

Affiliated to the University of Mumbai

Programme: Bachelor of Science Course: Information Technology

Syllabus for the Academic Year 2024-2025 based on the National Education Policy 2020



PROGRAMME SPECIFIC OUTCOMES				
1	Identify information technology related problems, analyze them and design the system or provide solution to the problem			
2	Apply the knowledge obtained and emerge as a Developer, Designer, Tester, Security Analyst, Technical Analyst, Networking related modules			
3	To think analytically, creatively and critically in developing robust, extensible and highly maintainable technological solutions to simple and complex problems.			

Г

DEPARTMENT OF INFORMATION TECHNOLOGY SEMESTED 3

SEMESTER 3				
COURSE TYPE	COURSE CODE	COURSE TITLE	CREDITS	
MAJOR	T233MJ	PYTHON PROGRAMMING	3	
MAJOR PRACTICAL	Т233МЈР	PYTHON PROGRAMMING PRACTICAL	1	
MAJOR	T234MJ	DATABASE MANAGEMENT SYSTEM	3	
MAJOR PRACTICAL	T234MJP	DATABASE MANAGEMENT SYSTEM PRACTICAL	1	
MINOR	T233MN	DATA STRUCTURES	3	
MINOR PRACTICAL	T233MNP	DATA STRUCTURES PRACTICAL	1	
OPEN ELECTIVE (OE) 1	TOE301	DIGITAL MARKETING	2	
VOCATIONAL SKILL COURSE (VSC)	TVSC301	COMPUTER NETWORKS	(1+1)=2	
ABILITY ENHANCEMENT COURSE (AEC)	TAEC301	CAMPUS TO CORPORATE	2	



MAJOR: PYTHON PR	OGRAMMING	Semester – 3	3
Course Title: PYTHON	PROGRAMMING	Course Cod	le: T233MJ
COURSE OBJECTIVE	CS:		
	ting elements such as variable	s, expressions, con	ndition statements, loop and
control statements.			
2. To learn usage of function	and strings in Python.		
3. To learn the concept of list	, tuple, dictionary, exception.		
0	pic- classes and objects, inher	tance, polymorph	ism
5. To learn the concept of file	e		
6. To learn how to handle the	exception.		
COURSE OUTCOMES:			
The learner will be able to:			
	thon program, define variable	s use if if-else fo	or while loops
	ecursion, a string as a sequence		· •
1 10	s, dictionary and exception ha	•	iu sumg operations.
	ented concepts, classes, object	-	polymorphism
5. Explore file handling mech		, mileritance, and	porymorphism.
	th and finally to handle the exe	ception.	
Lectures per week (1 Lectur		`	3
Total number of Hours in a	Semester		45
Credits			3
Evaluation System	Semester End	2	50 marks
	Examination	Hours	
	Internal Assessment		50 marks

Introduction: History of Python, Features of Python, Installing Python, Running Python program, Comments in Python, Variable, Data type in Python, Type conversion	
Operators in Python : Arithmetic operator, Assignment operator, Relational operator, Logical operator, Boolean operator, Bitwise operator, Membership operator, Identity operator	15 hours
Input and Output : Input statement, print() statement	
Control Statements: if statement, ifelse statement, ifelifelse	
statement, while loop, for loop, infinite loop, nested loops, break statement,	
	 History of Python, Features of Python, Installing Python, Running Python program, Comments in Python, Variable, Data type in Python, Type conversion Operators in Python : Arithmetic operator, Assignment operator, Relational operator, Logical operator, Boolean operator, Bitwise operator, Membership operator, Identity operator Input and Output : Input statement, print() statement Control Statements: if statement, ifelse statement, ifelse



Unit 2	 Functions: Defining a function, Calling a Function, Format and actual arguments, method overloading, Recursive function, Creating our own module in python Strings: Creating Strings, Length of string, Indexing in string, Slicing the strings, String method(find(), rfind(), index(), rindex(), lstrip(), rstrip(), count(), replace(), upper(), lower(), swapcase(), title(), split(), join()), String testing methods, Sorting strings, Traversal with a for Loop, String operation Lists: List, creating list and Accessing Elements, Lists are mutable, updating list, Repetition of lists, Membership in List, Cloning list, Built-in List functions and methods, Nested Lists Tuple: Tuple, creating tuples, accessing tuple elements, basic operation on 	15 hours
	tuple, Built-in Tuple Functions, Inserting elements in tuple, Modifying elements in tuple, Deleting elements in tuple	
Unit 3	Dictionary : Creating a Dictionary, Accessing Values in a dictionary, Updating Dictionary, Built-in Dictionary Method, Sorting elements of Dictionary, Converting list into Dictionary, Converting Strings into Dictionary	
	OOPs in Python : Features of OOPs, Classes and Objects, self variable, constructor, Inner classes, Inheritance, Constructors in Inheritance, super() method, types of inheritance, method overriding, Polymorphism, operator overloading, Abstract method and abstract class	15 hours
	Exceptions: Errors in Python, Exception, Exception Handling, Types of Exceptions	
	File Handling in Python:	
	Python File Open, modes for opening a file, Reading the File, Read Lines, Close Files, write to an Existing File, create a New File, delete a File, check if File exist, Delete Folder	



MAJOR: PYTHON PROGRAMMING	Semester – 3		
PRACTICAL			
Course Title: PYTHON PROGRAMMING	Course Code: T233MJP		
PRACTICAL			
Lectures per week (1 Lecture is 60 minutes)	2		
Total number of Hours in a Semester	30		
Credits	1		
Evaluation System Practical Examination	2 Hours 50 marks		

List of Practical:

1		ne student's grade based on the resul ast be calculated as per the following			
		Average Mark	Grade		
		91-100	A1		
		81-90	A2		
		71-80	B1		
		61-70	B2		
		51-60	C1		
		41-50	C2		
		33-40	D		
		21-32	E1		
		0-20	E2		
	b. Write a pro	ogram to generate the Fibonacci serie	 2S.		
2	a. Write a function that reverses the user defined value.				
	b. Write a recursive function to print the factorial for a given number.				
3	a. Design a Python function to check if a given number is prime or not.				



	b. Design a Python function that returns the results of addition, subtraction, multiplication and division.
4	a. Design a python program to display all positions of a sub string in a given main string.
	b. Design a python program to sort a group of strings into alphabetical order.
5	a. Design a python program to create a list with employee data and then retrieve a particular employee details.
	b. Design a Python program to sort a list of tuples.
6	a. Design a python program to create a dictionary from keyboard and display the elements.
	b. Design a python program to convert the elements to two lists into key-value pairs of a dictionary.
7	a. Design a python to create employee class.
	b. Design a Python class called Book with a constructor to initialize attributes like title, author, and year_published.
8	a. Design a python program to implement single inheritance.
	b. Design a python program to implement multiple inheritance.
9	a. Design a Python code to implement exception handling to handle the scenario where the user attempts to divide by zero.
	b. Design a Python code to show the use of finally clause.
10	a. Write a Python program to read an entire text file.
	b. Write a Python program to append text to a file and display the text.

REFERENCES:

Sr.	Title	Author/s	Publisher	Edition	Year
No.					
-			D 1 D	and To the	
1	Core Python Programming	Dr. Nageshwara Rao	Dreamtech Press	2 nd Edition	2018
2	Think Python	Allen Downey	O'Reilly	1st	2012
3	An Introduction to	Jason	SPD	1st	2014
	Computer Science using	Montojo, Jennifer			



	Python 3	Campbell, Paul Gries			
4	Python GUI	Burkhard A. Meier	Packt		2015
	Programming Cookbook				
5	Introduction to Problem	E. Balagurusamy	TMH	1st	2016
	Solving with Python				
6	Object-oriented	Michael H.	Pearson	1st	2008
	Programming in Python	Goldwasser, David	Prentice		
		Letscher	Hall		

MAJOR: DATABASE MANAGEMENT SYSTEM	Semester – 3			
Course Title: DATABASE MANAGEMENT Course Code: T234MJ				
SYSTEM				
COURSE OBJECTIVES:				
1. The objective of the course is to present an introduction to detabase management systems, with				

- 1. The objective of the course is to present an introduction to database management systems, with an emphasis on how to organize, maintain and retrieve efficiently, and effectively information from a DBMS.
- 2. Analyze database requirements and determine the entities involved in the system and their relationship to one another.
- 3. To study the introduction to PL/SQL.

COURSE OUTCOMES:

The learner will be able to:

- 1. Describe the fundamental elements of relational database management systems
- 2. Explain the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and SQL.
- 3. Design ER-models to represent simple database application scenarios
- 4. Convert the ER-model to relational tables, populate relational database and formulate SQL queries on data.
- 5. Improve the database design by normalization.

Lectures per week (1 Lecture is 60 minutes)		3	
Total number of Hours in a Semester		45	
Credits			3
Evaluation System	Semester End	2	50 marks
_	Examination	Hours	
	Internal Assessment		50 marks

UNIT 1	Introduction to Databases and Transactions	
	What is database system, purpose of database system, view of data, relational	
	databases, database architecture, transaction management	

2024-2025 BSC IT



	Data Models	15 hours
	The importance of data models, Basic building blocks, Business rules, The evolution of data models, Degrees of data abstraction. Database Design, ER Diagram and Unified Modeling Language	
	Database design and ER Model: overview, ER Model, Constraints, ER Diagrams, ERD Issues, weak entity sets, Codd's rules, Relational Schemas, Introduction to UML	
UNIT 2	Relational database model:	
	Logical view of data, keys, integrity rules, Relational Database design: features of good relational database design, atomic domain and Normalization (1NF, 2NF, 3NF, BCNF).	15 hours
	Constraints, Views and SQL	
	Constraints, types of constrains, Integrity constraints, Views: Introduction to views, data independence, security, updates on views, comparison between tables and views SQL: data definition, aggregate function, Null Values, nested sub queries, Joined relations. Triggers.	
	Transaction management and Concurrency	
	Control Transaction management: ACID properties, serializability and concurrency control, Lock based concurrency control (2PL, Deadlocks), Time stamping methods	
UNIT 3	PL-SQL : Beginning with PL / SQL, Identifiers and Keywords, Operators, Expressions, Sequences, Control Structures, Cursors and Transaction, Collections and composite data types, Procedures and	
	Functions, Exceptions Handling, Packages, With Clause and	15 hours
	Hierarchical Retrieval, Triggers.	



MAJOR: DATABASE MANAGEMENT SYSTEM	Semester – 3		
Course Title: DATABASE MANAGEMENT SYSTEM Course Code: T234MJP			
Lectures per week (1 Lecture is 60 minutes) 2			
Total number of Hours in a Semester	30		
Credits	1		
Evaluation System Practical Examination	2 Hours50 marks		

List of Practical:

1	SQL Statements – 1
	Writing Basic SQL SELECT Statements Restricting and Sorting Data
2	SQL Statements – 2 Single-Row Functions Displaying Data from Multiple Tables
3	SQL Statements – 3
	Aggregating Data Using Group Functions
4	SQL Statements – 4 Subqueries
5	Manipulating Data Using INSERT statement Using DELETE statement Using UPDATE statement
6	Creating and Managing Tables Creating and Managing Tables
7	Creating and Managing other database objects Including Constraints Creating Views



	Other Database Objects	
8	Using SET operators, Date/Time Functions, GROUP BY clause (advanced features) and advanced subqueries Using SET Operators Datetime Functions Enhancements to the GROUP BY Clause Advanced Subqueries	
9	Introduction to print hello world in pl/sql	
10	Write a program for Control Structures in PL/SQL	

REFERENCES:

Sr. No.	Title	Author/s	Publisher	Edition	Year
1	Database System and Concepts	A Silberschatz, H Korth, S Sudarshan	McGraw- Hill	Fifth Edition	
2	Database Systems	Rob Coronel	Cengage Learning	Twelft h Edition	
3	Programming with PL/SQL for Beginners	H. Dand, R. Patil and T. Sambare	X – Team	First	2011
4	Introduction to Database System	C.J.Date	Pearson	First	2003

2024-2025 BSC IT



MINOR: DATA STRUCTURES	Semester – 3
Course Title: DATA STRUCTURES	Course Code: T233MN
COURSE OBJECTIVES:	

1. To provide the knowledge of basic data structures and their implementations.

- 2. To understand the importance of data structures in context of writing efficient programs.
- 3. To develop skills to apply appropriate data structures in problem solving.
- 4. To understand and apply various searching and sorting algorithms.

COURSE OUTCOMES:

Upon Completing the Course, Students will able to:

- 1. Learn the basic types for data structure, implementation and application.
- 2. Know the strength and weakness of different data structures.
- 3. Use the appropriate data structure in context of solution of given problem.
- 4. Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data.

Lectures per v	week (1 Lectur	e is 60 minutes)		3	
Total number	of Hours in a	Semester			
Credits					
Evaluation Sy	stem	Semester End Examination	2 Hours	50 marl	ks
		Internal Assessment		50 marl	ks
UNIT 1 Concepts				15 hours	
	U	echniques: Sequential Search	and Binary Se	arch.	
UNIT 2 Theories	Linked List: Linked List, One-way Linked List, Traversal of Linked List, Searching, Memory Allocation and De-allocation, Insertion in Linked List, Deletion from Linked List, copying a List into Other List, Merging Two Linked Lists, splitting a List into Two Lists, Reversing One-way linked List.				15 hours
	Array Repre	Operations on the Stack, Me esentation of Stack, Linked renthesis, Recursion.			



UNIT 3 Application	Queue: Introduction, Operations on the Queue, Memory Representation of Queue, Array representation of queue, Linked List Representation of Queue, Circular Queue: Insertion, Deletion, Traversal, Deque: Insertion, Deletion and Traversal, Applications of Queues.	15 hours
	Trees: Tree, Binary Tree, Properties of Binary Tree, Memory Representation of Binary Tree, Operations Performed on Binary Tree: Preorder, Inorder and Postorder; Reconstruction of Binary Tree from its Traversals, Binary Search Tree, Operations on Binary Search Tree: Traversal, Search, Insertion and Deletion operations.	

MINOR: DATA STR	Semester – 3				
Course Title: DATA STRUCTURES PRACTICAL Course Code: T233MNH			MNP		
Lectures per week (1		2			
Total number of Hou	rs in a Semester		30		
Credits			1		
Evaluation System	Practical Examination	2 Hour	S	50 marks	

List OF PRACTICAL

List OF P	RACTICAL						
1.	Write a program to store the elements in 1-D array and perform the operations like searching,						
	sorting and reversing the elements.						
2.	Write a progra	im to create a singly l	inked list and display	the node eleme	ents in rev	erse order.	
3.	Write a progra	m to implement the c	concept of Stack with I	Push, Pop, Dis	play and F	Exit	
	operations.	-	-				
4.	Write a progra	m to implement Tow	er of Hanoi problem.				
5.	Write a progra	m to implement bubb	ole sort.				
6.	Write a progra	m to implement selec	ction sort.				
7.	Write a progra	m to search the element	ent using sequential se	earch.			
8.	Write a progra	m to search the eleme	ent using binary search	n.			
	Write a program	Write a program to implement the concept of Queue with Insert, Delete, Display and Exit operations.					
9.		•	* -		•	•	
10.	Write a program	n to implement the cond	cept of Deque.				
	<u> </u>	-					
Reference	es:						
Sr. No.	Sr. No. Title Author/s Publisher Edition Year						
1.	A Simplif	ied Approach to Data	Lalit Goyal, Vishal	SPD	1st	2014	
	Structures	5	Goyal,Pawan				
			Kumar				



2.	An Introduction to Data	Jean – Paul	Tata	2nd	2007
	Structure with Applications	Tremblay and Paul	MacGraw		
		Sorenson	Hill		
3.	Data Structure and Algorithm	Maria Rukadikar	SPD	1st	2017
4.	Schaum's Outlines Data	Seymour Lipschutz	Tata	2nd	2005
	structure		McGraw		
			Hill		
5.	Data structure – A	AM Tanenbaum, Y	Prentice	2nd	2006
	Pseudocode Approach	Langsam and MJ	Hall India		
	with C	Augustein			
6.	Data structure and	Weiss, Mark Allen	Addison	1st	2006
	Algorithm Analysis in C		Wesley		

OE : DIGITAL MARKETING	Semester – 3
Course Title: DIGITAL MARKETING	Course Code: TOE301
COURSE OBJECTIVES:	

- 1. To learn to evaluate the historical evolution discerning between traditional and digital approaches while appraising their respective advantages and drawbacks.
- 2. Understand to analyze sophisticated SEO strategies
- 3. Learn SEM skills through comprehensive keyword research, strategic PPC campaign management utilizing Google AdWords.
- 4. Critically evaluate social media marketing strategies.

COURSE OUTCOMES:

- 1. Discriminate between traditional and digital marketing methodologies, discerning their respective advantages and limitations.
- 2. Evaluate and adapt SEO strategies based on evolving algorithms and industry best practices to ensure sustained search engine visibility and traffic.
- 3. Develop and refine PPC advertising campaigns using Google AdWords, employing advanced ad copywriting and optimization techniques
- 4. Evaluate the effectiveness of social media marketing strategies in achieving business objectives, utilizing analytical tools to measure engagement and audience reach.

Lectures per week (1 Lecture is 60 minutes)	2
Total number of Hours in a Semester	30
Credits	2



	Introduction to Digital Marketing	
	Overview of digital marketing, History of digital marketing, Digital	
UNIT 1	marketing vs traditional marketing, Advantages and disadvantages of digital	15 hours
	marketing	
	Search Engine Optimization (SEO)	
	Introduction to SEO, how search engines work, On-page optimization	
	techniques, Off-page optimization techniques, SERP ,Technical SEO,404	
	Error, Canonical Tag, What Is AMP & Importance? What Is Sitemap &	
	Importance? What Are Robots.Txt & Importance? What Is SSL &	
	Importance? What Is Schema & Importance? Page load Optimization.	
	Search Engine Marketing (SEM)	
	Introduction to SEM, Keyword research and analysis, Pay-per-click (PPC)	
	advertising ,Google Ad Words ,Ad copywriting and optimization , Landing	
	page optimization, SEO algorithms	
	Social Media Marketing (SMM)	
UNIT 2	Introduction to SMM, Social media platforms and their	
	differences(Facebook ,Twitter , instagram ,LinkedIn) , Developing a social	15 hours
	media strategy, Measuring social media success, Newsfeed and	
	Recommendation Algorithms.	
	Website Hosting using Word Press	
	Website Planning & Development- Website, Types of Websites, Phases of	
	website development, Keywords: Selection process, An introduction to how	
	a web server works with Word Press, Creating basic things like posts, pages,	
	and users, and changing settings.	

REFERENCES:

Books an	Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year	
1.	Digital Marketing, V. Ahuja, Oxford University Press 4,	Digital Marketing, S.Gupta	McGraw-Hill	4		
2.	The Art of SEO Marketing: Mastering SEO Engine Optimization Media	Eric Enge and Stephan Spencer	O'reilly	3		
3	SOCIAL MEDIA MARKETING WORKBOOK 2022 by	Jason McDonald	Oxford University Press	Illustrated	2015	



VSC: CO	MPUTER NETWORKS	Semester – 3	
COURSE TITLE: COMPUTER NETWORKS Course Code: TVSC301			601
1. Stu top	OBJECTIVES: Idents will grasp the foundational concepts of computer neologies.		
acr 3. Th	Idents will gain comprehensive knowledge of how data is coss networks. ey will understand the functions and protocols associated Idents will be equipped with practical skills in configuring	with each layer in OSI an	d TCP/IP.
coi	nputer networks.	, managing, and toublest	
1. Stud trout	OUTCOMES : ents will demonstrate competency in using basic networki bleshooting purposes.		
and 1	ents will develop the ability to analyze and determine key network masks.	-	
GNS			ion tools like
	ents will acquire the skills to use Wireshark for packet and pleshooting and optimization		
Lectures p	er week (1 Lecture is 60 minutes)	1	
Total num	ber of Hours in a Semester	15	
Credits		1	
Basics of networking Model: introduction to Network, Topologies, OSI and TCP/IP model.UNIT 1TCP/IP model.15 hPhysical Layer: Bit rate, modulation, transmission modes. Data Link Layer Functions: Framing, addressing, error detection. Network Layer Functions: Routing, logical addressing, sub-netting. IP addresses, routers, routing protocols. Transport Layer Functions: Segmentation, flow control, error recovery. TCP, UDP, ports, sockets. Session Layer Functions: Dialog control, session establishment, termination. Concepts: Sessions, dialog, synchronization. Presentation Layer: Translation, encryption, compression. Application Layer: Interface with user applications, network services. Concepts: Protocols (HTTP, FTP, SMTP), APIs.15 h			15 hours
VSC 1:	COMPUTER NETWORKS	Semester – 3	
Course '	Title: COMPUTER NETWORKS	Course Code: TSEC201	
Lectures per week (1 Lecture is 60 minutes)		2	
	mber of Hours in a Semester	30	
Credits		1	
Evaluat	ion System Practical Examination	2 Hours	



Г

1	Study of Networking devices and Topologies.				
2	Basic networking commands.				
	 Ipconfigtracert Nslookup Hostname Systeminfo netstat 	6. route 7. getmac 8. ping 9. pathping 10. arp			
3	Configuring basic topology on G of network.	Configuring basic topology on GNS and Understanding different classes of network.			
4	 Given an IP address and network mask, determine other information about the IP address such as: Network address Network broadcast address Total number of host bits Number of hosts 				
5	Configure network topology and implement static routing.				
6	Configure a network using Distance vector Routing Model.				
7	Configure network using Link State Vector Routing Protocol				
8	Use of Wire-shark to scan and ch following protocols • HTTP • ICMP • TCP • SMTP	eck the packet information of			



REFERENCES:

Books and	Books and References:				
Sr. No.	Title	Author/s	Publisher	Edition	Year
1.	Data Communications and Networking with TCPIP Protocol Suit	Behrouz-A.Forouzan	Mc Graw Hill	5	2022

AEC:		Semester – 3	
Course Title	ourse Title: CAMPUS TO CORPORATE Course Code: TAEC301		
COURSE C	DBJECTIVES:		
1. Gain k	nowledge about different types of interviews an	d improve interview performan	ice.
2. Unders	stand intrapersonal and interpersonal communic	ation dynamics and conflict ma	nagement in
the wo	rkplace.		
3. Develo	pp skills and understand the importance of interr	national communication.	
4. Learn	effective strategies for delivering group commu	nication, teamwork and leaders	hip.
COURSE O	UTCOMES:		
	interview techniques to enhance job interview	performance and have a imp	actful media
intervi	ews and press conferences.		
2. Apply	interpersonal communication skills to build effe	ective relationships and manage	e conflicts in
-	sional settings.		
	nstrate improved speaking skills with clarity, con	-	
4. Effecti	ve deliver group communication, teamwork and	l exhibit impactful leadership.	
Lectures per	week (1 Lecture is 60 minutes)	2	
Total number	er of Hours in a Semester	30	
Credits		2	
	Interviews: Objectives of Interviews, Types		
UNIT 1	Interviews, Media Interviews, Press Conferen		15 hours
Concepts	Intrapersonal and Interpersonal Business		
	Intrapersonal Communication, Self-Concept and Dimensions of Self,		
	Interpersonal Needs, Social Penetration Theory, Rituals of		
	Conversation and Interviews, Conflict in the Work Environment.		
	International Communication: The Global	Marketplace, Styles of	
UNIT 2	Management, The International Assignment.		
Theories			
	Cycles and Member Roles, Group Problem Solving, Business and Professional Meetings, Teamwork and Leadership.		



SOPHIA COLLEGE FOR WOMEN (EMPOWERED AUTONOMOUS) <u>REFERENCES:</u>

Books ar	Books and References:					
Sr. No.	Title	Author/s	Publisher	Edition	Year	
1.	Business Communication for Success	University of Minnesota	University of Minnesota		2015	
2.	Technical Communication: Principles and Practice	Meenakshi Raman	Oxford University Press	3rd Edition	2015	

