BS- CS474P	Lab Course on Paradigm of Programming Languages	02
38.	IV	VII	6.0	DSC-22	BS- CS475P	Lab Course on Database Technologies	02
39.	IV	VII	6.0	DSC-23	BS- CS476P	Lab Course on Artificial Intelligence	02
40.	IV	VII	6.0	DSE-05	BS- CS477T (A) OR BS- CS477T (B)	Web Technology **OR** Design and Analysis of Algorithms	02

41.	IV	VII	6.0	DSE-06	BS- CS478P (A) OR BS- CS478P (B)	Lab Course on Web Technology **OR** Lab Course based on Design and Analysis of Algorithms	02
42.	IV	VII	6.0	RM-01	BS- CS479T/P	Project	04
43.	IV	VIII	6.0	DSC-24	BS- CS481T	Advanced Operating Systems	03
44.	IV	VIII	6.0	DSC-25	BS- CS482T	Information System Security	03
45.	IV	VIII	6.0	DSC-26	BS- CS483T	Mobile Technologies	02
46.	IV	VIII	6.0	DSC-27	BS- CS484P	Lab Course on Advanced Operating Systems	02
47.	IV	VIII	6.0	DSC-28	BS- CS485P	Lab Course on Information System Security	02
48.	IV	VIII	6.0	DSC-29	BS- CS486P	Lab Course on Mobile Technologies	02
49.	IV	VIII	6.0	DSE-07	BS- CS487T (A) OR BS- CS487T (B) OR BS- CS487T (C)	Dot Net OR Cloud Computing OR Network Cyber Security	02
50.	IV	VIII	6.0	DSE-08	BS- CS488P (A) OR BS- CS488P (B) OR BS- CS486P (C)	Lab Course o Dot Net OR Lab Course o Cloud Computing OR Lab Course on Network Cyber Security	02

51.	IV	VIII	6.0	OJT-02	BS- CS489P	OJT (On Job Training)	04

B.Sc. Computer Science (Major Honours with Research)

34.	IV	VII	6.0	DSC-20	BS-ZO471T	KLM	03
35.	IV	VII	6.0	DSC-21	BS-ZO472T	NOP	03
36.	IV	VII	6.0	DSC-22	BS-ZO473P	TUV	02
37.	IV	VII	6.0	DSC-23	BS-ZO474P	WXY	02
38.	IV	VII	6.0	DSE-05	BS-ZO475T	WXY	02
39.	IV	VII	6.0	DSE-06	BS-ZO476P	YXZ	02
40.	IV	VII	6.0	RM-01	BS-ZO477T/P	ZAB	04
41.	IV	VII	6.0	RP-01	BS-ZO488P	AAA	04
42.	IV	VIII	6.0	DSC-20	BS-ZO481	KLM	03
43.	IV	VIII	6.0	DSC-21	BS-ZO482	NOP	03
44.	IV	VIII	6.0	DSC-22	BS-ZO483	TUV	02
45.	IV	VIII	6.0	DSC-23	BS-ZO484	WXY	02
46.	IV	VIII	6.0	DSE-07	BS-ZO485	WXY	02
47.	IV	VIII	6.0	DSE-08	BS-ZO486	YXZ	02
48.	IV	VIII	6.0	RP-02	BS-ZO487	AAA	08

Ahmednagar Jilha Maratha Vidya Prasarak Samaj’s

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

Board of Studies in Computer Science

Sr. No.	Name	Designation
1.	Prof. M.B. Bhingare	Chairman
2.	Prof. A.D. Gangarde	Member
3.	Prof. M.B. Gobare	Member
4.	Prof. B.M. Danve	Member
5.	Dr. P.P. Mulay	Hon.Vice-Chancellor Nominee
6.	Dr. V.S. Kumbhar	Academic Council Nominee
7.	Prof. S.D. Pachpande	Academic Council Nominee
8.	Mr. U.C. Temkar	Industrial Expert
9.	Mrs. Aboli J.Joshi Potnis	Post Graduate Meriotirious Allumnus
10.	Prof. S.D. Shelke	Co-Opt (Electronics)
11.	Prof. S.A. Tarate	Co-Opt (Mathematics)
12.	Dr. A.A. Kulkarni	Co-Opt (Statistics)

- **Prologue/ Introduction of the programme:**

Education is the key to development of any society. Role of higher education is crucial for securing right kind of employment and also to pursue further studies in best available world class institutes elsewhere within and outside India. Quality education in general and higher education in particular deserves high priority to enable the young and future generation of students to acquire skill, training and knowledge in order to enhance their thinking, creativity, comprehension and application abilities and prepare them to compete, succeed and excel globally. Sustained initiatives are required to reform the present higher education system for improving and upgrading the academic resources and learning environments by raising the quality of teaching and standards of achievements in learning outcomes across all undergraduate programs in science, humanities, commerce and professional streams of higher education including computer science. B.Sc. (Computer Science) has been evolving as an important branch of science and engineering throughout the world in last couple of decades and it has carved out a space for itself like any other disciplines of basic science and engineering. Computer science is a discipline that spans theory and practice and it requires thinking both in abstract terms and in concrete terms. Computer science has a wide range of specialties. These include Computer Architecture, Software Systems, Graphics, Artificial Intelligence, Computational Science, and Software Engineering. Drawing from a common core of computer science knowledge, each specialty area focuses on specific challenges. Computer Science is practiced by mathematicians, scientists and engineers. Mathematics, the origins of Computer Science, provides reason and logic. Computer Science education at undergraduate level (+3) will result in earning Bachelor of Science (BSc) degree in Computer Science. The coursework required to earn a BSc is equally weighted in mathematics and science. B.Sc. with Computer Science are aimed at undergraduate level training facilitating multiple career paths. Students so graduated, can take up postgraduate programmes in Computer Science and can be employable at IT industries. There are several employment opportunities and after successful completion of an undergraduate programme in Computer Science, graduating students can fetch employment directly in companies as Web Developer, Software Engineer, Network Administrator, Data Scientist, or AI/ML personnel.

- **Programme Outcomes (POs)**

1. Demonstrate the aptitude of Computer Programming and Computer based problem solving skills.

2. Display the knowledge of appropriate theory, practices and tools for the specification, design, implementation.
3. Ability to link knowledge of Computer Science with other two auxiliary disciplines of study.
4. Display ethical code of conduct in usage of Internet and Cyber systems.
5. Ability to pursue higher studies of specialization and to take up technical employment.
6. Ability to formulate, to model, to design solutions, procedure and to use software tools to solve real world problems and evaluate.
7. Ability to operate, manage, deploy, configure computer network, hardware, software operation of an organization.
8. Ability to present result using different presentation tools.
9. Ability to appreciate emerging technologies and tools.
10. Apply standard Software Engineering practices and strategies in real-time software project development.
11. Design and develop computer programs/computer -based systems in the areas related to algorithms, networking, web design, cloud computing, IoT and data analytics.
12. The ability to work independently on a substantial software project and as an effective team member.

Ahmednagar Jilha Maratha Vidya Prasarak Samaj's

New Arts, Commerce and Science College, Ahmednagar

(Autonomous)

Syllabus

B.Sc. Computer Science (Major)

Title of the Course: Data Structure & Algorithms								
Year: II				**Semester: III**				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
DSC-6	BS-CS231T	03	00	03	45	30	70	100

Learning Objectives:

- Acquire some basic mathematical tools and techniques of algorithm analysis.
- To familiarise with basic data structures and to develop the ability to choose the appropriate data structure for designing efficient algorithms.
- Learn some basic algorithms with their rigorous proofs of correctness and efficiency analysis of implementation using appropriate data structures.

Course Outcomes (Cos)

- Differentiate primitive and non-primitive structures.
- To use well-organized data structures in solving various problems.
- To differentiate the usage of various structures in problem solution.
- Implementing data structures in various applications.

Detailed Syllabus:

Allotted

Lectures

Unit I: Introduction **05**

1.1 Concept

1.2 Datatype, Data Object Abstract Datatype (ADT)

1.3 Data structure Classification

1.4 Need of data structure

1.5 Application of data structure

1.6 Algorithm: Definition, characteristics, algorithm analysis (Time and space complexity)

1.7 Asymptotic notation

Unit II: Sorting Terminologies **10**

2.1 Searching Algorithm (Linear, Binary)

2.2 Sorting: Definition, types of sorting (Internal, External, In Place)

2.3 Lower bound on comparison based sorting

2.3.1 Insertion sort

2.3.2 Bubble sort

2.3.3 Selection sort

2.4 Divide and conquer strategy

2.4.1 Quick sort

2.4.2 Merge sort

2.5 Non comparison based sorting

2.5.1 Counting sort

2.5.2 Radix sort

Unit III: Linear Dynamic Data Structure-I (Linked list) 15

3.1 List as data structure, difference with array (linked list)

3.2 Static/Dynamic implementation of linked list

3.3 Types of linked list

3.3.1 Singly linked list

3.3.2 Doubly linked list

3.3.3 Circular linked list

3.4 Operations on linked list

3.4.1 Create, insert, delete, search, reverse, concatenate, merge, traverse

3.5 Time complexity

3.6 Application of linked list

3.6.1 Polynomial representation

3.7 Generalized link list (GLL)

3.7.1 Concepts, representation, polynomial representation using GLL

Unit IV: Linear Dynamic Data Structure-II (Stack) 04

4.1 Definition of stack

4.2 Operations on stack

4.2.1 init(), push(), pop(), isempty(), isfull(), peek()

4.3 Time complexity

4.4 Implementation: Static and Dynamic

4.5 Applications of stack

4.5.1 Function call & recursion

4.5.2 String reversal, palindrome checking

4.5.3 Expression types

4.5.3.1 Infix, Prefix, Postfix

4.5.3.2 Expression conversion and evaluation

Unit V: Linear Dynamic Data Structure-III (Queue) 05

5.1 Introduction

5.2 Operations

a. Enqueue(), dequeue(), isempty(), isfull(), peek()

5.3 Implementation (Static & Dynamic)

5.4 Types of Queue

5.4.1 Linear Queue

5.4.2 Circular Queue

5.4.3 Priority Queue

5.4.4 Double ended Queue

5.5 Applications

5.5.1 CPU scheduling in multiprogramming environment.

5.5.2 Round Robin Algorithm

Unit VI: Non-linear Data structure (Tree) 06

6.1 Introduction

6.2 Types of Tree

6.2.1 Binary Tree

6.2.2 Skewed Tree

6.2.3 Strictly binary Tree

6.2.4 Full binary Tree

6.3 Representation

6.4 Implementation & operations on binary search tree

6.4.1 Tree Traversal.

Suggested Readings/Material:

1. Data Structures, Horowitz, Sahani, Galgotia publication
2. Fundamentals of Computer Algorithms, Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekara, Galgotia Pub. 2001 ed.

Ahmednagar Jilha Maratha Vidya Prasarak Samaj's

New Arts, Commerce and Science College, Ahmednagar

(Autonomous)

Syllabus

B.Sc. Computer Science (Major)

Title of the Course: NoSQL								
Year: II			Semester: III					
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical					
						CIE	ESE	Total
DSC-7	BS-CS232T	03	00	03	45	30	70	100

Learning Objectives:

- Distinguish the different types of NoSQL databases.
- Understand the impact of the cluster on database design.
- Explain MongoDB, Cassandra,.

Course Outcomes (Cos)

- Explain and compare different types of NoSQL Databases.
- Compare and contrast RDBMS with different NoSQL databases.
- Demonstrate the detailed architecture and performance tune of Document-oriented NoSQL databases.
- Apply No-SQL development tools on different types of NoSQL Databases.

Detailed Syllabus:

Unit	Course Contents	Allotted Lectures
Unit I	**Introduction to NoSQL**	**(08)**
	1.1 What is NoSQL DB?	
	1.2 History of NoSQL DB	
	1.3 Features of NoSQL	
	1.4 Types of NoSQL DB	
	1.5 Difference Between RDBMS & NoSQL	
	1.6 Why NoSQL?	
	1.7 When should NoSQL be used?	
	1.8 NoSQL Database Micro-conceptions.	
	1.9 Benefits of using NoSQL DB	
Unit II	**Overview of MongoDB**	**(07)**
	2.1 What is database?	
	2.2 What are collections?	
	2.3 What is Document?	
	2.4 Where is MongoDB used?	

2.5 Why use MongoDB?

2.6 Advantages of using MongoDB.

Unit III **Concept of MongoDB** **(10)**

3.1 Data modeling of MongoDB

3.2 MongoDB

3.2.1 Create Database

3.2.2 Drop Database

3.2.3 Create collection

3.2.4 Drop collection

3.3 MongoDB Datatypes

3.4 MongoDB

3.4.1 Insert document

3.4.2Query Document

3.4.3 Update Document

3.4.4 Delete Document

Unit IV **Operations on MongoDB** **(08)**

4.1 MongoDB

4.1.1 Projection

4.1.2 limiting Records

4.1.3 Sorting Records

4.1.4 Indexing

4.1.5 Aggregation

4.1.6 Replication

Unit V **Advanced MongoDB** **(07)**

5.1 MongoDB

5.1.1 Relationships

5.1.2 References

5.1.3 covered Queries

5.1.4 Analyzing Queries

Unit VI **Introduction to Cassandra** **(05)**

6.1 Introduction

6.2 Architecture of Cassandra

6.3 Data model of Cassandra

- **Suggested Readings/Material:**

1. “NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence” by Pramod J Sadalage and Martin Fowler
2. NoSQL for Dummies A Willy Brand
3. http://nosql-database.org/.

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New Arts, Commerce and Science College, Ahmednagar
(Autonomous)
Syllabus
B.Sc. Computer Science (Major)

Title of the Course: Lab Course on Data Structures and Algorithms									
Year: II				**Semester: III**					
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks			
		Theory	Practical			CIE	ESE	Total	
DSC-8	BS-CS233P	00	02	02	60	15	35	50	

Learning Objectives:

1. Design or select an appropriate algorithm for a particular problem.
2. Design or select an appropriate data structures for a particular problem.
3. Write programs that make good use of stacks, queues, linked lists, trees, graphs, and hash tables.

Course Outcomes (Cos)

- Ability to understand a systematic approach to organizing, writing and debugging C programs
- Ability to implement linear and non-linear data structure operations using C programs
- :Ability to solve problems implementing appropriate data structures
- Ability to implement sorting and searching algorithms using relevant data structures

Detailed Syllabus:

Suggested List of Assignments:

SECTION-I

Data Structure Practical

Assignment 1

Implementation of sorting algorithms: Bubble sort, Insertion Sort & Selection sort

Assignment 2

Divide and Conquer Strategy:
i) Implementation of Merge sort
ii) Implementation Quick sort

Assignment 3

Non-comparison based sort:
i) Implementation of Count sort
ii) Implementation of Radix sort

Assignment 4

i) Structures- structure with array, structure with function, structure with pointer

ii) Pointer- pointer with array, pointer with structure, pointer to pointer

iii) Use of typedef, dynamic memory allocation

Linear singly link list:

i) Static implementation of linear singly linked list

ii) Dynamic implementation of linear singly linked list

iii) Create, insert, delete, display, search, count, Reverse

Assignment 5

Application of linear singly linked list:

i) Merge two linked list

ii) Concatenation of two linked list

iii) Polynomial addition of linked list

Assignment 6

Linear doubly linked list:

i) Dynamic implementation of linear singly linked list

Create, insert, delete, display, search, count, Reverse

Assignment 7

Circular linked list:

i) Dynamic implementation of circular singly linked list

ii) Dynamic implementation of circular doubly linked list

Basic operations: Create, display, delete, insert, delete

Assignment 8

Stack:

Static and dynamic implementation of stack to perform basic operations init(), push(), pop(), peek(), isfull(), isempty()

Assignment 9

Applications of Stack:

i) Checking for string is Palindrome or not?

ii) Evaluation Post-Fix expression

iii) Evaluation Pre-Fix expression

iv) Infix to Post-Fix conversion

v) Infix to Pre-Fix conversion

Assignment 10 Queue:

Implementation of (Static and Dynamic) of Queue to perform basic operations: Create, Insert, Delete, Display

Assignment 11

Implementation of circular queue:

Implementation of Priority queue and Dequeue

Assignment 12

Dynamic implementation of binary search tree to perform basic operations:

-Create

-Traversing of tree

-In Order

-Post Order, Pre Order

Ahmednagar Jilha Maratha Vidya Prasarak Samaj's

New Arts, Commerce and Science College, Ahmednagar
(Autonomous)
Syllabus
B.Sc. Computer Science (Major)

Title of the Course: Lab Course on NoSQL								
Year: II			Semester: III					
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical					
						CIE	ESE	Total
SEC-3	BS-CS234P	00	02	02	60	15	35	50

Learning Objectives:

- students should be able to - apply data modeling using MongoDB NoSQL
- apply data processing and analysis using MongoDB NoSQL –
- apply data aggregation and transformation using MongoDB NoSQL. –
- perform data mapping to data warehouse

Course Outcomes (Cos)

- Create database tables in MongoDB.
- Write and execute simple, nested queries.
- Make the student capable of making a choice of what database technology to use based on their application need.

Detailed Syllabus:

<u>Mongo DB Practical</u>

Assignment 1

Create database with name movie & a collection of document film, perform insert , display & Delete Operations on collection film

Assignment 2.

Create database with name company & an employee is a collection of document. Perform ,insert, Display, Arithmetic functions, increment Decrement & Delete

Assignment 3.

Create a database with the name student having collection teacher &perform create DB, Drop DB, & create collection

Assignment 4.

This assignment is based on company database having collection employee & Transactions. Perform, insert document, query document, update document & delete

Assignment 5.

i) Design a database as per your Requirements

ii) Combine the objects into one document if you will use them together

iii) Duplicate the data (but limited)

iv) Do join while write , not on read

v) Do complex aggregation in the schema.

Assignment 6.

Create database employee & Create a collection &insert data then find ,find one, sort, limit, skip, distinct, projection

Assignment 7

i) Design your schema according to users requirements.

ii) Combine objects into one document if you will used them together otherwise separate them (but make sure their should not be need of joins)

iii) Duplicate the data(but limited)

iv) Do join while write , not on read

v) Do complex aggregation in the schema

Assignment 8

Create database college ;create collection named class ; create collection course ;Insert documents in class and course; update modifiers ($ set , $ unset ,$ increment ,$ push all, $ pull, $ add)

Assignment 9

Create a database with a name hospital. A Doctor is a collection of a documents with the fields performed ,drop Database, Drop collection.

Assignment 10

Create a database named sports collection called games

i) Design your schema according to user's requirements.

ii) Combine objects into one document if you will use them together otherwise separate them(but make sure there should not be need of joins)

iii) Duplicate the data (but limited)

iv) Do join while write , not on read

v) Do complex aggregation in the schema

Suggested Readings/Material:

Laboratory handbook prepared by the college.

Ahmednagar Jilha Maratha Vidya Prasarak Samaj's

New Arts, Commerce and Science College, Ahmednagar

(Autonomous)

Syllabus

B.Sc. Computer Science (Major)

Title of the Course: Field Project using Software Engineering Concepts								
Year: II				**Semester: III**				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical					
						CIE	ESE	Total
FP-1	BS-CS235P	00	02	02	60	15	35	50

Learning Objectives:

- Basic knowledge and understanding of the analysis and design of complex systems.
- Ability to apply software engineering principles and techniques.
- Ability to develop, maintain and evaluate large-scale software systems.
- To produce efficient, reliable, robust and cost-effective software solutions.

Course Outcomes (Cos)

- Identify requirements analyze and prepare models.
- Prepare the SRS, Design document, Project plan of a given software system.
- Develop design schemes in software project.
- To improve the quality of the software project.

SECTION - I

Unit	**Course Contents**	**Allotted Lectures**
Unit I	**Introduction to Software Engineering** 1.1 Software definition 1.2 Software characteristics 1.3 Changing nature of software 1.4 SDLC 1.5 Software process 1.5.1 The process framework 1.5.2 Umbrella activities 1.5.2 Process adaptation	**(05)**
Unit II	**Software Development Models & Architecture** 2.1 Waterfall model 2.2 V-model 2.3 Spiral model	**(05)**

2.4 Iterative model

2.5 Incremental model

Unit III Agile Methodology **(06)**

3.1 What is Agility?

3.2 Agile development model

3.3 Agile testing methods

3.4 Scrum

3.5 Extreme Programming (XP)

3.6 Crystal

3.7 Dynamic Software Development Method (DSDM)

3.8 Need of Agile model

3.9 Advantage & Disadvantage of agile

Unit IV Software Requirements **(05)**

4.1 Types of Requirements

- 4.1.1 Functional requirement
- 4.1.1 Non-functional requirement
- 4.1.3 Domain functional requirement

4.2 Software Requirement Specification (SRS)

- 4.2.1 Definition
- 4.2.2 Need of SRS
- 4.2.3 How to write good SRS for project
  - 4.2.3.1 Introduction
  - 4.2.3.2 Overview
    - Customer
    - Functionality
    - Platform
    - Development Responsibility
  - 4.2.3.3 Goals & scopes
  - 4.2.3.4 Deliverables
  - 4.2.3.5 Risk Management
    - Risk identification
    - Risk mitigation.
  - 4.2.3.6 Scheduling & Estimates
  - 4.2.3.7 Technical Process

4.3 Characteristics of SRS

Unit V Design Models (08)

5.1 Introduction to UML

5.2 Structural Modeling

- 5.2.1 Use Case Model
- 5.2.2. Class Model

5.3 Behavioral Modeling

- 5.3.1 Sequence Diagram
- 5.3.2 Activity Diagram
- 5.3.3 Communication or Collaboration Diagram

5.4 Architectural Model

- 5.4.1 Component diagram
- 5.4.2 Artifact diagram
- 5.4.3 Deployment diagram

Unit VI Design Concepts (02)

6.1 Introduction
6.2 Abstraction
6.3 Pattern
6.4 Modularity
6.5 Information hiding
6.6 Functional independence
6.7 Refinement
6.8 Refactoring
6.9 Design classes

Detail Guidelines for Field Project (FP)

SECTION – II

Software Engineering Mini-Project

1. Detail study of UML diagrams:

-ER Diagram

-Components of ER Diagram

Example-1: Draw ER diagram for library management system.

Example-2: Draw ER diagram for blood bank system.

Example-3: Draw ER diagram for hotel management system.

2. Detail study of Data Flow Diagram of Level-0 and Level-1:

Example-1: Draw DFD diagram for library management system.

Example-2: Draw DFD diagram for blood bank system.

Example-3: Draw DFD diagram for hotel management system.

3. Detail study of Use-Case diagram:

Example-1: Draw Use-Case diagram for library management system.

Example-2: Draw Use-Case diagram for blood bank system.

Example-3: Draw Use-Case diagram for hotel management system.

4. Detail study of Activity diagram.

Example-1: Draw Activity diagram for library management system.

Example-2: Draw Activity diagram for blood bank system.

Example-3: Draw Activity diagram for hotel management system.

5. Detail study of Class diagram.

Example-1: Draw class diagram for library management system.

Example-2: Draw class diagram for blood bank system.

Example-3: Draw class diagram for hotel management system.

6. Detail study of component diagram.

Example-1: Draw component diagram for library management system.

Example-2: Draw component diagram for blood bank system.

Example-3: Draw component diagram for hotel management system.

7. Detail study of Sequence diagram.

Example-1: Draw Sequence diagram for library management system.

Example-2: Draw Sequence diagram for blood bank system.

Example-3: Draw Sequence diagram for hotel management system.

8. Detail study of collaboration diagram.

Example-1: Draw collaboration diagram for library management system.

Example-2: Draw collaboration diagram for blood bank system.

Example-3: Draw collaboration diagram for hotel management system

Sample case study:

Library Management System

Electronic Cash Counter

School Management System

Blood Bank System

Online Share Market Trading

Hotel Management System

Online Examination System

Bank Management System

Image Processing System

E-commerce

Suggested Readings/Material:

Laboratory handbook prepared by the college.

Ahmednagar Jilha Maratha Vidya Prasarak Samaj's

New Arts, Commerce and Science College, Ahmednagar

(Autonomous)

Syllabus

B.Sc. Computer Science (Major)

Title of the Course: Object Oriented Concepts using C++								
Year: II			**Semester: IV**					
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
DSC-9	BS-CS241T	03	00	03	45	30	70	100

Learning Objectives:

1. To understand how C++ improves C with object-oriented features.
2. To learn how to write inline functions for efficiency and performance.
3. To learn the syntax and semantics of the C++ programming language.
4. To learn how to design C++ classes for code reuse.

Course Outcomes (Cos)

- To learn the fundamental concepts and methodologies which are essential to build C++ programs.
- Apply the concepts of object oriented programming.
- Apply virtual and pure virtual functions and complex programming.

Detailed Syllabus:

Unit	Course Contents	Allotted Lectures
Unit I	**1.1 Ethics of Object Oriented Programming** 1.1.1 Object oriented programming paradigm. 1.1.2 Basic concepts of object oriented programming. (objects, classes, Data abstraction, Data encapsulation, inheritance, polymorphism, Dynamic binding, message passing) 1.1.3 Benefits of OOPs 1.1.4 Applications of OOPs **1.2 Introduction of C++** 1.2.1 What is C++? 1.2.2 Application of C++ 1.2.3 Structure of C++ program 1.2.4 Simple C++ program **1.3 Managing Console I/O Operations**	**(08)**

1.3.1 Streams of C++

1.3.2 Stream Class of C++

1.3.3 Unformatted I/O Operations

1.3.4 Formatted I/O Operations

1.3.5 Managing output with Manipulators

Unit II **Tokens, Expressions of C++** **(05)**

2.1 Tokens

2.2 Keywords

2.3 Identifiers

2.4 Basic data types

2.5 User defined data types

2.6 Derived data types

2.7 Symbolic constants

2.8 Dynamic initialization of variables

2.9 Reference variables

2.10 Operators in C++

2.11 Scope resolution operators

2.12 Memory dereferencing operators

2.13 Memory management operators

2.14 Manipulators

2.15 Type cast operators

Unit III **Functions in C++** **(06)**

3.1 Function prototyping

3.2 Call by reference

3.3 Return by reference

3.4 Inline function

3.5 Function overloading

3.6 Friend function

Unit IV **Class & Objects in C++** **(06)**

4.1 Specifying a class and creating object of class

4.2 Defining member function

4.3 A C++ program with class

4.4 Memory allocation of object

4.5 Array of objects

4.6 Static data member

4.7 Static member function

Unit V **Constructor and Destructor** **(08)**

5.1 Definition of constructor

5.2 Types of constructor

5.3 Destructor

5.4 Operator overloading

5.4.1 Definition, rules for overloading operators

5.4.2 Unary operator overloading

5.4.3 Binary operator overloading

Unit VI 6.1 Inheritance **(13)**

6.1.1 Definition, visibility modifier (private, public, protected)

6.1.2 Types of inheritance

6.1.2.1 Single inheritance

6.1.2.2 Multilevel inheritance

6.1.2.3 Multiple inheritance

6.1.2.4 Hierarchical inheritance

6.1.2.5 Hybrid inheritance

6.1.3 Abstract classes

6.1.4 Virtual base classes

6.1.5 Virtual function

6.1.6 Rules for virtual function

6.1.7 Pure virtual function

6.1.8 This pointer

6.2 Working with files

6.2.1 Classes for file stream operations

6.2.2 Opening and closing files

6.2.3 File pointers & their manipulations

6.2.4 Sequential I/P & O/P operations

Suggested Readings/Material:

1. Object-oriented programming with C++ by E.Balaguruswamy, 2nd Edition, TMH.
2. C++: The Complete Reference- Schildt, McGraw-Hill Education (India)
3. Mastering C++ - Venugopal, McGraw-Hill Education (India)

Ahmednagar Jilha Maratha Vidya Prasarak Samaj's

New Arts, Commerce and Science College, Ahmednagar

(Autonomous)

Syllabus

B.Sc. Computer Science (Major)

Title of the Course: Core Python								
Year: II			**Semester: IV**					
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
DSC-10	BS-CS242T	03	00	03	45	30	70	100

Learning Objectives:

- Master the fundamentals of writing Python scripts.
- Learn core Python scripting elements such as variables and flow control structures.
- Discover how to work with lists and sequence data.
- Write Python functions to facilitate code reuse.
- Use Python to read and write files.

Course Outcomes (Cos)

- Acquire knowledge and programming skills in python
- Students will learn the concepts like Basics of Python programming
- Decision Making and Functions in Python

Detailed Syllabus:

Unit	**Course Contents**	**Allotted Lectures**
Unit I	Introduction to python interpreter 1.1 Introduction to Python Programming Language 1.2 History of python 1.3 features of python programming 1.4 Applications areas of python programming 1.5 Running Simple Python program 1.6 Basics of Python 1.6.1 Standard data types 1.6.2 Variables and Constants, 1.6.3 Python identifiers and reserved words 1.6.4 Lines and indentation 1.6.5 Multi-line Statements 1.6.6 Comments 1.6.7 Input/output with print and input 1.7 Operator in Python 1.7.1 Assign	**(08)**

	ment Operator 1.7.2Arithme tic Operator 1.7.3 Relational Operator 1.7.4 Logical Operator 1.7.5 Bitwise Operator 1.7.6 Membership Operator 1.7.7 Identity Operator 1.7.8 Precedence of operators 1.7.9 Type conversion 1.8 Writing Simple program 1.8.1 Examples	
Unit II	Control Statement 2.1Conditio nalStatem ents2.1.1if Statement 2.1.2 if else Statement 2.1.3 if elif else Statement 2.1.3 nested if-else Statement 2.1.4 Assert Statement 2.2 Loop in Python 2.2.1 for loop 2.2.2 while loop 2.3 nested Loop Control Statements 2.3.1 break 2.3.2 continue 2.3.3 pass 2.4 Strings 2.4.1declar ation of String 2.4.2String manipulation 2.4.3Specialoperat ions on String 2.4.4Escapecharac ters 2.4.5Stringformatti ngoperator 2.4.6 Raw String and Unicode strings 2.4.7Built-inStringmethods	**(12)**

UnitIII	Lists, Functions tuples, dictionaries, Sets 3.1 Python Lists 3.1.1 Defining List 3.1.2 creating and accessing elements 3.1.3 updating & deleting lists 3.1.4traversing a List and range function 3.1.5 reverse Built-in List Operators 3.1.6 Basic list operation 3.1.6.1 Concatenation, Repetition, In Operator3.1.7Built-inListfunctionsandmethods 3.2 Function 3.2.1 Function Definition 3.2.2Function Calls 3.2.3Type Conversion Functions3.2.4Bulit in functions 3.2.1 Math Functions 3.2.5 Composition 3.2.6 Adding New Functions 3.2.7 Flow of Execution 3.2.8 Parameters and Arguments 3.2.9VariablesandParameters 3.2.10Anonymous 3.2.11 Boolean Functions 3.2.13 functional programming tools 3.2.13.1 Recursion 3.2.13.2 map () 3.2.13.3 filter () 3.2.13.4 reduce () 3.3 Tuples 3.3.1 Accessing values in Tuples 3.3.2 Tuple Assignment 3.3.3 Tuples as return values 3.3.4 Variable-length argument tuples 3.3.4 Basic tuples operations	**(13)**

	on 3.3.4.2Repetition 3.3.4.3in Operator 3.3.4.4Iterating tuple value3.3.4Built-in tuple functions 3.3.4.1indexing 3.3.4.2slicing 3.3.4.3matrices 3.4 Dictionary 3.4.1Defining Dictionary 3.4.2 creating and accessing elements 3.4.3 updating & deleting Dictionary element 3.4.4 Properties of Dictionary keys 3.4.5 Operations in Dictionary 3.4.6 Built-In Dictionary Functions3.4.7Built-inDictionaryMethods 3.4.8 Variable-length argument Dictionary 3.4.9 Zip function 3.5 Set 3.5.1 Definition 3.5.2 transaction of set (Adding, Union, intersection) 3.5.3workingwithsets	
Unit IV	Modules, File Handling and Exception handling 4.1Modules 4.1.2Importingmodule 4.1.3Creating &exploring modules4.1.4Standard in build Modules 4.1.4.1Math module 4.1.4.2Random module 4.1.4.3Date and Time module 4.2 Packages 4.2.1Importing package 4.2.2 creating package 4.2.3 examples4.3File Handling 4.3.1 Creating files 4.3.2 Operations on files (open, close, read, write) 4.3.3 File object attributes4.3.4file positions 4.3.5 Listing Files in a Directory 4.3.6 Testing File Types 4.3.7 Removing files and	**(12)**

	directories4.3.8copying and renaming files 4.3.9splitting path names 4.3.10 creating and moving directories4.4RegularExpression- 4.4.1Concept of regular expression 4.4.2Various types of regular expressions 4.4.3 match () function. 4.5ExceptionHandling 4.5.1 Built-in Exceptions 4.5.2 Handling Exceptions 4.5.3ExceptionwithArguments User-defined Exceptions.		

Suggested Readings/Material:

1 An Introduction to Computer Science using Python 3 by Jason Montojo, Jennifer Campbell, Paul Gries, The pragmatic bookshelf-2013

2 James Payne, “Beginning Python: Using Python and Python 3.1,Wrox Publication

3 Introduction to Problem Solving with Python by E balguruswamy,TMH publication2016

Ahmednagar Jilha Maratha Vidya Prasarak Samaj's

New Arts, Commerce and Science College, Ahmednagar

(Autonomous)

Syllabus

B.Sc. Computer Science (Major)

Title of the Course: Lab Course on Object Oriented Concepts using C++								
Year: II			Semester: IV					
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
DSC-11	BS-CS243P	00	02	02	60	15	35	50

Learning Objectives:

Ability to:

1. Creating simple programs using classes and objects in C++.
2. Implement Object Oriented Programming Concepts in C++.
3. Develop applications using stream I/O and file I/O.
4. Implement simple graphical user interfaces.
5. Implement Object Oriented Programs using templates and exceptional handling concepts.

Course Outcomes (Cos)

- Create database tables in MongoDB.
- Write and execute simple, nested queries.
- Make the student capable of making a choice of what database technology to use based on their application need.

Detailed Syllabus:

SECTION-I

Object Oriented Concepts using C++

Assignment 1

Structure of C++ program, Header file, comments, main functions, C++ Program template, The standard output stream, cascading of I/O operation.

Assignment 2

Class, object, public, private, protected, defining member function. member function defined inside the class, member function defined outside the class, array of object manipulators.

Assignment 3

function, inline function, friend function, static class member and static member function. static data members, static member function.

Assignment 4

function, overloading way to overload a function, default arguments, sample programs and Examples.

Assignment 5.

constructors and destructors: constructors, types of constructors, default constructor, copy constructor, dynamic constructors, destructor dynamic memory allocation operator new operator.

Assignment 6.

Operator overloading, function overloading, function overriding

Assignment 7

Inheritance, implementation of inheritance in C++, types of Inheritance,

Assignment 8

Virtual function & polymorphism:

Compile time polymorphism, runtime polymorphism, examples virtual functions in derived class, pure virtual class & abstract class, examples

Assignment 9

Working with files:

File, stream, opening file, closing file, text file

Suggested Readings/Material:

Laboratory handbook prepared by the college.

Ahmednagar Jilha Maratha Vidya Prasarak Samaj's

New Arts, Commerce and Science College, Ahmednagar

(Autonomous)

Syllabus

B.Sc. Computer Science (Major)

Title of the Course: Lab Course on Core Python								
Year: II				**Semester: IV**				
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
VSC-2	BS-CS244P	00	02	02	60	15	35	50

Learning Objectives:

- To define the structure and components of a Python program.
- To learn how to write loops and decision statements in Python.
- To learn how to write functions and pass arguments in Python.
- To learn how to build and package Python modules for reusability.

Course Outcomes (Cos)

- Students will be able to understand why Python is a useful scripting language for developers.
- Students will learn how to design and program Python applications.

Detailed Syllabus

Assignments 1:

Introduction:

Introduction to python programming language and basic concept like comment, Indentation. basic programming using print and input function.

Assignments 2:

Operator in python

Demonstration of arithmetic operator, relational operator, logical operator, bitwise operator membership operator and identity operator

Assignments 3:

Control statement

Conditional Statement

Demonstration of Conditional Statements if statement, if else Statement,
if elif else Statement, nested if-else Statement, Assert Statement

Assignments 4:

Control statement

Loop

Demonstration of looping statement while, for and nested loop and loop control Statement break, continue and pass

Assignments 5:

List

Demonstration of List and various operation on the list

Assignments 6:

Function

Demonstration of function and writing user define functions

Assignments 7:

Function
Anonymous (lambda function)
Demonstration of Anonymous (lambda function) and writing Anonymous (lambda function)

Assignments 8:

Function

Boolean function
Demonstration of Boolean function and writing Boolean function

Assignments 9:

Function

Function programming tools

Demonstration of function programming tools and programming using map(),

Filter(), reduce method

Function

Recursion

Demonstration of recursion and programming using recursion

Assignments 7:

Tuple

Demonstration of Tuple and various operation on the tuple

Assignments 8

Tuple:
Variable-length argument tuples

Demonstration of Variable-length argument Function and writing function with Variable-length argument

Assignments 9:

Dictionary

Demonstration of Dictionary and various operation on the Dictionary

Assignments 10:

Dictionary
Variable-length argument Dictionary
Demonstration of Variable-length argument Function and writing function with Variable-length argument

Assignments 11:

Dictionary
Zip function
Demonstration of zip() function and writing programs using zip function

Assignments 12:

Set

Demonstration of Set and various operation on the Set

Assignments 13:

Standard Modules

Demonstration of Standard Modules (Date and Time, Math and Random) and programming using the methods from them

Assignments 14:

File Handling

Demonstration of file in python and writing program for file manipulation

Assignments 15

Regular expression

Demonstration of regular expression and write program by using regular expression

Assignments 16

Exception Handling

Demonstration of exception handling and writing program for exception handling

Assignments 17

Exception Handling

Demonstration of user define exception andWrite a program in Python to handle user defined exception for given problem

Suggested Readings:

Laboratory handbook prepared by the college.

Ahmednagar Jilha Maratha Vidya Prasarak Samaj's

New Arts, Commerce and Science College, Ahmednagar

(Autonomous)

Syllabus

B.Sc. Computer Science (Major)

Title of the Course: Project								
Year: II			Semester: IV					
Course Type	Course Code	Credit Distribution		Credits	Allotted Hours	Allotted Marks		
		Theory	Practical			CIE	ESE	Total
CEP-1	BS-CS245P	00	02	02	60	15	35	50

Detail Guidelines for Community Engagement Project (CEP)

Teaching Scheme 03 Lectures/ week/ **Batch Size :**20

Examination Scheme IA: 15 marks UE: 35 marks

Project Guidelines:

- Students should work in a team of minimum 3 and maximum 4 students.
- Students can choose a project topic and implement the same using any language/technology covered in the curriculum so far. The operating environment must be Linux.
- The student group will work independently throughout the project work including: problem identification, information searching, literature study, design and analysis, implementation, testing, and the final reporting.
- Project guide must conduct project presentations (minimum 2) to monitor the progress of the project groups.
- At the end of the project, the group should prepare a report which should conform to international academic standards. The report should follow the style in academic journals and books, with clear elements such as: abstract, background, aim, design and implementation, testing, conclusion and full references, Tables and figures should be numbered and referenced to in the report.
- The final project presentation with demonstration (UE) will be evaluated by the project guide (appointed by the college) and one

external examiner (appointed by the University).

Recommended

Documentation

contents: abstract

Introduction

- Motivation
- Requirement analysis - Functional requirements, performance requirements, security requirements etc.

System Design

- Design constraints
- System Model: Using OOSE
- Data Model
- User interfaces

Implementation details

- Software/hardware specifications

Outputs and Reports Testing

- Test Plan, Black Box Testing or Data Validation Test Cases, White Box Testing or Functional Validation Test cases and results

Conclusion *and* Recommendations

Future Scope

Bibliography and References

Project Related Assignments

Guidelines:

- The project assignments are a compulsory part of the project course and should be carried out by each project group.
- Project assignments are to be given by the guide for continuous internal evaluation.
- The project assignments are to be allotted to each group separately by the project guide on the basis of the implementation technology. A suggested list of assignments is given below.

  1. Project Time management: plan (schedule table), Gantt chart, Roles and responsibilities, data collection, Implementation
  2. Simple assignments to evaluate choice of technology
  3. Assignments on UI elements in chosen technology
  4. Assignments on User interfaces in the project
  5. Assignments on event handling in chosen technology
  6. Assignments on Data handling in chosen technology
  7. Online and offline connectivity
  8. Report generation
  9. Deployment considerations
  10. Test cases

Each student within the group must work actively and contribute to the assignments, project work and report writing

Evaluation guidelines:

IA (15 marks)			**UE (35 marks)**		
First presentation	Second presentation	Assignments	Project Logic/ Presentation	Assignments and Project Documentation	Viva
05	05	05	20	10	05

- problem statement
- purpose/objective and goals
- literature survey
- project scope and limitations

System analysis

- Existing systems
- scope and limitations of existing systems
- project perspective, features
- stakeholders