Vivekanand Education Society's Institute of Technology
An Autonomous Institute Affiliated to University of Mumbai
Hashu Advani Memorial Complex, Collector's Colony,
Chembur, Mumbai – 400 074. India

Department of Information Technology

Syllabus (NEP Scheme)

Sem-III

w.e.f. A.Y. 2024-25

Vivekanand Education Society's Institute of Technology An
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Hashu Advani Memorial Complex, Collector's Colony, Chembur, Mumbai – 400 074.India

CURRICULUM SCHEME FOR NEP UNDERGRADUATE ACADEMIC PROGRAM AT VESIT
2024 : B.Tech Information Technolgy Branch

Semester III Scheme

Type of Course	Course Code	Name of Course	Teaching scheme (Contact Hours)			Credits Assigned			
			Th	Pr	Tut	Th	Pr	Tut	Total
Programme Core Course (PCC)	NITPC31	Data Communication and Computer Networking	3	2	--	3	1	--	4
Programme Core Course (PCC)	NITPC32	Data Structures: Algorithms and Applications	3	2	--	3	1	--	4
Programme Core Course (PCC)	NITPC33	Database Management System	3	2	--	3	1	--	4
Multidisciplinary Minor (MDM)	NITMM31	DevOps for Cloud Platform	3	2	--	3	1	--	4
Entrepreneurship /Economics/ Management Courses	NITEM31	Financial Management	2	--	--	2	--	--	2
Community Eng. Project	NITAE311	Professional Communication and Ethics-II	1	--	01 (2*)	1	--	1	2
	Total Credits		**15**	**8**	**2**				**20**

** Tutorial for complete class*

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Semester III Examination Scheme

Type of Course	Course Code	Name of Course	Examination scheme						Total
			Theory				Term Work	Pract & Oral	
			Internal Assessment		End Sem Exam	Exam Duration in hours			
			MT	CA					
Programme Core Course (PCC) [Marks = 150]	NITPC31	Data Communication and Computer Networking	20	20	60	2	25	25	150
Programme Core Course (PCC) [Marks = 150]	NITPC32	Data Structures: Algorithms and Applications	20	20	60	2	25	25	150
Programme Core Course (PCC) [Marks = 150]	NITPC33	Database Management System	20	20	60	2	25	25	150
Multidisciplinary Minor (MD M) [Marks = 150]	NITMM31	DevOps for Cloud Platform	20	20	60	2	25	25	150
Entrepreneurship/ Economics/ Management Courses [Marks = 50]	NITEM31	Financial Management	20	–	30	1	–	–	50
Community Eng. Project [Marks = 50]	NITAE311	Professional Communication and Ethics-II	–	–	–	–	50	–	50
	Total		**100**	**80**	**270**	**–**	**150**	**100**	**700**

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Semester III
Syllabus

Vivekanand Education Society's Institute of Technology
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COURSE NAME : Data Communication and Computer Networking

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/ PR	Tut	Total
NITPC31	Data Communication and Computer Networking (Theory)	03	---	---	03	---	---	03
NITPCL31	Data Communication and Computer Networking (Lab)	---	02	---	---	01	---	01

Data Communication and Computer Networking(Theory)

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/ PR	Tut	Total
NITPC31	Data Communication and Computer Networking (Theory)	03	---	---	03	---	---	03

Examination Scheme							
Course Code	Course Name	Theory			Term Work	Practical & Oral	Total
		Internal Assessment		End Sem Exam			
		Mid-Term Test	Continuous Assessment				
NITPC31	Data Communication and Computer Networking (Theory)	20	20	60	---	---	100

Course Prerequisite: Basic knowledge of Computer Networks.	
Course Objectives:	
1	Study the basic taxonomy and terminology of the computer networking, the fundamentals and basics of Physical layer and enumerate the layers of OSI model and TCP/IP model.
2	Study data link layer concepts, design issues, and protocols.
3	Gain core knowledge of Network layer routing protocols and IP addressing.
4	Study Session layer design issues, Transport layer services, and protocols.
5	Study the Presentation layer paradigms and protocols.
6	Acquire knowledge of Application layer and Protocols.
Course Outcomes: After successful completion of the course students will be able to:	
1	Describe communication protocols,layered network architectures and types of transmission media with real time applications.
2	Describe the functions of the data link layer and explain the protocols.
3	Classify the routing protocols and analyze how to assign the IP addresses for the given network.
4	Describe the Session layer design issues and Transport layer services.
5	Explain the Presentation layer paradigms and Protocols.
6	Explain the functions of the Application layer.
Learning Outcomes:	
1	Execute and evaluate network administration commands and demonstrate their use in different network scenarios.
2	Demonstrate the installation and configuration of a network simulator.
3	Demonstrate and measure different network scenarios and their performance behavior.
4	Implement the socket programming for client server architecture.
5	Analyze the traffic flow of different protocols.
6	Design a network for an organization using a network design tool.

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Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tut	Total
NITPCL31	**Data Communication and Computer Networkings (Lab)**	---	**02**	---	---	**01**	---	**01**

Examination Scheme							
Course Code	Course Name	Theory			Term Work	Practical & Oral	Total
		Internal Assessment		End Sem Exam			
		Mid-Term Test	Continuous Assessment				
NITPCL31	**Data Communication and Computer Networkings (Lab)**	**---**	**---**	**---**	**25**	**25**	**50**

Lab Prerequisite:	
Lab Objectives:	
1	To get familiar with the basic network administration commands
2	To install and configure a network simulator and learn the basics of TCL scripting.
3	To understand the network simulator environment and visualize a network topology and observe its performance.
4	To implement client-server socket programs.
5	To observe and study the traffic flow and the contents of protocol frames.
6	To design and configure a network for an organization.
Lab Outcomes: After successful completion of the course students will be able to:	
1	Execute and evaluate network administration commands and demonstrate their use in different network scenarios.
2	Demonstrate the installation and configuration of a network simulator.
3	Demonstrate and measure different network scenarios and their performance behavior.

4	Implement the socket programming for client server architecture.
5	Analyze the traffic flow of different protocols.
	Design a network for an organization using a network design tool.

Data Communication and Computer Networking(Theory)

Module	Contents	Hrs
Data Communications	Components – Direction of Data flow – Networks – Components and Categories – Types of Connections – Topologies –Protocols and Standards – ISO / OSI model, Example Networks such as ATM, Frame Relay, ISDN Physical layer: Transmission modes, Multiplexing, Transmission Media, Switching, Circuit Switched Networks, Datagram Networks, Virtual Circuit Networks, Connecting Devices, OSI reference model, TCP/IP protocol suite**.**	**06**
Data link layer	Introduction, Framing, and Error – Detection and Correction – Parity – LRC – CRC Hamming code, Flow and Error Control, Noiseless Channels, Noisy Channels.Medium Access sub layer: ALOHA, CSMA/CD, LAN – Ethernet IEEE 802.3, IEEE 802.5 – IEEE 802.11, Random access, Controlled access.	**07**
Network Layer	Introduction: Network-Layer Services, Packet Switching, Network-Layer Performance, Network-Layer Performance, Network-Layer Congestion, Structure of A Router, Network Layer Protocols: IPv4 Datagram Format, IPv4 Addresses, Forwarding of IP Packets, ICMPv4, Unicast Routing: General Idea, Routing Algorithms, Unicast Routing Protocols, Multicast Routing. Next generation IP: Packet Format , IPv6 Addressing , Transition from IPv4 to IPv6, ICMPv6.	**08**
Session Layer and Transport Layer	Session layer design issues, Session Layer protocol - Remote Procedure Call (RPC), Transport Layer Protocols: Simple Protocol, Stop-and-Wait Protocol, Go- Back-N Protocol (GBN), Selective- Repeat Protocol, Bidirectional Protocols: Piggybacking, Internet Transport-Layer Protocols, User	**08**

	Datagram Protocol: User Datagram, UDP Services, UDP Applications, Transmission Control Protocol: TCP Services, Features and Segment, TCP Timers	
Presentation Layer	Compression: Lossless Compression, Lossy Compression, Multimedia data: Text, Image, Video , Audio ,Multimedia in the Internet: Streaming Stored Audio/Video, Streaming Live Audio/Video, Real-Time Interactive Audio/Video, Huffman Coding, Adaptive Huffman Compression, Dictionary Based Compression, Speech Compression, LZW, RLE, Image Compression – GIF,JPEG.	**05**
Application Layer	World Wide Web and HTTP, FTP, Electronic Mail, TELNET, Secure Shell (SSH), Domain Name System (DNS) **Overview of VPN** **Overview on Wireless Network and Mobile Network - LAN, PAN, Sensor Networks, Adhoc Network**	**04**
	Total	**39**

Textbooks:	
1	Behrouz A. Forouzan, Forouzan Mosharrat , Computer Networks: A Top down Approach, McGraw Hill education.
2	Andrew S Tanenbaum, Computer Networks -, 4th Edition, Pearson Education.
3	Ranjan Bose, Information Theory, Coding and Cryptography, Ranjan Bose, Tata McGrawHill , Second Edition
Reference Books:	
1	Behrouz A. Forouzan, Data communications and Networking, Fifth edition TMH 2013.
2	J. F. Kurose, K. W. Ross, Computer Networking: A Top 2 -Down Approach Featuring the Internet, 3rd Edition, Pearson Education
Access to software and virtual labs:	
1	Network Simulator ns2
2	https://www.nsnam.org/
3	Packet Tracer
4	Network Impairment Emulator
Industry articles and case studies :	

1	https://www.cisco.com/c/en/us/solutions/cisco-on-cisco/enterprise-networks.html
2	https://simplycoding.in/networking-case-study-questions/
3	Mapping the Internet to the Ethernet
Any other (Access to AI tools / Data driven insights (if applicable) or any other):	
1	https://www.techtarget.com/searchnetworking/definition/network-analytics
2	https://www.oreilly.com/library/view/data-analytics-for/9780135183496/

Internal Assessment:

1) Assessment consists of one Mid Term Test of 20 marks and Continuous Assessment of 20 marks.
2) Mid Term test is to be conducted when approx. 50% syllabus is completed.
3) Duration of the midterm test shall be one hour.

Continuous Assessment:

Continuous Assessment is of **20 marks**. The rubrics for assessment will be considered on approval by the subject teachers. The rubrics can be any 2 or max 4 of the following:

Sr. No	Rubrics	Marks
1	Certificate course for 4 weeks or more: NPTEL/ Coursera/ Udemy/any MOOC	10 marks
2	Wins in the event/competition/hackathon	10 marks
3	Content beyond syllabus presentation	10 marks
4	Creating Proof of concept	10 marks
5	Mini Project / Extra Experiments/ Virtual Lab	10 marks
6	GATE Based Assignment test/Tutorials etc	10 marks
7	Participation in event/workshop/talk / competition followed by small report and certificate of participation relevant to the subject (in other institutes)	05 marks
8.	Multiple Choice Questions (Quiz)	05 marks
9.	Peer Review and participation the marks can be left blank (with discretion of faculty)	05 Marks

End Semester Theory Examination:	
1	Question paper will be of 60 marks
2	Question paper will have a total of five questions
3	All questions have equal weightage and carry 20 marks each
4	Any three questions out of five needs to be solved.

Data Communication and Computer Networking (Lab)

Suggested Experiments: Students are required to complete at least 10 experiments.	
Star (*) marked experiments are compulsory.	
Sr. No.	**Name of the Experiment**
1	Understanding Basic networking Commands and Case study on different Networking devices.
2	Installation and configuration of NS2.
3	Create a LAN, MAN and WAN network in Cisco Packet Tracer.
4	To understand all topologies(mesh, ring, bus, star and hybrid) in Cisco Packet Tracer.
5	Configuring IPv4 and IPv6 Interfaces in Cisco Packet Tracer.
6	Implementation and study of Go back-N and selective repeat protocols in python programming.
7	Socket Programming (TCP and UDP , Client - Server) in python programming.
8	Configuring and Troubleshooting a HTTP and FTP in Cisco Packet Tracer.
9	Configuring Domain Name System (DNS) in Cisco Packet Tracer.

10	Examining TELNET Server in Cisco Packet Tracer..
11*	Network design for an organization using the following concepts: 1. VPN Network

Note: Suggested List of Experiments is indicative. However, flexibilities lie with individual course instructor to design and introduce new, innovative and challenging experiments, (limited to maximum 30% variation to the suggested list) from within the curriculum, so that, the fundamentals and applications can be explored to give greater clarity to the students and they can be motivated to think differently.

Term Work:	
1	Term work should consist of 10 experiments.
2	The final certification and acceptance of term work ensures satisfactory performance of laboratory work and minimum passing marks in term work.
3	Total 25 Marks (Experiments: 15-marks, Term work Assessment: 10-marks)

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COURSE NAME Data Structures : Algorithms and Applications

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/ PR	Tut	Total
NITPC32	Data Structures: Algorithms and Applications (Theory)	03	---	---	03	---	---	03
NITPCL32	Data Structures: Algorithms and Applications (Lab)	---	02	---	---	01	---	01

Data Structures : Algorithms and Applications(Theory)

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/ PR	Tut	Total
NITPC32	Data Structures: Algorithms and Applications (Theory)	03	---	---	03	---	---	03

Examination Scheme							
Course Code	Course Name	Theory			Term Work	Practical & Oral	Total
		Internal Assessment		End Sem Exam			
		Mid-Term Test	Continuous Assessment				
NITPC32	**Data Structures: Algorithms and Applications (Theory)**	**20**	**20**	**60**	**---**	**---**	**100**

Course Prerequisite: Introduction of C programming language.	
Course Objectives:	
1	The fundamental knowledge of data structures.
2	The programming knowledge which can be applied to sophisticated data structures
3	The fundamental knowledge of stacks, queues, linked lists etc.
4	The fundamental knowledge of Trees, Graphs etc.
5	The fundamental knowledge of different sorting, searching, hashing and recursion techniques
6	The real time applications for stacks, queue, linked list, trees, graphs etc.
Course Outcomes: After successful completion of the course students will be able to:	
1	Classify and Apply the concepts of stacks, queues and linked lists in real life problem solving.
2	Classify, apply and analyze the concepts trees in real life problem solving.

3	Illustrate and justify the concepts of graphs in real life problem solving.
4	List and examine the concepts of searching techniques in real life problem solving.
5	List and examine the concepts of sorting techniques in real life problem solving.
6	Examine and justify different operations of stacks, queues, linked list, trees and graphs to various applications
Learning Outcomes:	
1	Classify and Apply the concepts of stacks, queues and linked lists in real life problem solving.
2	Classify, apply and analyze the concepts trees in real life problem solving.
3	Illustrate and justify the concepts of graphs in real life problem solving.
4	List and examine the concepts of searching techniques in real life problem solving.
5	List and examine the concepts of sorting techniques in real life problem solving.
6	Examine and justify different operations of stacks, queues, linked list, trees and graphs to various applications

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tut	Total
NITPCL32	**Data Structure: Algorithms and Applications (Lab)**	---	**02**	---	---	**01**	---	**01**

Examination Scheme							
Course Code	Course Name	Theory			Term Work	Practical & Oral	Total
		Internal Assessment		End Sem Exam			
		Mid-Term Test	Continuous Assessment				
NITPCL32	**Data Structures: Algorithms and Applications (Lab)**	**---**	**---**	**---**	**25**	**25**	**50**

Lab Prerequisite: C Programming	
Lab Objectives:	
1	To use data structures as the introductory foundation for computer automation to engineering problems
2	To use the basic principles of programming as applied to complex data structures.
3	To learn the principles of stack, queue, linked lists and its various operations.
4	To learn fundamentals of binary search tree, implementation and use of advanced tree like AVL, B trees and graphs.
5	To learn about searching, hashing and sorting.
6	To learn the applications of linked lists, stacks, queues, trees and graphs.
Lab Outcomes:	

After successful completion of the course students will be able to:	
1	Describe various types of Data Structures viz. stack, queue, linked list, trees, graphs; and the operations that can be performed on each. and calculate the time and Space complexity of each operation.
2	Describe various searching and sorting methods.
3	Select appropriate data structure to be used for the given problem
4	Explain and use the concept of recursion
5	Develop an algorithm and a C program for the given application.

Data Structures : Algorithms and Applications(Theory)

Module	Contents	Hrs
Prerequisite	Defining, Declaring and Initialization of structure variables. Accessing members of a structure, Array of structures, Nested structures, Pointers to structures. Passing structure, structure members, structure arrays and pointer to structure as function parameters. Self-referential structures.. **Recursion**: Writing a recursive function, Flow of control in recursive functions, Winding and unwinding phase, **Time and space complexity of algorithm.**	**03**
1	Introduction to Data Structures: Linear and Non Linear Data Structures, Static and Dynamic Data Structures. Concept of Stack and Queue. Array Implementation of Stack and Queue, Circular Queue, Double Ended Queue, Priority Queue. Concept of Linked Lists. Singly linked lists, doubly linked lists and circular linked lists. Insertion, deletion, update and copying operations with Singly linked lists, doubly linked lists and circular linked lists. Reversing a singly linked list. **Self-learning Topics**: Linked List Implementation of Stack, Linked List implementation of Queue, Circular Queue, Double Ended Queue, Priority Queue.	**09**
2	Introduction to Trees: Terminology, Types of Binary trees. Non recursive Preorder, in-order and post-order traversal. Creation of binary trees from the traversal of binary trees. Binary search tree: Traversal,	**07**

	searching, insertion and deletion in binary search tree. Threaded Binary Tree: Finding in-order successor and predecessor of a node in threaded tree. Insertion and deletion in threaded binary tree. AVL Tree: Searching and traversing in AVL trees. Tree Rotations: Right Rotation, Left Rotation. Insertion and Deletion in an AVL Tree. **Self-learning Topics**: Implementation of AVL Tree	
3	Introduction to Graphs: Undirected Graph, Directed Graph, graph terminology, Connectivity in Undirected and Directed Graphs. Spanning tree. Representation of graph: adjacency matrix, adjacency list, Transitive closure of a directed graph and path matrix. Traversals: Breadth First Search, Depth First Search. **Self-learning Topics**: Implementation of BFS, DFS	**05**
4	Searching: Sequential Search, Binary Search. Hashing: Hash Functions: Truncation, Mid-square Method, Folding Method, Division Method. Collision Resolution: Open Addressing: Linear Probing, Quadratic Probing, Analysis of all searching techniques **Self-learning Topics: Double Hashing, Separate Chaining Bucket Hashing.**	**04**
5	Insertion sort, Selection sort, Merge sort, Quick sort and Radix sort. Analysis of all sorting techniques. **Self-learningTopics: Radix-Exchange Sort,shell sort**	**04**
6	Applications of Linked Lists: Addition of 2 Polynomials and Multiplication of 2 polynomials. Applications of Stacks: Reversal of a String, Checking validity of an expression containing nested parentheses, Function calls, Polish Notation: Introduction to infix, prefix and postfix expressions and their evaluation and conversions. Application of Queues: Scheduling, Round Robin Scheduling Applications of Trees: Huffman Tree and Heap Sort. Applications of Graphs: Dijkstra's Algorithm, Minimum Spanning Tree: Prim's Algorithm, Kruskal's Algorithm. **Practical Applications and Case Studies: Real-world applications of data structures and algorithms**	**07**

	Case studies highlighting the importance of efficient algorithms in software development and systems engineering	
	Total	**39**

Textbooks:	
1	S. K Srivastava, Deepali Srivastava; Data Structures through C in Depth; BPB Publications; 2011
2	YeYedidya Langsam, Moshej Augenstein, Aaron M. Tenenbaum; Data Structure Using C & C++; Prentice Hall of India; 1996.
3	Reema Thareja; Data Structures using C; Oxford
Reference Books:	
1	Ellis Horowitz, Sartaj Sahni; Fundamentals of Data Structures; Galgotia Publications; 2010 Jean Paul Tremblay, Paul G. Sorenson
2	Rakesh K. Shukla; Data Structures using C and C++; Wiley India; 2009.
Access to software and virtual labs:	
	https://visualgo.net/en/
	https://ds1-iiith.vlabs.ac.in/List%20of%20experiments.html
	https://www.onlinegdb.com/
	https://dev.to/prnvbirajdar/list-of-visual-tools-to-help-with-data-structures-and-algorithms-4nb2?comments_sort=latest
Industry articles and case studies :	
	"Data Structures for Efficient Memory Management in Operating Systems" by ACM Digital Library URL: https://dl.acm.org/doi/10.1145/3373376
	Case Study: "Sorting Algorithms for Big Data Applications" by IEEE Xplore URL: https://ieeexplore.ieee.org/document/8259339
	Case Study: "Search Algorithms in E-commerce Platforms" by SpringerLink URL: https://link.springer.com/chapter/10.1007/978-3-030-32475-9_7

Any other (Access to AI tools / Data driven insights (if applicable) or any other):	
	AI-powered Coding Assistants: Tabnine: https://www.tabnine.com/
	GitHub Copilot (Limited Access): https://github.com/features/copilot
	https://www.hackerrank.com/domains/data-structures
	https://leetcode.com/explore/interview/card/leetcodes-interview-crash-course-data-structures-and-algorithms/703/arraystrings/
	https://cs50.harvard.edu/x/2023/weeks/5/

Internal Assessment:

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1	Question paper will be of 60 marks
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Data Structures : Algorithms and Applications(Lab)

Suggested Experiments: Students are required to complete at least 10 experiments.	
Star (*) marked experiments are compulsory.	
Sr. No.	**Name of the Experiment**
1*	Implementation of Stack Data Structure using array.
2*	Conversion of Infix Expression to Postfix Expression Using Stack
3*	Implementation of Linear Queue Data Structure using array.
4	Implementation of Circular Queue Data Structure using array.
5*	Implementation of Singly Linked List.
6*	Linked List implementation of Stack/queue in real life application.
7	Implementation of Circular Singly Linked List.
8*	Implementation of Circular Doubly Linked List.
9*	Implementation of Binary Search Tree .
10	Implementation of AVL tree.

11*	Implementation of BFS and DFS on a directed graph using an adjacency matrix.
12*	Implementation of Binary Search in real life application
13*	Implementation of Menu driven Selection sort, Bubble sort, Insertion sort
14	Implementation of Menu driven Merge Sort and Quick Sort

Note: Suggested List of Experiments is indicative. However, flexibilities lie with individual course instructor to design and introduce new, innovative and challenging experiments, (limited to maximum 30% variation to the suggested list) from within the curriculum, so that, the fundamentals and applications can be explored to give greater clarity to the students and they can be motivated to think differently.

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COURSE NAME Database Management System

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/ PR	Tut	Total
NITPC33	Database Management System (Theory)	03	---	---	03	---	---	03
NITPCL33	Database Management System(Lab)	---	02	---	---	01	---	01

Database Management System (Theory)

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/ PR	Tut	Total
NITPC33	Database Management System (Theory)	03	---	---	03	---	---	03

Examination Scheme							
Course Code	Course Name	Theory			Term Work	Practical & Oral	Total
		Internal Assessment		End Sem Exam			
		Mid-Term Test	Continuous Assessment				
NITPC33	Database Management System (Theory)	20	20	60	---	---	100

Course Prerequisite: Basic knowledge of databases.	
Course Objectives:	
1	To learn the basics and understand the need of a database management system.
2	To construct conceptual data and Relational models for real world applications from ER/EER.
3	Apply SQL to find solutions to a broad range of queries.
4	To understand the concept of Database Normalization and its need and types.
5	To understand the concepts of transaction processing- concurrency control & recovery procedures.
6	To understand the concepts of NOSQL, XML and Big Data.
Course Outcomes: After successful completion of the course students will be able to:	
1	Identify the need of Database Management System.
2	Create and Design conceptual and Relational models for real life applications.
3	Formulate Queries using SQL.
4	Improve the database design by normalization.
5	Demonstrate the concept of transaction, concurrency and recovery.
6	Master the basics of NOSQL, XML,Big Data and construct queries.
Learning Outcomes:	
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 SQL
3	Design ER-models to represent simple database application scenarios and convert the ER-model to relational tables, populate relational database and formulate SQL queries on data.
4	Improve the database design by normalization.

5	Demonstrate the concept of transaction, concurrency and recovery.
6	Master the basics of NOSQL, XML,Big Data and construct queries.

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tut	Total
NITPCL33	SQL Lab (Lab)	---	02	---	---	01	---	01

Examination Scheme							
Course Code	Course Name	Theory			Term Work	Practical & Oral	Total
		Internal Assessment		End Sem Exam			
		Mid-Term Test	Continuous Assessment				
NITPCL33	SQL Lab (Lab)	---	---	---	25	25	50

Lab Prerequisite:	
Lab Objectives:	
1	To identify and define problem statements for real life applications
2	To construct conceptual data model for real life applications
3	To Build Relational Model from ER/EER and demonstrate usage of relational algebra.
4	To Apply SQL to store and retrieve data efficiently.
5	To Apply NOSQL queries.
6	To understand the concepts of transaction processing- concurrency control & recovery procedures.

Lab Outcomes: After successful completion of the course students will be able to:	
1	Define problem statement and Construct the conceptual model for real life application.
2	Create and populate a RDBMS using SQL.
3	Formulate and write SQL queries for efficient information retrieval
4	Ability to design and implement a database schema for given problem.
5	Ability to formulate queries using NOSQL.
6	Demonstrate the concept of concurrent transactions.

Database Management System (Theory)

Module	Contents	Hrs
1	**Database System Concepts and Architecture:** Introduction, Characteristics of Databases, File system v/s Database system, Data abstraction and Data Independence, DBMS system architecture,Database Administrator (DBA), Role of DBA.	**04**
2	**The Entity-Relationship Model :** Conceptual Modeling of a database, The Entity-relationship (ER) Model, Entity Type, Entity Sets,Attributes and Keys, Relationship Types,Relationship Sets, Weak entity Types Generalization,Specialization and Aggregation,Extended Entity-Relationship (EER) Model.	**05**
3	**Structured Query Language (SQL) & Indexing:** Overview of SQL, Data Definition Commands,Data Manipulation commands, Data Control commands, Simple and Nested queries, Set operations, aggregate functions, Complex Retrieval Queries using Group By,Views and Join in SQL,Integrity constraints in SQL.	**09**
4	**Relational Database Design:** Design guidelines for relational Schema,Functional Dependencies, The need for normalization, The	**08**

	normalization process, Normal Forms- 1NF, 2NF, 3NF & The Boyce-Codd Normal Form (BCNF),4NF,5NF.	
5	**Transactions Management and Concurrency and Recovery: Transaction:** Transaction concept, State Diagram, ACID Properties, Transaction Control Commands,Concurrent Executions, Serializability – Conflict and View,Concurrency Control: Zock-based-protocols, Deadlock handling ,Timestamp-based protocols,Recovery System: Failure Classification, Storage structure, Recovery & atomicity, Log based recovery,Shadow paging.	**07**
6	**Large Scale Data Management : Introduction, Need of NOSQL, CAP Theorem, Different NOSQL databases:stores, Columnar families, Document databases, Graph Databases Introduction to Big Data and XML: DTD, XML Schemas, XQuery, XPath, JSON: Overview, Data Types, Objets, Schema, JSON with Java/PHP/Ruby/Python, Introduction to Hadoop, HDFS, Dealing with Massive Datasets, Introduction to HBase: Overview, HBase Data Model**	**06**
	Total	**39**

Textbooks:	
1	Korth, Slberchatz, Sudarshan, Database System Concepts, 6th Edition, McGraw Hill
2	Elmasri and Navathe, Fundamentals of Database Systems, 6th Edition, Pearson education
3	Raghu Ramkrishnan and Johannes Gehrke, Database Management Systems, TMH
4	Silberschatz A., Korth H., Sudarshan S, Database System Concepts, McGraw Hill Publication, ISBN- 0-07-120413-X, Sixth Edition.
5	S. K. Singh, Database Systems: Concepts, Design and Application, Pearson Publication, ISBN-978-81-317-6092-5
Reference Books:	
1	Peter Rob and Carlos Coronel, ― Database Systems Design, Implementation and Management‖,Thomson Learning, 9th Edition.

2	SQL & PL / SQL for Oracle 11g Black Book, Dreamtech Press
3	G. K. Gupta : "Database Management Systems", McGraw – Hill
4	Large Scale and Big Data by Sherif Sakr, Mohamed Gaber – Auerbach Publications
Access to software and virtual labs:	
1	https://onlinecourses.nptel.ac.in/noc21_cs58/preview
2	https://www.geeksforgeeks.org/dbms/ https://www.geeksforgeeks.org/sql-tutorial/#mysql
3	https://sqlzoo.net/wiki/SQL_Tutorial
4	https://www.geeksforgeeks.org/dbms/ https://www.geeksforgeeks.org/sql-tutorial/#mysql
Industry articles and case studies :	
1	Real-world Database Integration Case Studies: Success Stories, Benefits, and Outcomes
2	A SUITE OF CASE STUDIES IN RELATIONAL DATABASE DESIGN
3	Database Management Trends
Any other (Access to AI tools / Data driven insights (if applicable) or any other):	
1	https://app.datacamp.com/learn/courses
2	https://www.lucidchart.com/pages/
3	https://postgresml.org/

Internal Assessment:

1) Assessment consists of one Mid Term Test of 20 marks and Continuous Assessment of 20 marks.
2) Mid Term test is to be conducted when approx. 50% syllabus is completed.
3) Duration of the midterm test shall be one hour.

Continuous Assessment:

Continuous Assessment is of **20 marks**. The rubrics for assessment will be considered on approval by the subject teachers. The rubrics can be any 2 or max 4 of the following:

Sr. No	Rubrics	Marks
1	Certificate course for 4 weeks or more: NPTEL/ Coursera/ Udemy/any MOOC	10 marks
2	Wins in the event/competition/hackathon	10 marks

3	Content beyond syllabus presentation	10 marks
4	Creating Proof of concept	10 marks
5	Mini Project / Extra Experiments/ Virtual Lab	10 marks
6	GATE Based Assignment test/Tutorials etc	10 marks
7	Participation in event/workshop/talk / competition followed by small report and certificate of participation relevant to the subject (in other institutes)	05 marks
8.	Multiple Choice Questions (Quiz)	05 marks
9.	Peer Review and participation the marks can be left blank (with discretion of faculty)	05 Marks

End Semester Theory Examination:	
1	Question paper will be of 60 marks
2	Question paper will have a total of five questions
3	All questions have equal weightage and carry 20 marks each
4	Any three questions out of five needs to be solved.

SQL (Lab)

Suggested Experiments: Students are required to complete at least 10 experiments.	
Star (*) marked experiments are compulsory.	
Sr. No.	**Name of the Experiment**
1*	Identify real world problems and develop the problem statement. Design an Entity-Relationship (ER) / Extended Entity-Relationship (EER) Model.
2*	Mapping ER/EER to Relational schema model.
3*	Create a database using DDL and apply integrity constraints.
4	Perform data manipulations operations on populated databases.
5*	Perform Authorization using Grant and Revoke.
6*	Implement Basic and complex SQL queries.
7	Implementation of Views and Triggers.
8*	Demonstrate database connectivity using JDBC.
9*	Execute TCL commands.

10	Implement functions and procedures in SQL
11*	Implementation of Cursor.
12*	Implementation and demonstration of Transaction and Concurrency control techniques using locks.
13*	Create an XML database and validate it using XML schema.
14*	Create Document,column and graph based data using NOSQL database tools.
15	Develop a simple GUI based database application and incorporate all the above mentioned features.
16	Case Study using any of the real-life database applications from the following list a)Inventory Management for a EMart Grocery Shop b)Society Financial Management c)Cop Friendly App - Eseva d)Property Management - eMall e)Star Small and Medium Banking and Finance • Build Entity Model diagram - The diagram should align with the business and functional goals stated in the application. • Apply Normalization rules in designing the tables in scope. • Prepared applicable views,triggers(for auditing purposes), functions for enabling enterprise grade features. • Build PL SQL / Stored Procedures for Complex Functionalities,ex EOD Batch Processing for calculating the EMI for Gold Loan for each eligible Customer. • Ability to showcase ACID properties with sample queries with appropriate settings.

Note: Suggested List of Experiments is indicative. However, flexibilities lie with individual course instructor to design and introduce new, innovative and challenging experiments, (limited to maximum 30% variation to the suggested list) from within the curriculum, so that, the fundamentals and applications can be explored to give greater clarity to the students and they can be motivated to think differently.

Term Work:	
1	Term work should consist of 10 experiments.
2	The final certification and acceptance of term work ensures satisfactory performance of laboratory work and minimum passing marks in term work.

3	Total 25 Marks (Experiments: 15-marks, Term work Assessment: 10-marks)

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COURSE NAME : DevOps for Cloud Platform

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/ PR	Tut	Total
NITMM31	DevOps for Cloud Platform (Theory)	03	---	---	03	---	---	03
NITMML31	DevOps for Cloud Platform (Lab)	---	02	---	---	01	---	01

DevOps for Cloud Platform (Theory)

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/ PR	Tut	Total
NITMM31	DevOps for Cloud Platform (Theory)	03	---	---	03	---	---	03

Examination Scheme							
Course Code	Course Name	Theory			Term Work	Practical & Oral	Total
		Internal Assessment		End Sem Exam			
		Mid-Term Test	Continuous Assessment				
NITMM31	DevOps for Cloud Platform (Theory)	20	20	60	---	---	100

Course Prerequisite: Basic knowledge of Cloud databases.	
Course Objectives:	
1	To provide knowledge of software engineering discipline.
2	To understand and analyze Process Models in software design .
3	To understand DevOps practices which aim to simplify Software Development Life Cycle.
4	To understand different Version Control tools.
5	To familiarize with Jenkins build & test software Applications..
6	To familiarize with testing tools.
Course Outcomes: After successful completion of the course students will be able to:	
1	Understand and demonstrate the basic principles of software engineering.
2	Analyze, evaluate Process Models in software design.
3	To understand the fundamentals of DevOps engineering and be fully proficient with DevOps terminologies, concepts, benefits, and deployment options.
4	To be aware of different Version Control tools.
5	Apply Jenkins to Build, Deploy and Test the Software Applications
6	To be aware of different testing tools.
Learning Outcomes:	
1	Develop an understanding of various software development methodologies and their applications, allowing students to choose the most appropriate approach for different project scenarios and effectively manage software development processes.
2	Understand the core principles of DevOps, including continuous integration, continuous delivery, and automation, and comprehend the role of DevOps Engineers in facilitating collaboration, automation, and efficiency across development and operations teams.
3	Acquire practical skills in version control using Git and GitHub, enabling students to track changes, collaborate with team members, and maintain version history for software projects, ensuring transparency, collaboration, and reliability in code management.
4	Gain hands-on experience in deploying and testing applications on Jenkins servers, integrating automated testing frameworks like Selenium and TestNG, and streamlining the continuous integration and delivery process for efficient software releases

5	Learn to define and execute Jenkins pipelines using scripted or declarative syntax, allowing students to automate build, test, and deployment processes, enhance productivity, and ensure consistency and reliability in software delivery pipelines.
6	Understand the setup and configuration of Jenkins Master/Slave architecture, enabling students to distribute build jobs across multiple nodes, improve build performance, and scale resources efficiently to meet the demands of large-scale software projects.

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	Practical	Tut	Total
NITMML31	**DevOps for Cloud Platform (Lab)**	---	**02**	---	---	**01**	---	**01**

Examination Scheme							
Course Code	Course Name	Theory			Term Work	Practical & Oral	Total
		Internal Assessment		End Sem Exam			
		Mid-Term Test	Continuous Assessment				
NITMML31	**DevOps for Cloud Platform (Lab)**	---	---	---	**25**	**25**	**50**

Lab Prerequisite: -	
Lab Objectives:	
1	Apply diverse software development methodologies, including traditional and Agile models.
2	Gain insight into DevOps principles and practices, along with the responsibilities of DevOps Engineers.
3	Implement version control using Git and GitHub to manage source code effectively.
4	Deploy and test applications on Jenkins, integrating automated testing into the CI/CD pipeline.
5	Implement Jenkins pipelines to automate software delivery workflows.
6	Configure Jenkins Master/Slave architecture for distributed build processing
Lab Outcomes: After successful completion of the course students will be able to:	
1	Execute and evaluate network administration commands and demonstrate their use in different network scenarios.
2	Demonstrate the installation and configuration of a network simulator.
3	Demonstrate and measure different network scenarios and their performance behavior.
4	Implement the socket programming for client server architecture.
5	Analyze the traffic flow of different protocols.
	Design a network for an organization using a network design tool.

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DevOps for Cloud Platform(Theory)

Module	Contents	Hrs
Prerequisite	**Concepts of Data Communication**	
Introduction To Software Engineering	Software Engineering- Process framework, the Capability Maturity Model (CMM), Advanced Trends in Software Engineering	**04**
Process Models	Prescriptive Process Models: The Waterfall, Incremental Process Models, Evolutionary Process Models: RAD & Spiral Agile process model: Extreme Programming (XP), Scrum, Kanban	**05**
Introduction to DevOps	Concept of DevOps with related technologies used to Code, Build, Test, Configure & Monitor the Software Applications.	**06**
Version Control using GIT	Version Control, GIT Installation, working with remote repository, GIT Cheat sheet, Create and Fork repositories in GitHub, Apply branching, merging and rebasing concepts, Implement different Git workflow strategies in real-time scenarios, Understand Git operations in IDE, AWS Codecommit	**08**
Working with Jenkins	Introduction to Jenkins (With Architecture), Introduction to Ant, Jenkins Management Adding a slave node to Jenkins, Build the pipeline of jobs using Ant in Jenkins, Create a pipeline script to deploy an application over the Tomcat server.	**08**
Introduction to Selenium and Testing	Introduction to Testing, Different types and levels of testing, Testing Strategy, Automated vs. Manual testing, Testing tools, Selenium, Integration of Selenium with Jenkins, TestNG, GitLab, AWS, CodePipeline	08
	Total	**39**

Textbooks:	
1	Behrouz A. Forouzan, Forouzan Mosharrat , Computer Networks: A Top down Approach, McGraw Hill education.
2	Andrew S Tanenbaum, Computer Networks -, 4th Edition, Pearson Education.
3	Ranjan Bose, Information Theory, Coding and Cryptography, Ranjan Bose, Tata McGrawHill , Second Edition
Reference Books:	
1	Rajkumar buyya, Christian vecchiola, S Thamarai Selvi , "Mastering cloud computing", TataMcGraw Hill Education Private Limited, 2013. Barrie sosinsky, "Cloud computing bible, Wiley publishing 4. 5.
2	Anthony T .Velte, Toby J. Velte, Robert Elsenpeter, "Cloud Computing a Practical Approach",Tata McGraw-HILL, 2010 Edition.
3	Barrie sosinsky, "Cloud computing bible, Wiley publishing
4	James Loope, "Managing Infrastructure with puppet", O'REILLY , June 2011
Industry articles and case studies :	
1	• **https://en.wikipedia.org/wiki/Waterfall_model** • https://www.guru99.com/what-is-sdlc-or-waterfall-model.html • **https://www.geeksforgeeks.org/difference-between-waterfall-model-and-spiral-model/** • https://www.tutorialspoint.com/sdlc/pdf/sdlc_spiral_model.pdf • **https://www.atlassian.com/agile/scrum** • https://www.atlassian.com/agile/scrum • **https://www.atlassian.com/agile/kanban/kanban-vs-scrum)** • https://confluence.atlassian.com/agile066 • **https://roadmap.sh/pdfs/roadmaps/devops.pdf** • **https://www.amazon.com/DevOps-Handbook-World-Class-Reliability-Organizations/dp/1942788002** • **https://www.ibm.com/topics/devops** • https://git-scm.com/downloads
Any other (Access to AI tools / Data driven insights (if applicable) or any other):	
1	https://cloud.google.com/appengine/docs
2	https://www.chef.io/solutions/cloud-management/
3	https://dev.twitter.com/overview/documentation
4	ttps://www.cloudfoundry.org/
5	https://aws.amazon.com/documentation
6	https://developers.facebook.com/

Internal Assessment:

1) Assessment consists of one Mid Term Test of 20 marks and Continuous Assessment of 20 marks.
2) Mid Term test is to be conducted when approx. 50% syllabus is completed.
3) Duration of the midterm test shall be one hour.

Continuous Assessment:

Continuous Assessment is of **20 marks**. The rubrics for assessment will be considered on approval by the subject teachers. The rubrics can be any 2 or max 4 of the following:

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1	Certificate course for 4 weeks or more: NPTEL/ Coursera/ Udemy/any MOOC	10 marks
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8.	Multiple Choice Questions (Quiz)	05 marks
9.	Peer Review and participation the marks can be left blank (with discretion of faculty)	05 Marks

End Semester Theory Examination:	
1	Question paper will be of 60 marks
2	Question paper will have a total of five questions
3	All questions have equal weightage and carry 20 marks each
4	Any three questions out of five needs to be solved.

DevOps for Cloud Platform (Lab)

Suggested Experiments: Students are required to complete at least 10 experiments.	
Star (*) marked experiments are compulsory.	
Sr. No.	**Name of the Experiment**
1*	Application of at least two traditional process models.
2*	Application of the Agile process models.
3*	To understand DevOps: Principles, Practices, and DevOps Engineer Role and Responsibilities.
4	To implement Version control for different files/directories using GIT, install git, and create a GitHub account.
5*	To implement version control using GitHub to sync local GIT repositories and perform various related operations using a GIT Cheat-Sheet
6*	To deploy and test Java/web/Python applications on Jenkins server
7	To implement Jenkins pipeline using scripted/declarative pipeline
8*	To use Jenkins to deploy and run test cases for Java/Web applications using Selenium/TestNG
9*	To implement Jenkins Master/Slave architecture

Note: Suggested List of Experiments is indicative. However, flexibilities lie with individual course instructor to design and introduce new, innovative and challenging experiments, (limited to maximum 30% variation to the suggested list) from within the curriculum, so that, the fundamentals and applications can be explored to give greater clarity to the students and they can be motivated to think differently.

Term Work:	
1	Term work should consist of 10 experiments.
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3	Total 25 Marks (Experiments: 15-marks, Term work Assessment: 10-marks)

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COURSE NAME : Financial Management

Course Code	Course Name	Teaching Scheme (Teaching Hours)			Credits Assigned			
		Theory	Practical	Tutorial	Theory	TW/ PR	Tut	Total
NITEM31	Financial Management (Theory)	02	---	---	02	---	---	02

Course Code	Course Name	Examination Scheme			Credits Assigned			
		Mid Test (MT)	CA*	End Sem Exam	Exam Duration (Hrs)	TW	Pract & oral	Total
NITEM31	Financial Management (Theory)	20	---	30	1	---	---	50

Financial Management(Theory)

Course Prerequisite:	
Course Objectives:	
1	To know about the Indian financial system, instruments, and market.
2	To understand the relationship between risk, return and time value of Money.
3	To understand the financial statements and ratio analysis.
4	To understand personal taxation.
Course Outcomes :	
1	To explain Indian financial system, instrument and market.
2	To determine risk, return and time value of Money with respect to financial decisions.
3	To decide investment decisions for projects with the help of financial ratios.
4	To determine components involved in taxation

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Financial Management

Module		Topics	Hours
1	**Indian Financial System**		8
	1.1	Characteristics, Components and Functions of Financial System. Financial Instruments: Meaning, Characteristics and Classification of Basic Financial Instruments — Equity Shares, Preference Shares, Bonds- Debentures, Certificates of Deposit, Treasury Bills, Trade credit.	
	1.2	Financial Markets: Meaning, Characteristics and Classification of Financial Markets — Capital Market, Money Market and Foreign Currency Market	
	1.3	Financial Institutions: Meaning, Characteristics and Classification of Financial Institutions: Commercial Banks, Investment-Merchant Banks and Stock Exchanges	
2	**Financial Risk and Returns**		6
	2.1	Concepts of Returns and Risks: Measurement of Historical Returns and Expected Returns of a Single Security and a Two-security Portfolio	
	2.2	Measurement of Historical Risk and Expected Risk of a Single Security and a Two-security Portfolio.	
	2.3	Time Value of Money: Future Value of a Lump Sum, Ordinary Annuity, and Annuity Due; Present Value of a Lump Sum, Ordinary Annuity, and Annuity Due; Continuous Compounding and Continuous Discounting.	
3	**Corporate Finance**		6
	3.1	Overview of Financial Statements: Balance Sheet, Profit and Loss Account, and Cash Flow Statement.	
	3.2	Financial Ratio Analysis: Purpose of Financial Ratio Analysis. Liquidity Ratios; Efficiency or Activity Ratios; Profitability Ratios; Capital Structure Ratios; Stock Market Ratios; Limitations of Ratio Analysis.	

4	**Introduction to Taxation**		
	4.1	Introduction and Objectives, Assessment Year, Previous Year, Person	**6**
	4.2	Assessee, Assessment, Income	
	4.3	Gross Total Income, Total Income, Scheme of charging income tax	
Total			**26**

Reference Books:	
1	Fundamentals of Financial Management, 13th Edition (2015) by Eugene F. Brigham and Joel F. Houston; Publisher: Cengage Publications, New Delhi.
2	Analysis for Financial Management, 10th Edition (2013) by Robert C. Higgins; Publishers: McGraw Hill Education, New Delhi.
3	Indian Financial System, 9th Edition (2015) by M. Y. Khan; Publisher: McGraw Hill Education, New Delhi.
4	Financial Management, 11th Edition (2015) by I. M. Pandey; Publisher: S. Chand (G/L) & Company Limited, New Delhi.
Industry articles and case studies :	
1	https://onlinecourses.swayam2.ac.in/cec20_mg05/preview

	Assessment:
1	**Internal Assessment:**
	Assessment consists of one Mid Term Test of 20. Mid Term test is to be conducted when approx. 50% syllabus is completed Duration of the midterm test shall be one hour.

End Semester Theory Examination	
1	Question paper will be of 30 marks
2	Question paper will have a total of five questions
3	All questions have equal weightage and carry 10 marks each
4	Any three questions out of five need to be solved.

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COURSE NAME : Professional Communication and Ethics-II

Course Code	Course Name	Teaching Scheme (Contact Hours)			Credits Assigned			
		Theory	Pract.	Tut.	Theory	TW/Pra		
NITAE311	**Professional Communication and Ethics II**	01	01 (2 Hours) *	--	01	01	--	**02**

* Students to be divided into Batches

Prerequisite: Professional Communication and Ethics-I	
Course Objectives:	
1	To discern and develop an effective style of writing important technical/business documents.
2	To investigate possible resources and plan a successful job campaign.
3	To understand the dynamics of professional communication in the form of group discussions, meetings, etc. required for career enhancement.
4	To develop creative and impactful presentation skills.
5	To analyze personal traits, interests, values, aptitudes and skills.
6	To understand the importance of integrity and develop a personal code of Ethics.
Course Outcomes:	
1	Plan and prepare effective business/ technical documents which will in turn provide a solid foundation for their future managerial roles.
2	Strategize their personal and professional skills to build a professional image and meet the demands of the industry.
3	Emerge successful in group discussions, meetings and result-oriented agreeable solutions in group communication situations.
4	Deliver persuasive and professional presentations.
5	Develop creative thinking and interpersonal skills required for effective

	professional communication.
6	Apply codes of ethical conduct, personal integrity and norms of organizational behavior.

Professional Communication and Ethics-II Syllabus

Module		Topics	Hours
1	**ADVANCED TECHNICAL WRITING: PROJECT/PROBLEM BASED LEARNING (PBL)**		**6**
	1.1	**Definition, Purpose & Types of Proposals** ● Solicited & Unsolicited Proposals ● Types (Short and Long proposals)	
	1.2	**Parts of a Proposal** ● Elements ● Scope and Limitations ● Conclusion	
	1.3	**Objectives of Report Writing** • Information • Decision Making • Analysis • Recommendations	
	1.4	**Parts of a Long Formal Report:** • Prefatory Parts (Front Matter) • Report Proper (Main Body) • Appended Parts (Back Matter)	
	1.5	**Language and Style of Reports** ● Tense, Person & Voice of Reports ● Numbering Style of Chapters, Sections, Figures, Tables ● Referencing Styles in APA & MLA Format ● Proofreading through Plagiarism Checkers	
	1.6	**Technical Paper Writing:** ● Parts of a Technical Paper ● Language and Formatting ● Writing an abstract ● Referencing in IEEE Format	

	1.7	**Presenting data-figures, diagrams and labeling** ● Graphic Organizers for Summaries ● Radial Diagrams like Mind Maps ● Flow Charts ● Cyclic Diagrams ● Linear Diagrams like Timelines ● Pyramids ● Venn Diagrams	
2	**EMPLOYMENT SKILLS**		
	2.1	**Cover Letter & Resume** ● Parts and Content of a Cover Letter ● Difference between Bio-data, Resume & CV ● Essential Parts of a Resume ● Types of Resume (Chronological, Functional & Combination)	**6**
	2.2	**Statement of Purpose** ● Importance of SOP ● Tips for Writing an Effective SOP	
	2.3	**Group Discussions** ● Purpose of a GD ● Parameters of Evaluating a GD ● Types of GDs (Normal, Case-based & Role Plays) ● GD Etiquettes	
	2.4	**Personal Interviews** ● Planning and Preparation ● Types of Questions ● Types of Interviews (Structured, Stress, Behavioral, Problem ● Solving & Case-based) ● Modes of Interviews: Face-to-face (One-to one and Panel) ● Telephonic, Virtual	
3	**BUSINESS MEETINGS**		**2**
	3.1	• **Documentation** • Notice • Agenda • Minutes	

	3.2	• **Conducting Business Meetings:** • Types of Meetings • Roles and Responsibilities of Chairperson, Secretary and Members • Meeting Etiquette	
4	**TECHNICAL/ BUSINESS PRESENTATIONS**		**2**
	4.1	• **Effective Presentation Strategies** • Defining Purpose • Analyzing Audience, Location and Event • Gathering, Selecting And Arranging Material • Structuring a Presentation • Making Effective Slides • Types of Presentations Aids • Closing a Presentation • Platform skills	
	4.2	**Group Presentations** ● Sharing Responsibility in a Team ● Building contents and visuals together ● Transition Phases	
5		**INTERPERSONAL SKILLS**	**5**
	5.1	**Interpersonal Skills** ● Emotional Intelligence ● Leadership & Motivation ● Conflict Management & Negotiation ● Time Management ● Assertiveness ● Decision Making	
6		**CORPORATE ETHICS**	**2**
	6.1	**6.1Intellectual Property Rights** ● Copyrights ● Trademarks ● Patents ● Industrial Designs	
	6.2	**Case Studies** ● • Cases related to Business/ Corporate Ethics	
7	7.1	**PROFESSIONAL WRITING SKILLS**	**3**

		• Developing Professional Writing Skills • Effective introduction with emphasis on general statement, opposing statement and thesis statement • Critical response to a text with special reference to purpose, evaluation of the content, theme and style of a text • Organization of ideas, sentence construction and word choice, grammar and usage • Explanation and support of ideas (special reference to writing paragraphs opening statement, body, closing statement, linkers)	
	7.2	**Creative Writing** • Narrative essays • Content writing • Blog	
		Total	**26**

Reference Books:

1	Lesiker and Petit (1997), "Report Writing for Business", McGraw-Hill Education 10th edition
2	Butterfield, J. (2017). Verbal communication: Soft skills for a digital workplace. Boston, MA: Cengage Learning.
3	Bove, C. L., & Thill, J. V. (2017). *Business communication today*, 14th Edition, NJ: Pearson.
4	Robbins, S. P., Judge, T. A., & Campbell, T. T. (2017). *Organizational Behaviour*. Harlow, England: Pearson.
5	Fred Luthans. (2010). *Organizational Behavior* , McGraw Hill Education, 12th edition
6	B N Ghosh(2017), *Managing Soft Skills for Personality Development*, Tata McGraw Hill Education.
7	R. C. Sharma, Krishna Mohan, Virendra Singh Nirban (2020). *Business Correspondence and Report Writing* , 6th Edition, McGraw Hill

8.	Julie-Ann Amos (2004). *Handling Tough Job Interviews* Jaico Publishing House
References: Web Links	
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Term Work

Term Work will be for 50 - Marks as given below

Sr No	Headings	Marks
A	Assignments	10 Marks
B	Mini Project with Presentation	10 Marks
C	Media Studies	10 Marks
D	Book Report and Presentation	10 Marks
E	Group Discussion	10 Marks
		Total 50 Marks

A) Assignments: List of assignments are as given below. The assignments have to be discussed in the group and approved by the faculty. All assignments will be submitted by students individually. (10 Marks):-

Sr No	List of Assignments
1.	Resume, Cover Letter and SOP
2.	Summarizing data figures into paragraphs (Module 1.7)
3.	Notice, Agenda and Minutes of Meeting
4.	Two case studies on Business Ethics
5.	Assignment on (Teamwork, Leadership, Decision Making and Problem Solving)

B) Report on Final presentation: A detail typed report to be prepared with a minimum of 25 pages and maximum 30 pages. The format of the report to be discussed and approved by faculty

C) It is mandatory for all students to participate in the Final Group Discussion.