



**SWAMINARAYAN
UNIVERSITY**
THE RESERVOIR OF ALL KNOWLEDGE

FACULTY OF IT AND COMPUTER SCIENCE

COURSE CURRICULUM

Course Title: DATA STRUCTURES
(Code: DSBIM108-1C)

IT and CS Programmes in which this course is offered	Semester in which offered
Bachelor of Science In Information Technology-(B.Sc.IT)	Fourth Semester

Course Objectives -Data structure is a subject of primary importance in Information and Communication Technology. Organizing or structuring data is important for implementation of efficient algorithms and program development. Development of application systems and software that use underlying architecture of machines efficiently and effectively requires the ability to use and manipulate various types of Data Structures and other constructs.

The practice of data structure techniques is essential for all programming. The knowledge of “C” language and data structures will be reinforced by practical exercises during the course of study. The course will help students to develop the capability of selecting a particular data structure.

Teaching and Examination Scheme –

Content Hours per Week			Course Credits		Examination Marks				100
L	T	P	T	P	Theory Marks		Practical Marks		
			2	2	E	M	I	EV	
2	0	4	4		25	25	25	25	

*E - External Examination, M- Mid Semester Examination, I- Internal Submission & Viva,
EV - External Viva

DETAILED COURSE CONTENTS -

Sr.	Topic	Teaching Hrs.
1	INTRODUCTION TO DATA STRUCTURE: <ul style="list-style-type: none">• Data Management concepts• Data types – primitive and non-primitive• Performance Analysis and Measurement(Time and space analysis of algorithms-Average, best and worst case analysis), Types of Data Structures- Linear & Non Linear Data Structures.	8
2	LINEAR DATA STRUCTURE <ul style="list-style-type: none">• Array: Representation of arrays, Applications of arrays, sparse matrix and its representation• Stack: Stack-Definitions & Concepts, Operations On Stacks, Applications of Stacks, Polish Expression, Reverse Polish Expression And Their Compilation, Recursion, Tower of Hanoi• Queue: Representation Of Queue, Operations On Queue, Circular Queue, Priority Queue, Array representation of Priority Queue, Double Ended Queue, Applications of Queue• Linked List: Singly Linked List, Doubly Linked list, Circular linked list, Linked implementation of Stack, Linked implementation of Queue, Applications of linked list.	10
3	NON LINEAR DATA STRUCTURE : <ul style="list-style-type: none">• Tree-Definitions and Concepts, Representation of binary tree, Binary tree traversal (Inorder, postorder, preorder), Threaded binary tree, Binary search trees, Conversion of General Trees To Binary Trees, Applications Of Trees Some balanced tree mechanism, eg. AVL trees, 2-3 trees, Height Balanced, Weight Balance• Graph-Matrix Representation Of Graphs, Elementary Graph operations,(Breadth First Search, Depth First Search, Spanning Trees, Shortest path, Minimal spanning tree)	10
4	Graph <ul style="list-style-type: none">• Introduction• Basic Terminology• Representation of Graph• Adjacency Matrix (Array)• Adjacency Linked• Traversal of Graph• Breadth First Traversal (Algorithm and Tracing)• Depth First Traversal (Algorithm and Tracing)• Application of Graph• Spanning Tree• Mnimum Spanning Tree (BFS and DFS)• Prim's Algorithm• Kruskal's Algorithm• Shortest Path Algorithm• Dijkstra's Algorithm	8

***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

Revised Bloom's Taxonomy

Distribution of Theory Marks					
Remember	Understand	Apply	Analyze	Evaluate	Create
07	07	11	-	-	-

*Legends: R = Remembrance; U = Understanding; A = Application N :Analyze andE :EvaluateC :Create and Above Levels (Revised Bloom's Taxonomy)

SUGGESTED LEARNING RESOURCES**A. List of Books**

SR NO.	TITLE OF BOOKS	AUTHOR NAME	PUBLICATION
1	An Introduction to Data Structures with Applications	Jean-Paul Tremblay & Paul G.Sorenson	Tata McGraw Hill
2	Data Structures using C & C++	Ten Baum	Prentice-Hall International

B. List of Major Equipment/ Software

1. 'C' Compiler

C. List of Software/Learning Websites

1. 'C' Programming Language: <http://www.w3schools.in>
2. 'C' Programming Language Tutorial : <https://www.javatpoint.com/c-programming-language-tutorial>

Course**Outcomes:**

Sr. No.	CO statement	Marks % Weightage
CO-1	To understand data management concepts, data types, and analyze algorithm performance for linear and non-linear data structures.	20
CO-2	To understand and implement linear data structures like arrays, stacks, queues, and linked lists, along with their applications.	30
CO-3	To understand and apply tree and graph data structures, including traversal, search, balancing, and common algorithms like BFS, DFS, and shortest path.	25
CO-4	To understand graph representations, traversals, and algorithms like Prim's, Kruskal's, and Dijkstra's for solving graph-related problems.	25

SUGGESTED LIST OF PRACTICAL/EXERCISES

Sr. No	Practical/ Exercises	Approx Hrs. Required
1.	Introduction to pointers. Call by Value and Call by reference	02
2.	Introduction to Dynamic Memory Allocation. DMA functions malloc(), calloc(), free() etc.	02
3.	Implement a program for stack that performs following operations using array. (a) PUSH (b) POP (c) PEEP (d) CHANGE (e) DISPLAY	02
4.	Implement a program to convert infix notation to postfix notation using stack	02
5.	Write a program to implement QUEUE using arrays that performs following operations (a) INSERT (b) DELETE (c) DISPLAY	02
6.	Write a program to implement Circular Queue using arrays that performs following operations. (a) INSERT (b) DELETE (c) DISPLAY	02
7.	Write a menu driven program to implement following operations on the singly linked list. (a) Insert a node at the front of the linked list. (b) Insert a node at the end of the linked list. (c) Insert a node such that linked list is in ascending order.(according to info. Field) (d) Delete a first node of the linked list. (e) Delete a node before specified position. (f) Delete a node after specified position.	12
8.	Write a program to implement following operations on the doubly linked list. (a) Insert a node at the front of the linked list. (b) Insert a node at the end of the linked list. (c) Delete a last node of the linked list. (d) Delete a node before specified position.	08
9.	Write a program to implement following operations on the circular linked list. (a) Insert a node at the end of the linked list. (b) Insert a node before specified position. (c) Delete a first node of the linked list. (d) Delete a node after specified position	08
10.	Implement recursive and non-recursive tree traversing methods inorder, preorder and postorder traversal.	02



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FACULTY OF IT AND COMPUTER SCIENCE

COURSE CURRICULUM

Course Title: BIG DATA ANALYTICS
(Code: BDBIM109-1C)

IT and CS Programmes in which this course is offered	Semester in which offered
Bachelor of Science In Information Technology-(B.Sc.IT)	Fourth Semester

Course Objectives –To provide knowledge about scalable, reliable and distributed storage environment for huge amount of data.To provide insights of data analysis in distributed environment.To optimize business decisions and create competitive advantage with Big Dataanalytics .To introduce programming tools PIG & HIVE in Hadoop echo system. To able to realistically assess the application of big data analytics technologies for different usage scenarios

Today's world is a data-driven world. Increasingly, the efficient operation of organizations across sectors relies on the effective use of vast amounts of data. Big data analytics helps us to examine these data to uncover hidden patterns, correlations, and other insights. It is a fast-growing field and skills in the area are some of the most in-demand today.

Teaching and Examination Scheme –

Content Hours per Week			Course Credits		Examination Marks			
L	T	P	T	P	Theory Marks		Practical Marks	
			3	2	E	M	I	EV
3	0	2	4		25	25	25	25

*E - External Examination, M- Mid Semester Examination, I- Internal Submission & Viva, EV - External Viva

DETAILED COURSE CONTENTS -

Sr.	Topic	Teaching Hrs.
1	Introduction to Big Data <ul style="list-style-type: none"> Introduction– distributed file system–Big Data and its importance, Four Vs, Drivers for Big data, Big data analytics, Big data applications. Algorithms using map reduce Introduction to Hadoop and its Architecture <ul style="list-style-type: none"> Big Data – Apache Hadoop & Hadoop EcoSystem, Moving Data in and out of Hadoop – Understanding inputs and outputs of MapReduce –Data Serialization 	8
2	HDFS, HIVE AND HIVEQL, HBASE <ul style="list-style-type: none"> HDFS-Overview, Installation and Shell, Java API; Hive Architecture and Installation, Comparison with Traditional Database, HiveQL Querying Data, Sorting And Aggregating, Map Reduce Scripts, Joins & Sub queries, HBase concepts, Advanced Usage, Schema Design, Advance Indexing, PIG, Zookeeper , how it helps in monitoring a cluster, HBase uses Zookeeper and how to Build Applications with Zookeeper 	10
3	SPARK <ul style="list-style-type: none"> Introduction to Data Analysis with Spark, Downloading Spark and Getting Started, Programming with RDDs, Machine Learning with MLlib 	8
4	NoSQL and Database for the Modern Web <ul style="list-style-type: none"> What is it?, Where It is Used Types of NoSQL databases, Why NoSQL?, Advantages of NoSQL, Use of NoSQL in Industry, SQL vs NoSQL, NewSQL Database for the Modern Web <ul style="list-style-type: none"> Introduction to MongoDB key features, Core Server tools, MongoDB through the JavaScript's Shell, Creating and Querying through Indexes, Document-Oriented, principles of schema design, Constructing queries on Databases, 	10

	<ul style="list-style-type: none"> collections and Documents, MongoDB Query Language 	
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***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

Revised Bloom's Taxonomy

Distribution of Theory Marks					
Remember	Understand	Apply	Analyze	Evaluate	Create
07	07	11	-	-	-

*Legends: R = Remembrance; U = Understanding; A = Application N :Analyze andE :EvaluateC :Create and Above Levels (Revised Bloom's Taxonomy)

SUGGESTED LEARNING RESOURCES

A. List of Books

SR NO.	TITLE OF BOOKS	AUTHOR NAME	PUBLICATION
1	Intelligent Data Analysis	Michael Berthold, David J. Hand	Springer
2	Taming The Big Data Tidal Wave: Finding Opportunities In Huge Data Streams With Advanced Analytics	Bill Franks	Wiley
3	Professional Hadoop Solutions	Boris lublinsky, Kevin t. Smith, Alexey Yakubovich	Wiley.
4	Understanding Big data	Chris Eaton and Paul C. Zikopoulos	TMH
5	Big Data and Analytics	Seema Acharya, SubhashiniChhellappan	Willey,
6	MongoDB in Action	Kyle Banker, PiterBakkum , Shaun Verch	DreamTech,

B. List of Software/Learning Websites

<http://in.reuters.com/tools/rss>

<http://www.altova.com/xmlspy.html>

<https://www.w3.org/RDF/>

Course Outcomes:

Sr. No.	CO statement	Marks % Weightage
CO-1	To understand the fundamentals of Big Data, including its characteristics, drivers, and applications, and apply MapReduce algorithms within the Hadoop ecosystem for	15

	data processing and analysis.	
CO-2	To implement and utilize HDFS for distributed file storage, perform data querying and analysis with Hive and HiveQL, and design and interact with NoSQL databases using HBase, leveraging related technologies like Pig and Zookeeper for cluster management and application development	20
CO-3	Students will be able to use Apache Spark to perform data analysis, manipulate Resilient Distributed Datasets (RDDs), and apply basic machine learning algorithms using MLlib.	20
CO-4	To understand the core concepts of NoSQL databases, differentiate various NoSQL database types, and evaluate their advantages, disadvantages, and appropriate use cases in comparison to SQL and NewSQL databases.	25
CO-5	Able to design, implement, and query document-oriented databases using MongoDB, leveraging its key features, core tools, and JavaScript shell for modern web applications.	20

SUGGESTED LIST OF PRACTICAL/EXERCISES

Sr. No	Practical/ Exercises	Approx Hrs. Required
1.	Case Study: Stage 1: Selection of case study topics and formation of small working groups of 2/3 students per group. Students engage with the cases, read through background material provided in the session and work through an initial set of questions to deepen the understanding of the case. Sample applications and data will be provided to help students familiarize themselves with the cases and available (big) data. Stage 2: The groups are given a specific task relevant to the case in question and are expected to develop a corresponding big data concept using the knowledge gained in the course and the parameters set by the case study scenario. A set of questions that help guide through the scenarios will be provided. Stage 3: Each group prepares a short 2 – 5 page report on their results and a 10 min oral presentation of their big data concept.	06
2.	To draw and explain Hadoop Architecture and Ecosystem with the help of a casestudy using WorkCount example. To define and install Hadoop.	02
3.	To understand the overall programming architecture using Map Reduce API.	02
4.	To implement the following file management tasks in Hadoop System (HDFS): Adding files and directories, Retrieving files, Deleting files.	02
5.	Store the basic information about students such as roll no, name, date of birth ,and address of student using various collection	02

	types such as List, Set and Map.	
6.	Basic CRUD operations in MongoDB.	02
7.	To perform NoSQL database using MongoDB to create, update and insert.	02
8.	Retrieve various types of documents from students collection.	02
9.	To find documents from Students collection.	02
10.	To run a basic Word Count MapReduce program to understand MapReduce	02
11.	Paradigm: To count words in a given file, To view the output file, and To calculate	02



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FACULTY OF IT AND COMPUTER SCIENCE

COURSE CURRICULUM

Course Title: Operating System
(Code: OSBIM110-1C)

IT and CS Programmes in which this course is offered	Semester in which offered
Bachelor of Science In Information Technology-(B.Sc.IT)	Fourth Semester

Course Objectives -This course OPERATING SYSTEMS is an essential part of any Computer-Science education. The purpose of this course is to understand the mechanisms of the Operating Systems like Process Management, Memory Management, Device Management, Information Management, Storage Structures used in OS and Protection Principles. How effectively the OS is utilizing the CPU resources with the help of these mechanisms.

Teaching and Examination Scheme –

Content Hours per Week			Course Credits		Examination Marks			
L	T	P	T	P	Theory Marks		Practical Marks	
			3	2	E	M	I	EV
3	0	2	4		60	40	30	20
150								

*E - External Examination, M- Mid Semester Examination, I- Internal Submission & Viva, EV - External Viva

DETAILED COURSE CONTENTS -

Sr.	Topic	Teaching Hrs.
1	INTRODUCTION What is an Operating System, Simple Batch System, Multiprogram Batch System, Time Sharing Systems, Personal Computer System, Network OS, Parallel System, Distributed Systems, Real-Time Systems <ul style="list-style-type: none"> Memory Management: Background, Logical versus Physical Address Space, Swapping, Contiguous Allocation, Paging, Segmentation. Virtual Memory: Demand Paging, Page Replacement, Page 	8

	Replacement Algorithms, Performance of Demand Paging, Allocation of Frames, Thrashing, Other Consideration.	
2	PROCESSES <ul style="list-style-type: none"> • Process Concept, Process Scheduling, • Operation on Processes, Process Scheduling – Basic Concepts - Scheduling Criteria - Scheduling Algorithms FCFS, SJF, Priority, Round- Robin) • Thread – Overview – Benefits - User & Kernel Threads and Multithreading Models. • CPU Scheduling: Basic Concepts, Scheduling, Criteria, Scheduling, Algorithms, Multiple Processor Scheduling, • Process Synchronization: Background, The Critical Section Problem, Synchronization Hardware, Semaphores, Classical Problems of Synchronization. 	12
3	DEADLOCKS <ul style="list-style-type: none"> • System Model, • Deadlock Characterization, • Methods for Handling Deadlocks, • Deadlock Prevention, • Deadlock Avoidance, • Deadlock Detection, • Recovery from Deadlock. 	12
4	DEVICE MANAGEMENT <ul style="list-style-type: none"> • Techniques for Device Management, • Dedicated Devices, Shared Devices, • Virtual Devices, • Input or Output Devices, Storage Devices, • Buffering, • Secondary Storage Structure Disk Structure, • Disk Scheduling, • Disk Management, • Swap Space Management, • Disk Reliability. 	12

***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

Revised Bloom's Taxonomy

Distribution of Theory Marks					
Remember	Understand	Apply	Analyze	Evaluate	Create
07	07	11	-	-	-

*Legends: R = Remembrance; U = Understanding; A = Application N :Analyze and E :EvaluateC :Create and Above Levels (Revised Bloom's Taxonomy)

SUGGESTED LEARNING RESOURCES

A. List of Books

SR NO.	TITLE OF BOOKS	AUTHOR NAME	PUBLICATION
1	Modern Operating Systems 4 th Edition (2014)	Andrew S. Tanenbaum, Herbert Bos	Pearson
2	Operating Systems – Internals and Design Principles 8 th Edition (2009)	Willaim Stallings	Pearson
3	Operating System Concepts 8 th Edition	Abraham Silberschatz, Peter B. Galvineg Gagne	Wiley India Education
4	Operating Systems 3 rd Edition	Godbole and Kahate	McGraw Hill
5	Operating Systems – Internals and Design Principles 5 th Edition (2005)	Stallings	Pearson

Course Outcomes:

Sr. No.	CO statement	Marks % Weightage
CO-1	To understand operating system concepts, memory management, and virtual memory techniques.	15
CO-2	To understand and apply process management concepts, scheduling algorithms, thread management, CPU scheduling, and process synchronization techniques.	30
CO-3	To understand deadlock characteristics, prevention, avoidance, detection, and recovery methods in operating systems.	30
CO-4	To understand device management techniques, including handling dedicated, shared, and virtual devices, storage, buffering, and disk management.	25

SUGGESTED LIST OF PRACTICAL/EXERCISES

Sr. No	Practical/ Exercises	Approx Hrs. Required
1	Installation of virtual machine software.	04
2	Installation of Linux operating system (RedHat / Ubuntu) on virtual machine.	04
3	Installation of Windows operating system on virtual machine	04
4	Linux commands: Working with Directories: (a) pwd, cd, absolute and relative paths, ls, mkdir, rmdir (b) file, touch, rm, cp, mv, rename, head, tail, cat, tac, more, less, strings, chmod	04

5	Linux commands: Working with files: (a) ps, top, kill, pkill, bg, fg (b) grep, locate, find, locate. (c) date, cal, uptime, w, whoami, finger, uname, man, df, du, free, whereis, which. (d) Compression: tar, gzip.	08
6	Windows (DOS) Commands – 1 (a) Date, time, prompt, md, cd, rd, path. (b) Chkdsk, copy, xcopy, format, fidsk, cls, defrag, del, move.	04
7	Windows (DOS) Commands – 2 (a) Diskcomp, diskcopy, diskpart, doskey, echo (b) Edit, fc, find, rename, set, type, ver	04
8	Working with Windows Desktop and utilities (a) Notepad (b) Wordpad (c) Paint (d) Taskbar (e) Adjusting display resolution (f) Using the browsers (g) Configuring simple networking (h) Creating users and shares	08
9	Working with Linux Desktop and utilities (a) The vi editor (b) Graphics (c) Terminal (d) Adjusting display resolution (e) Using the browsers (f) Configuring simple networking (g) Creating users and shares	08
10	Installing utility software on Linux and Windows	02



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FACULTY OF IT AND COMPUTER SCIENCE

COURSE CURRICULUM

Course Title: CLOUD COMPUTING
(Code: CCBIE103-1C)

IT and CS Programmes in which this course is offered	Semester in which offered
Bachelor of Science In Information Technology-(B.Sc.IT)	Fourth Semester

Course Objectives -This course aims students to understand the hardware, software concepts and architecture of cloud computing. Students realize the importance of Cloud Virtualization, Abstractions and Enabling Technologies.

Demonstrate comprehensive understanding, practical proficiency, and effective communication in cloud computing concepts, architectures, deployment models, virtualization, and security measures, while collaborating to propose and implement realworld cloud solutions.

Teaching and Examination Scheme –

Content Hours per Week			Course Credits		Examination Marks				150
L	T	P	T	P	Theory Marks		Practical Marks		
			2	1	E	M	I	EV	
3	0	2	3		60	40	30	20	

*E - External Examination, M- Mid Semester Examination, I- Internal Submission & Viva, EV - External Viva

DETAILED COURSE CONTENTS -

Sr.	Topic	Teaching Hrs.
1	Introduction to Cloud Computing <ul style="list-style-type: none"> Cloud Computing at a glance, The vision of cloud computing Defining a cloud, A closer look The cloud computing reference model, Characteristics and benefits, Challenges ahead Historical Developments Distributed systems, Virtualization Web 2.0 Build Cloud Computing Environments, Computing platforms and 	06

	technologies <ul style="list-style-type: none"> • Amazon Web Services (AWS),Google AppEngine • Microsoft Azure ,Hadoop 	
2	Principles of Parallel and Distributed Computing <ul style="list-style-type: none"> • Eras of computing • Parallel vs. distributed computing • Elements of parallel computing • What is parallel processing? • Hardware architectures for parallel processing • Approaches to parallel programming • Elements of distributed computing • General concepts and definitions • Components of a distributed system • Architectural styles for distributed computing • System architectural styles • Models for interprocess communication • Technologies for distributed computing • Service-oriented computing 	14
3	Virtualization <ul style="list-style-type: none"> • Introduction • Characteristics of virtualized environments • Taxonomy of virtualization techniques • Execution virtualization • Machine reference model • Other types of virtualization • Virtualization and cloud computing • Pros and cons of virtualization • Technology examples • VMware: full virtualization • Virtualization Solution • End-user (desktop) virtualization overriding. 	14
4	Cloud Computing Architecture <ul style="list-style-type: none"> • Introduction • The cloud reference model • Architecture • Infrastructure- and hardware-as-a-service • Platform-as-a-service • Software-as-a-service • Types of clouds • Public clouds • Private clouds • Hybrid clouds • Community clouds • Economics of the cloud 	08

***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

Revised Bloom's Taxonomy

Distribution of Theory Marks					
Remember	Understand	Apply	Analyze	Evaluate	Create
19	25	16	-	-	-

*Legends: R = Remembrance; U = Understanding; A = Application N :Analyze andE :EvaluateC :Create and Above Levels (Revised Bloom's Taxonomy)

SUGGESTED LEARNING RESOURCES

A. List of Books

SR NO.	TITLE OF BOOKS	AUTHOR NAME	PUBLICATION
1	Cloud Computing: Concepts, Technology & Architecture	Thomas Erl , Ricardo Puttini , Zaigham Mahmood	Pearson Service Technology ISBN(9780133387520)
2	Cloud Computing Black Book	Kailash Jayaswal, JagannathKallakurchi, Donald J. Houde, Dr. Deven Shah	Dreamtech Press ISBN(978-9351193944)

B. List of Software/Learning Websites

https://www.tutorialspoint.com/cloud_computing/index.htm

<https://www.geeksforgeeks.org/cloud-computing/>

https://www.w3schools.com/aws/aws_cloudessentials_cloudcomputing.php

<https://www.w3schools.in/cloud-computing>

<https://www.javatpoint.com/cloud-computing>

https://onlinecourses.nptel.ac.in/noc21_cs14/preview

<https://www.edx.org/learn/cloud-computing/ibm-introduction-to-cloud-computing>

<https://www.coursera.org/specializations/cloud-computing>

<https://aws.amazon.com/education/awseducate/>

Course Outcome :

Sr. No.	CO statement	Marks % Weightage
CO-1	To understand cloud computing concepts, architectures, and deployment models, including AWS, Azure, and Hadoop.	15
CO-2	To understand parallel and distributed computing principles, architectures, and programming models, and apply them to design and analyze distributed systems.	30
CO-3	To understand virtualization concepts, techniques, and applications, including cloud computing and VMware, and analyze its advantages and disadvantages.	30
CO-4	To understand cloud computing architectures, service models (IaaS, PaaS, SaaS), deployment types, and economic considerations.	25

SUGGESTED LIST OF PRACTICAL/EXERCISES

Sr. No	Practical/ Exercises	Approx Hrs. Required
1.	To study cloud architecture and cloud computing model.	02
2.	Study and implementation of Infrastructure as a Service <ul style="list-style-type: none"> • OpenStack Computing Components • install OpenStack on Ubuntu 18.04 with DevStack 	02
3.	study and implementation of Storage as a Service	02
4.	Case Study: "Choosing the Right Cloud Deployment Model" <ul style="list-style-type: none"> • Examine case studies of organizations adopting different cloud deployment models (public, private, hybrid, community). • Analyze the advantages and disadvantages of each model. • Discuss key drivers influencing the choice of a specific cloud deployment model. 	02
5.	Case Study: "Comparative Analysis of Cloud Service Providers" <ul style="list-style-type: none"> • Evaluate case studies of major cloud service providers (e.g., AWS, Azure, Google Cloud). • Analyze their service models (SaaS, PaaS, IaaS) and advantages/disadvantages. • Discuss the impact of cloud computing on users using realworld examples. 	02
6.	Working and installation of Google App Engine	02
7.	Working and installation of Microsoft Azure.	02
8.	Case Study: "Implementing Virtualization in Enterprise IT" <ul style="list-style-type: none"> • Explore a case where an organization successfully implemented virtualization. • Discuss the types of virtualization used (desktop, network, storage, data). • Analyze the advantages and disadvantages experienced by the organization. 	02
9.	Case Study: "Data Security and Privacy in a Cloud-Based Healthcare System" <ul style="list-style-type: none"> • Investigate a case where a healthcare organization adopted cloud computing. • Discuss infrastructure security at the network, host, and application levels. • Analyze data security, storage, and privacy issues in the context of sensitive healthcare data. 	02
10.	"Global Company's Hybrid Cloud Strategy" <ul style="list-style-type: none"> • Examine a multinational corporation's use of a hybrid cloud model. Analyze how the organization balances data storage, compliance, and efficiency. 	02



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COURSE CURRICULUM

Course Title: MODERN INDIAN LANGUAGE
(Code: AEC104-1C-D)

IT and CS Programmes in which this course is offered	Semester in which offered
Bachelor of Science In Information Technology-(B.Sc.IT)	Fourth Semester

Course Objectives –

- Develop basic conversational skills in the target language. Understand and use fundamental grammar and vocabulary. Read and comprehend simple texts in the target language. Write basic sentences and paragraphs in the target language.
- કોઈ પણ વિદ્યાશાખા કે વિષયના વિદ્યાર્થીઓ ગુજરાતી સાહિત્યના સૌંદર્યનો આસ્વાદ માણી સાહિત્ય પ્રત્યે અભિમુખ થશે,
- हिन्दी नाटक के बारे में विस्तार से जानकारी देना
- हिन्दी भाषा के व्यावहारिक ज्ञान से अवगत कराना

Teaching and Examination Scheme –

Content Hours per Week			Course Credits		Examination Marks				
L	T	P	T	P	Theory Marks		Practical Marks		50
			2	0	E	M	I	EV	
2	0	0	2		25	25	0	0	

*E - External Examination, M- Mid Semester Examination, I- Internal Submission & Viva, EV - External Viva

DETAILED COURSE CONTENTS -

Sr.	Topic	Teaching Hrs.
1	કૃતિ – વિનોદ ભટ્ટ - શ્રેષ્ઠ હાસ્યરચનાઓ - સંપા. વિનોદ ભટ્ટ એકમ - 1. વિનોદ ભટ્ટ - શ્રેષ્ઠ શ્રેષ્ઠ હાસ્યરચનાઓ (સંપા. વિનોદ ભટ્ટ)નો કૃતિવક્ષી અભ્યાસ (પસંદગીની રચનાઓનો અભ્યાસ) વિનોદ ભટ્ટ - શ્રેષ્ઠ હાસ્યરચનાઓ પહેલું સુખ તે મૂંગી નાર	12

	આંખ આડા કાન ભૂલચૂક લેવી-દેવી અમદાવાદ એટલે અમદાવાદ	
2	રચનાકાર ઓર રચના કા મૂલયાકન જયશંકર પ્રસાદ: વયક્તિત્વ ઓર કૃતિત્વ 'ધ્રુવસ્વામિની' નાટક કા કથાનક ઓર ઉદ્દેશ્ય ધ્રુવસ્વામિની કા ચરિત્ર, રામગુપ્ત કા ચરિત્ર	12

***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

SUGGESTED LEARNING RESOURCES

A. List of Books

SR NO.	TITLE OF BOOKS	AUTHOR NAME	PUBLICATION
1	વિનોદ ભટ્ટ - શ્રેષ્ઠ હાસ્યરચનાઓ પહેલું સુખ તે મૂંગી નાર આંખ આડા કાન ભૂલચૂક લેવી-દેવી અમદાવાદ એટલે અમદાવાદ	વિનોદ ભટ્ટ	-
2	'ધ્રુવસ્વામિની' (નાટક)	જયશંકર પ્રસાદ	ધ્રુમિલ પ્રકાશન, અમદાવાદ

B. List of Software/Learning Websites

https://www.youtube.com/watch?v=seDBeQ_ITdk
<https://www.youtube.com/watch?v=kKaGU0kYaq4>

Revised Bloom's Taxonomy

Distribution of Theory Marks					
Remember	Understand	Apply	Analyze	Evaluate	Create
07	07	11	-	-	-

*Legends: R = Remembrance; U = Understanding; A = Application N :Analyze and E :Evaluate C : Create and Above Levels (Revised Bloom's Taxonomy)

Course Outcomes:

Sr. No.	CO statement	Marks % Weightage
CO-1	વિદ્યાર્થીઓ કૃતિ દ્વારા સમાજ અને સંસ્કૃતિને ઓળખી શકશે. વિદ્યાર્થીઓ સપર્ધાત્મક પરીક્ષાની તૈયારીના ભાગરૂપે કેટલીક સાહિત્યિક બાબતો વિશે જાણશે	50
CO-2	છાત્ર નાટક કે તત્ત્વ કો સમજૂકર અલોચના કરના સીખેંગે	50



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FACULTY OF IT AND COMPUTER SCIENCE

COURSE CURRICULUM

Course Title: ENTERPRISE RESOURCE PLANNING
(Code: SEC104-1C-D)

IT and CS Programmes in which this course is offered	Semester in which offered
Bachelor of Science In Information Technology-(B.Sc.IT)	Fourth Semester

Course Objectives –

The course would make students aware about ERP theory and practice. This course provides the students with the knowledge of evolution of ERP systems, business process reengineering, ERP technologies, process mapping, ERP life cycle and ERP auditing and risk issues.

The student would be able

- 1) To comprehend the technical aspects of ERP systems.
- 2) To learn concepts of reengineering and how they relate to ERP system implementations.
- 3) To understand the success and failure factors of ERP implementation.
- 4) To understand the steps and activities in the ERP life cycle.
- 5) To identify and describe typical functionality in an ERP system.

Teaching and Examination Scheme –

Content Hours per Week			Course Credits		Examination Marks			
L	T	P	T	P	Theory Marks		Practical Marks	
			0	2	E	M	I	EV
0	0	4	2		0	0	25	25

*E - External Examination, M- Mid Semester Examination, I- Internal Submission & Viva,
EV - External Viva

DETAILED COURSE CONTENTS -

Sr.	Topic	Teaching Hrs.
1	Introduction to Enterprise and ERP <ul style="list-style-type: none"> • Introduction • Business Functions and Business Processes • Integrated Management Information • Role of the Enterprise in Implementing the ERP System • Business Modeling • Introduction • Common ERP Myths • A Brief History of ERP • The Advantages of ERP • Why ERP Package Now • Over Expectation in ERP • Roadmap for successful ERP implementation • The Role of CIO • Will ERP fit the ways A Company does Business? • Why is ERP important to A Company? • ERP market has Grown and will continue to Grow • How does ERP create Value? 	08
2	Risk, Benefits and Technologies related to ERP <ul style="list-style-type: none"> • Risks of ERP • Risk Factors of ERP Implementation People Issues • Process Risks Technological Risks Implementation Issues • Operation and Maintenance issues • Benefits of ERP • Information Integration Reduction of Lead-time On-time Shipment Reduction in Cycle Time • Improved Resource Utilization Better Customer Satisfaction Improved Supplier Performance Increased Flexibility • Reduced Quality Costs • Better Analysis and Planning Capabilities • Introduction • Business Process Reengineering (BPR) • Data Warehousing • Data Mining • On-line Analytical Processing (OLAP) • Product Life Cycle Management (PLM) • Supply Chain Management (SCM) • Customer Relationship Management (CRM) • Geographical Information Systems (GIS) • Intranet and Extranets • Advanced Technology and ERP Security • Middleware • Security and ERP 	08
3	ERP Functional Modules, ERP- Implementations <ul style="list-style-type: none"> • Functional Modules • Introduction • Functional Module of ERP Software Financial Module Manufacturing Module • HR Module • Materials Management Module Production Planning Module Plant Maintenance Module Quality Management Module Purchasing Module 	08

	<ul style="list-style-type: none"> Marketing Module Sales and Distribution Module ERP-Implementation Basics Why ERP? Technological, Operational, and Business Reasons for Implementing ERP Implementation Challenges ERP Implementation Life Cycle Objectives of ERP Implementation Different Phases of ERP Implementation 	
4	Success & Failure Factors of an ERP Implementation, Present & Future <ul style="list-style-type: none"> Success Factors Failure Factors ERP and eBusiness eBusiness Supply Chain Integration The eBusiness Process Model ERP / eBusiness Integration ERP, Internet and WWW ERP II ERP, Internet and WWW ERP to ERP II Bringing ERP to the ERP Enterprise 	08

***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/Quizzes/Surprise Tests (Summative/MCQ) etc.

Revised Bloom's Taxonomy

Distribution of Theory Marks					
Remember	Understand	Apply	Analyze	Evaluate	Create
07	07	11	-	-	-

*Legends: R = Remembrance; U = Understanding; A = Application N :Analyze andE :EvaluateC :Create and Above Levels (Revised Bloom's Taxonomy)

SUGGESTED LEARNING RESOURCES

A. List of Books

SR NO.	TITLE OF BOOKS	AUTHOR NAME	PUBLICATION
1	Enterprise Resource Planning	Alexis Leon	TMH
2	Enterprise Resource Planning	MahadeoJaiswal and Ganesh Vanapalli	MacMillan Publications
3	Enterprise Resource Planning	Summer	Pearson Education

B. List of Software/Learning Websites

- <https://www.javatpoint.com/erp-full-form>
- <https://www.investopedia.com/terms/e/erp.asp>

COURSE OUTCOMES:

Sr. No.	CO statement	Marks % Weightage
CO-1	To comprehend the technical aspects of ERP systems.	20

CO-2	To learn concepts of reengineering and how they relate to ERP system implementations.	25
CO-3	To understand the success and failure factors of ERP implementation.	30
CO-4	To understand the steps and activities in the ERP life cycle and To identify and describe typical functionality in an ERP system.	25

SUGGESTED LIST OF PRACTICAL/EXERCISES

Sr. No	Practical/ Exercises	Approx Hrs. Required
1.	Study practical about Integrated Management Information and Role of the Enterprise in Implementing the ERP System.	02
2.	Study practical about Business Modeling.	02
3.	Study practical about Roadmap for successful ERP implementation and The Role of CIO.	02
4.	Study practical about ERP important to A Company.	02
5.	Study practical about Risk, Benefits and Technologies related to ERP .	02
6.	Study practical about ERP related technologies.	02
7.	Study practical about ERP Functional Modules.	02
8.	Study practical about ERP- Implementations.	02
9.	Study practical about Success & Failure Factors of an ERP Implementation.	02
10.	Study practical about Present & Future of ERP.	02



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COURSE CURRICULUM

Course Title: THE ART OF BEING HAPPY
(Code: CVA104-1C-D)

IT and CS Programmes in which this course is offered	Semester in which offered
Bachelor of Science In Information Technology-(B.Sc.IT)	Fourth Semester

Course Objectives -

- The students shall be able to evaluate the factors contributing to the phenomenon of happiness in the personal, familial and community life of an individual in different cultures in the Indian context.
- They will be able to develop healthy interpersonal relationships and wellbeing, cherishing the values of Indian culture and philosophy.
- They will be able to relate to the global phenomenon of sustainable development and become sensitive to the needs of the planet.

Teaching and Examination Scheme –

Content Hours per Week			Course Credits		Examination Marks				100
L	T	P	T	P	Theory Marks		Practical Marks		
			2	0	E	M	I	EV	
2	0	0	2		60	40	0	0	

*E - External Examination, M- Mid Semester Examination, I- Internal Submission & Viva,
EV - External Viva

DETAILED COURSE CONTENTS -

Sr.	Topic	Teaching Hrs.
1	Human Ecology and Happiness <ul style="list-style-type: none"> Definitions/Factors of Happiness: <ol style="list-style-type: none"> Environmental and Social,Physical, emotional and psychological well-being for happiness Physiological and hormonal basis of happiness Coping with Stress: 	12

	i. A life saving skill ii. Culture and Happiness, iii. Self-Actualization	
2	The Reference Model for network communication <ul style="list-style-type: none"> • PanchKosh Theory & Idea of Well-Being • Idea of Self and other • Hierarchy and stages of happiness • Measuring happiness: Key indicators , Happiness Index , India in Global Happiness Indices 	12

***Continuous Evaluation:**

It consists of Assignments/Seminars/Presentations/(Summative/MCQ) etc.

Revised Bloom's Taxonomy

Distribution of Theory Marks					
Remember	Understand	Apply	Analyze	Evaluate	Create
07	07	11	-	-	-

*Legends: R = Remembrance; U = Understanding; A = Application N :Analyze and E :Evaluate C : Create and Above Levels (Revised Bloom's Taxonomy)

SUGGESTED LEARNING RESOURCES

A. List of Books

S.No.	Title of Book	Author	Publication
1.	Anthropology of Happiness: the state of Well-Being and the way of Joy, In Social Science	Leontiev, Dmitry	World Bank Publications.
2.	Authentic happiness: Using the new positive psychology to realize your potential for lasting fulfillment	Seligman, M	Free Press

Course Outcomes:

Sr. No.	CO statement	Marks % Weightage
CO-1	To understand the environmental, social, physical, emotional, psychological, and physiological factors contributing to human happiness.	25
CO-2	To learn stress coping skills, explore the relationship between culture and happiness, and understand self-actualization.	25
CO-3	To understand network communication models, PanchKosh theory, and the concepts of self and well-being.	25
CO-4	To understand happiness hierarchies, measurement indicators (including the Happiness Index), and India's global ranking.	25
