# Shri Vaishnav Vidyapeeth Vishwavidyalaya,Indore
## Shri Vaishnav Institute of Information Technology
## B.Tech. (CSE-Big Data Analytics/Cloud and Mobile Computing/Artificial Intelligence/Data Science/Full Stack Development & Block chain-IBM)
## Choice Based Credit System (CBCS)-2021-25
## SEMESTER-IV

| COURSE CODE | CATEGORY | COURSE NAME | TEACHING&EVALUATION SCHEME | | | | | L | T | P | CREDITS |
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| | | | THEORY | | | PRACTICAL | | | | | |
| | | | ENDSEM University Exam | Two Term Exam | Teachers Assessment* | ENDSEM University Exam | Teachers Assessment* | | | | |
| ML307 | BS | Environmental Management and Sustainability | 60 | 20 | 20 | 0 | 0 | 4 | 0 | 0 | 4 |

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## Course Objectives:
### The student will have ability to:
1. To create awareness towards various environmental problems.
2. To create awareness among students towards issues of sustainable development.
3. To expose students towards environment friendly practices of organizations.
4. To sensitize students to act responsibly towards environment.

## Course Outcomes:
The students will be able to:

1. The course will give students an overview of various environmental concerns and practical
2. Challenges in environmental management and sustainability.
3. Emphasis is given to make students practice environment friendly behavior in day-to-day Activities.

## Unit I: Introduction to Environment Pollution and Control                    10HRS
1.      Pollution and its types (Air, Water, and Soil): Causes, Effects and Control measures
2.      Municipal Solid Waste: Definition, Composition, Effects

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3. Electronic Waste: Definition, Composition, Effects
4. Plastic Pollution: Causes, Effects and Control Measures

## Unit II: Climate Change and Environmental Challenges                   9HRS
1. Global Warming and Green House Effect
2. Depletion of the Ozone Layer
3. Acid Rain
4. Nuclear Hazards

## Unit III: Environmental Management and Sustainable Development          8HRS
1. Environmental Management and Sustainable Development: An overview
2. Sustainable Development Goals (17 SDGs)
3. Significance of Sustainable Development
4. Environment Friendly Practices At Workplace and Home (Three Rs' of Waste Management,Water Conservation, Energy Conservation)

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## Unit IV: Environmental Acts                                          7HRS
1. The Water (Prevention and Control of Pollution) Act, 1974: Objectives, Definition of
1. Pollution under this act, Powers and Functlons of Boards
2. The Air (Prevention and Control of Pollution) Act, 1981: Objectives, Definition of Pollution under this act, Powers and Functions of Böards
3. The Environment (Protection) Act, 1986: Objectives, Definition of important terms used in this Act, Details about the act.
4. Environmental Impact Assessment: Concept and Benefits

## Unit V: Role of Individuals, Corporate and Society                   8HRS
1. Environmental Values
2. Positive and Adverse Impact of Technological Developments on Society and Environment
3. Role of an individual/ Corporate/ Society in environmental conservation
4. Case Studies: The Bhopal Gas Tragedy, New Delhi's Air Pollution, Arsenic Pollution in Ground Water (West Bengal), Narmada Valley Project, Cauvery Water Dispute,Fukushima Daiichi Disaster (Japan), Ozone Hole over Antarctica, Ganga Pollution, Deterioration of Taj Mahal. Uttarakhand flash floods

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## TEXTBOOKS:

1. Rogers, P.P., Jalal, K.F., Boyd, I.A.(Latest Edition) . An Introduction to Sustainable Development. Earthscan
2. Kalam, A.P.J. (Latest Edition). Target 3 Billon: Innovative Solutions Towards Sustainable Development. Penguin Books
3. Kaushik, A. and Kaushik (Latest Edition). Perspectives in Environmeniaf Studies. New Delhi:  New Age International Publishers.
4. Dhameja, S.K. (Latest Edition). Environmental Studies. S.K. Kataria and Sons.New Delhi
5. Bharucha,E. (Latest Edition). Environmental Studies for Undergraduate Courses. New Delhi: University Grants Commission.
6. Wright, R. T. (Latest Edition). Environmental Science: towards a sustainable future. New Delhi: PHL Learning Private Ltd.
7. Rajagopalan, R. (Latest Edition). Environmental Studies. New York: Oxford University Press.

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**REFERENCES:**
1. R. Rajagopalan(2006).Environmental Studies. Oxford University Press.
2. M. AnjiReddy(2006).Textbook of Environmental Sciences and Technology. BS Publication.
3. Richard T. Wright (2008).Enviromental Science: towards a sustainable future PHL Learning Private Ltd. New Delhi.
4. Gilbert M. Masters and Wendell P. Ela.(2008).Environmental Engineering and science. PHI Learning Pvt Ltd.
5. Daniel B. Botkin& Edwards A. Keller (2008). Environmental Science Wiley INDIA edition.
6.  AnubhaKaushik(2009).EnviromentalStudies. New age international publishers

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## Course Objectives:
 **The student will have ability to:**
1. To differentiate among the various database system according to their function.
2. To understand the process to develop database model and database design.
3. To understand managing a database using Structured Query Language.
4. To expand an understanding of necessary DBMS concepts such as: Database Transactions, Database Security, Integrity, Concurrency.
5. To understand and build a straightforward database system and show competence with the  fundamental tasks involved with modeling, designing, and implementing a DBMS.

## Course Outcomes:
After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes. The students will be able to:

1. Construct conceptual data models by identifying the entities and relationships.
2. Evaluate the normality of a logical data model and correct any anomalies.
3. Develop physical data models for relational database management systems.
4. Implement relational databases using a RDBMS

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5. Work as a valuable member of a database design and implementation team.

**Syllabus:**

**UNIT I**
**Introduction:** Concept & Overview of DBMS, Three Schema Architecture of DBMS, Database Approach v/s Traditional File Accessing Approach, Advantages of Database Systems, Data Models, Schema and Instances, Data Independence, Data Base Language and Interfaces, Functions of DBA and Designer, Database Users.
**Entity-Relationship Model:** Basic concepts, Design Issues, Mapping Constraints, Keys, Entity- Relationship Diagram, Weak Entity Sets and Extended E-R features. ER Diagram to Relational Table conversion.

**UNIT-II**
**Relational Model:** Structure of Relational Databases, Relation , Characteristics of Relations, Domains, Tuples , Relational schema and instance, Relational Algebra, Relational Algebra Operations (select, project, join and its type,  union, intersection, set difference, Cartesian

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product, rename, division), Extended Relational Algebra Operations (Generalized Projection , Aggregate Functions , Outer Join),
**Relational Calculus**: types of relational calculus, tuple and domain oriented relational calculus, and its operation.

## UNIT-III
**Integrity Constraints:** Null Values, Domain Constraints, Entity Integrity Constraints Referential Integrity Constraints, Key constraints, Triggers.
**Relational Database Design**: Functional Dependency, Inference rule, Different Anomalies in designing a Database. Normalization , Decomposition, Normal Forms (1NF, 2NF, 3NF, Boyce-Codd Normal Form, Normalization using Multi-Valued Dependencies, 4NF, Join Dependency, 5NF), Canonical  cover.

## UNIT IV
**Query Optimization:** Introduction, steps of optimization, various algorithms to implement select, project and join operations of relational algebra, optimization methods: heuristic based, cost estimation based. **Transaction Processing,**

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**Concurrency Control and Recovery Management:** Transaction Model properties, State Serializability, Lock base protocols, Two Phase Locking, Time Stamping Protocols for Concurrency Control, and Validation Based Protocol, Multiple Granularities, Granularity of Data Item. Multi version schemes, Recovery with Concurrent Transaction, Recovery technique based on Deferred Update and Immediate Update, Shadow Paging, Recovery in Multi Database System and Database Backup and Recovery from Catastrophic Failure.

**UNIT V**
**Index structures:** Types of index (primary, secondary, clustering, partitioning, unique and non index), use and Purpose of index, searching via an index**.**
**SQL:** DDL, DML, DQL (column function and grouping, union, multiple queries, union all, sub-query using  IN, NOT IN, HAVING, GROUP BY CLAUSE), DCL (grant, revoke), TCL (Commit, roll back, save point, set Transaction)
**Distributed database:** Planning for distributed database, management-centralized and decentralized Back-up and recovery.

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## Text books:

1. Henry F. Korth and Silberschatz Abraham, "Database System Concepts", Mc.GrawHill, 6th Edition,2015.
2. C J Date, "An Introduction to Database System", Pearson Educations, 8th Edition, 2004.
3. Elmasri, Navathe, "Fundamentals of Database Systems", Pearson Educations 7th Edition, 2016.
4. SeemaKedar, Database Management System, Technical Publications, 2009.
5. 5.Rajiv Chopra,Database Management System (DBMS) A Practical Approach. Kindle Edition, S Chand (December 1, 2010), 2017.

## Reference Books:
1. IBM Career Education- database management system.
2. Abraham Silberschatz and S Sudarshan "Database System Concepts" 6th Edition McGraw-Hill Education – Europe 2013.
3. Raghu Ramakrishnan and Johannes Gehrke "Database Management Systems" McGrawHill Education, 2003.
4. Kahate, Atul "Introduction to Database Management Systems"Pearson Education India,

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**List of Practical:**

1. Design a Database and create required tables. For e.g. Bank, College Database.
2. Apply the constraints like Primary Key, Foreign key, NOT NULL to the tables.
3. Write a SQL statement for table and record handling like implementing INSERT statement, Using SELECT and INSERT together, DELETE, UPDATE, TRUNCATE statements and DROP, ALTER statements.
4. Write the queries for Retrieving Data from a Database Using the WHERE clause , Using Logical Operators in the WHERE clause , Using IN, BETWEEN, LIKE , ORDER BY, GROUP BY and HAVING Clause, Using Aggregate Functions and Combining Tables Using JOINS.
5. Write the query for implementing the following functions: MAX (), MIN (), AVG (), COUNT ().
6. Write the query to implement the concept of Integrity constrains.
7. Write the query to create the views.
8. Perform the queries for triggers.
9. Display name, hire date of all employees using cursors.
10. Display details of first 5 highly paid employees using cursors.
11. 11.Write a database trigger which fires if you try to insert, update, or delete after 7'o'

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clock.
12. Write a data base trigger, which acts just like primary key and does not allow duplicate values.
13. Perform the following operation for demonstrating the insertion, updating and deletion using the referential integrity constraints.
14. Write the query for creating the users and their role. Using GRANT and REVOKE operations

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## Course Educational Objectives (CEOs):

The student will have ability to:
1. To learn the fundamentals of Operating Systems.
2. To study the mechanisms of Operating System to handle processes and threads and their communication.
3. To gain knowledge of process management concepts that includes architecture, Mutual  exclusion algorithms, deadlock detection and recovery algorithms.
4. To learn the mechanisms involved in memory management in Operating System
5. To know the components and management aspects of disc scheduling.

## Course Outcomes (COs):

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes.

The students will be able to:

1. To describe the detail structure of Operating System.
2. To design and Implement Process management Techniques in Operating System.

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3. To calculate CPU Scheduling criteria.
4. To understand The Memory Management of Operating System.
5. To elaborate Disc Scheduling.

**Syllabus:**

**UNIT I**                                                                                                  **10HRS**
**Introduction to Operating System:** Introduction and Need of operating system, Layered Architecture/Logical Structure of Operating system, Type of OS(Multiprogramming , Time Sharing, Real Time ,Networked, Distributed, Clustered, Hand Held), Operating system as Resource Manager and Virtual Machine,System Calls/Monitor Calls,  Firmware- BIOS, Boot Strap Loader. Threads- processes versus threads, threading, concepts,  models, kernel & user level threads, thread usage, benefits.

**UNIT II**                                                                                                  **9HRS**
**Process Management:** Process Model, Creation, Termination, States & Transitions, Context Switching, Process Control Block, CPU and I/O bound, CPU scheduler- short, medium,  long-term, dispatcher, scheduling:- preemptive and non-preemptive, Static and Dynamic Priority Criteria/Goals/Performance Metrics, scheduling algorithms- FCFS, SJFS, shortest remaining

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time, Round robin, Priority scheduling, multilevel queue scheduling, multilevel feedback queue scheduling

## UNITIII                                                                                    8 HRS
**Interprocess Communication:** Introduction to Message Passing, Race Condition, Critical Section Problem, Peterson's Solution, Semaphore, Classical Problems of Synchronization Classical IPC Problems: Reader's & Writer Problem, Dinning Philosopher Problem. **Deadlock-** System model, Resource types, Deadlock Problem, Deadlock  Characterization, Methods for Deadlock Handling, Deadlock Prevention, Deadlock Avoidance:  Banker's algorithm, Deadlock Detection, Recovery from Deadlock.

## UNIT IV                                                                                   7 HRS
**Memory  Management:** concepts, functions, logical and physical address space, address binding, degree of multiprogramming, swapping, static & dynamic loading- creating a load module, loading, static & dynamic linking, memory allocation schemes- first fit,  next fit, best fit, worst fit and quick fit.
**Virtual Memory-** concept, virtual address space, paging scheme, pure segmentation and segmentation  with  paging scheme hardware support and implementation details, memory fragmentation, demand paging ,working set model, page fault frequency, thrashing, page

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replacement algorithms- optimal, FIFO,LRU; Bleady's anomaly; TLB ( translation look aside buffer).

**UNIT V**                                                                                                 **8HRS**
**File Management:** Concepts, Naming, Attributes, Operations, Types, Structure, File Organization & Access (Sequential, Direct ,Index Sequential) Methods, Memory Mapped Files, Directory Structures One Level, Two Level, Hierarchical/Tree, Acyclic Graph, General Graph, File System Mounting, File Sharing, Path Name, Directory Operations, Overview Of File System in Linux & Windows.
Input/output Subsystems- Concepts, Functions/Goals, Input/Output devices- Block And Character, Spooling, Disk Structure & Operation, Disk Attachment, Disk Storage Capacity, Disk Scheduling Algorithm- FCFS, SSTF, Scan Scheduling, C-Scan Schedule.

**Text books:**
1. Abraham Silberschatz,"Operating system concepts",10th Edition,John Willey & Sons.  INC, 2018
2. Andrew S.Tannanbaum, "Modern operating system", 4th Edition,Pearson Education, 2014

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3. Dhananjay M. Dhamdhere, "Operating Systems:A concept Based Approach", 3rd Edition TMH, 2017,
4. SibsankarHaldar, Alex AlagarsamyAravind,"Operating System", 8th Edition, Pearson Education India,, 2010

**Reference Books:**
1. Achyut S Godbole,"Operating System",3rd TMH,2017.
2. William Stalling, "operating system" 8th, Pearson Education, ,2014.
3. Vijay Shukla, "Operating System", 3rd, Kataria&Sons ,2013.
4. Singhal&Shivratri,"Advanced Concept in Operating Systems", 1st ,TataMc-Graw Hill Education, edition 2017.

**List of Practical:**
1. Implement and update the BIOS settings of your PC.
2. If there are 5 printers are connected in a system each process to print will take different time  to complete, and CPU will give a fixed time to each process after that deadline next process  will enter in CPU. If a problem not completed in a given slot then that process will be re enter as per the FCFS, on rotation basis? Apply the scheduling on this?
3. Implement Non Preemptive Priority CPU Scheduling.

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Implement Non Preemptive Shortest Job first CPU Scheduling.

4. If there are 5 different resources like 3 printer,2 scanner are connected to a system each taking different time to complete the task. Which scheduling is best and gives best performance of  CPU?
5. Implement the scheduling for that where CPU give chance to complete those process first  which comes first?
6. Implement Round-Robin CPU scheduling.
7. Write a program to implement Semaphore.
8. Find the solution for the situation where 5 faculties are sitting in a round table. There are 4  ball pens are placed on this table. At a time only one pen can be picked by one faculty to  writing work. What will happen if all picked the pen for writing simultaneously?
9. Find the solution for dentist checkup clinic where only one chair and one dentist is available  for treatment. And having n chairs to waiting for patient.  If there is no patient, then the doctor sleeps in his own chair.  When a patient arrives, he has to wake up the doctor. If there are many patients and the doctor is doing treatment of him, then the remaining patients either wait if there are empty chairs in the waiting  room or they leave if no chairs are empty.

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10. Implement Non Preemptive Shortest Job first CPU Scheduling.
11. Write a program for Memory Management Algorithms e.g. First Fit, Best Fit, Worst Fit.
12. Demonstrate Virtual memory Techniques like, LRU, FIFO etc.
13. Implement Shortest Seek Time First Disk Scheduling Algorithm.
14. Implement Scan Scheduling Disk Scheduling Algorithm.
15. Implement Circular Scan Disk Scheduling Algorithm.
16. Implement Look Disk Scheduling Algorithm.

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## Course Educational Objectives (CEOs):

Students will acquire knowledge on:

1. Understand the importance of Microservices and describe its need as an Architecture Implementation.
2. Understand strengthen the understanding of basic concepts of Docker and Kubernetes.
3. Understand the Html and its Tags
4. Understand CSS and how we implement in html
5. Be able to Deploy application on docker and Access the Kubernetes

## Course Outcomes (COs):

At the end of the mobility period, students will be able to:

1 Run docker commands.
2 Deploy container and pods on Kubernetes.

## SYLLABUS

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## UNIT–I  CSS and JavaScript:                                                10HRS
Understand CSS, JavaScript, and DOM and BOM, Understand Client-side and Server-side Application

## UNIT–II Introduction to Micro services:                                    8HRS
Motivation for Microservices, What is monolithic application? Domain Driven Design, Edge Service, SOA and Microservices, Microservices characteristic, Microservices Security, API management and gateways, the future of Microservices, Microservices Governance, Cloud Application Component Architecture.

## UNIT–III Docker:                                                          7HRS
A shipping container for code, Benefits of using containers, Docker basic concepts, Docker architecture, Docker shared and layered file systems technology. Deployment of container, learn how to run Docker command, Container ecosystem and orchestration.

## UNIT–IV Kubernetes:                                                      8HRS
Kubernetes architecture, Master Node Components, Worker Node Components, Kubernetes Building Blocks, Images, Pods, Labels & Selectors, Namespace, Services, Replication Controller, Replica Sets, Deployments, Autoscaling, Config Maps & Secrets, Deploying Applications on Kubernetes, Kubectl Commands

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**UNIT–V** Case Study:                                                                          **8HRS**
The Journey from Monolith Architecture to Micro services; Refactoring A Monolith application Into A Cloud-Native App.


**TEXT BOOKS:**
1. Sam Newman ,"Building Microservices", O'Reilly Media
2. Ajay Sharma, "Microservices Architecture", Kindle Edition
3. IBM Career education Microservices Architecture and Implementation


**REFERENCES:**
R1:Eberhard Wolff ,"Microservices — A Practical Guide",  Korean translation
R2:Martin Kleppmann ,"Designing Data-Intensive Applications", O'Reilly Media
**Video Lectures**
https://www.youtube.com/watch?v=lktzQrHQcYU
https://youtu.be/KrPFRhKsXw8


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## LIST OF EXPERIMENTS:
1. Write a program to define variable, control structure in JavaScript.
2. Study and perform basic Docker commands.
3. Write docker commands to perform following operations-
    a. PULL & RUN MYSQL Image.
    b. Access running MYSQL container.
    c. Create one database name demo_db.
    d. Inside demo_db create one table named student(id, name, email, age)
    e. Commit edited mysql container.
    f. Push it into docker hub.
4. Write docker commands to perform following operations-
    a. Pull and run httpd server image on windows machine/linux machine.
    b. Access browser and check whether the httpd server is running?
    c. Access running httpd server & change the message( that is displaying on browser)

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5.  Write Dockerfile that perform following operations-
    a.  Base image should be alpine.
    b.  Add vim and curl in it.
6.  Write Dockerfile for NGINX server that perform following instructions-
    a.  Base image should be Ubuntu.
    b.  Maintainer information should be provided.
    c.  Install nginx.
    d.  Specify port No. to run nginx server.
    e.  Start nginx container.
7.  Study and perform basic kubectl commands.
8.  Write kubectl commands to launch a single node cluster.
    (https://www.katacoda.com/courses/kubernetes/launch-single-node-cluster)

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## Course Educational Objectives (CEOs):

The student will have ability to:
1. Gain the depth knowledge of data which helps the industry to take better decision
2. Understand how business analysis Software works to analyze the data.
3. Learn how business Intelligence can be applied.
4. Create reports, dashboards, stories and cross reports and accessing them accordingly.
5. Visualize the data in many forms and ways.

## Course Outcomes (COs):

1. The importance of analytics and how its transforming the world today
2. Understand how analytics provided a solution to industries using real case studies
3. Explain what is analytics, the various types of analytics, and how to apply it
4. Understand how a business analysis software works, and its architecture
5. Describe a reporting application, its interface, and the different report types
6. Create different types of advanced reports
7. Understand Active Reports and how to create them

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## UNIT–I Analytics Overview:                                                                8HRS
The history of analytics and how it has changed today ,Understanding how to analyze unstructured data ,Understanding how analytics is making the world smarter  ,Understanding where the future of analytics lies, Explaining why successful enterprises need business analytics ,Understanding how business analytics can help turn data into insight  ,Understanding how predictive analytics is transforming all types of organizations ,Explaining how analytics supports retail companies ,Understanding how analytics can reduce crime rates and accidents ,Explaining the use of analytics in law enforcement and insurance companies ,Understanding how analytics can affect the future of education, Understanding the importance of business analytics ,Comprehend how big data and analytics can help in understanding consumer/customer behavior ,Explaining how analytics can help manage assets ,Understanding how analytics can help combat fraud ,Explaining how analytics can help us to understand social sentiments.

## UNIT–II Business Intelligence and Analytics:                                         8HRS
Explaining what is analytics, Defining various types of analytics, Demonstrating how to apply analytics, Describing business intelligence, Demonstrating how to apply business intelligence.

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**UNIT–III Create list reports, Crosstab reports & Present data graphically: 8HRS**
Learning how to access content, use reports, and create dashboards ,Learning how personalize the IBM Cognos Analytics portal, Group, format, and sort list reports ,Describing the various options for aggregating data ,Creating a multi-fact query ,Creating a report with repeated data, Creating filters to narrow the focus of reports ,Examining detail filters and summary filters ,Determining when to apply filters on aggregate data, Formatting and sort crosstab reports ,Creating complex crosstab reports using drag and drop functionality ,Creating crosstab reports using unrelated data items, Creating charts containing peer and nested columns ,Presenting data using different chart type options ,Adding context to charts ,Creating and reuse custom chart palettes ,Introduction to visualization ,Presenting key data in a single dashboard report, Identifying various prompt types ,Using parameters and prompts to focus data ,Searching for prompt types ,Navigating between pages, Creating calculations based on the data in the data source ,Adding run-time information to the reports ,Creating expressions using functions, Enhancing report design with report objects ,Reusing objects within the same report ,Sharing layout components among separate reports ,Discussing report templates ,Choosing options to handle reports with no available data, Creating multi-lingual reports ,Highlighting exceptional data ,Showing and hide data ,Conditionally render objects in reports ,Conditionally format one crosstab measure based on another, Knowing how to let users navigate from a specific report to a target report ,Passing parameter values to filter the data in drill-through targets, Navigating through multiple reports, Force page breaks in

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reports ,Modifying existing report structures ,Applying horizontal formatting ,Specifying print options for PDF reports ,Formatting data and report objects

**UNIT–IV IBM Cognos Analytics:**                                                          **8HRS**
Describing IBM Cognos Analytics and its position within an analytics solution ,Describing IBM Cognos Analytics components ,Describing IBM Cognos Analytics at a high level ,Describing IBM Cognos Analytics security at a high level ,Explaining how to extend IBM Cognos Analytics Building query models and connect them to the report layout ,Editing an SQL statement to author custom queries ,Adding filters and prompts to a report using the query model, Creating reports by merging query results ,Creating reports by joining queries ,Combining data containers based on relationships from different queries ,Filtering reports on session parameter values ,Navigating a briefing book using a table of contents ,Creating dynamic headers and titles that reflect report data ,Navigating to specific locations in reports ,Creating a customer invoice report ,Controlling report displays using prompts ,Specifying conditional formatting values using prompts ,Specifying conditional rendering of objects based on prompt selection ,Creating sorted and filtered reports based on prompt selection, Creating a report that displays summarized data before detailed data ,Highlighting alternate rows in a list report ,Creating a report using an external data file ,Using single data items to summarize report information, Examining the report specification structure ,Modifying a report specification ,Adding custom toolbox objects and custom template options, Distributing reports using bursting ,Creating burst keys ,Identifying

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report recipients and data items using burst tables ,Distributing reports using email and the Business Analysis Solution Connection ,Creating tooltips that clarify report data ,Sending emails using links in a report, Describing Active Reports, and their value ,Saving Active Reports

**UNIT–V Focus reports using prompts and Extend reports using calculations:        8HRS**
Creating Active Reports as prompt pages, Converting existing reports to Active Reports , Explaining security considerations in Active Reports ,Debugging Active Report behavior, Describing active report connections ,Filtering and selecting active report controls, Modifying the interactive behavior of report controls ,Identifying active report controls and variables, Using variables to control multiple controls independently ,Controlling multiple controls from a single variable ,Authoring and optimizing active reports for mobile consumption, Describing characteristics of traditional charts in Active Reports, Controlling data display using decks and data decks ,Using decks and data decks to display traditional charts, Optimizing decks for performance ,Describing characteristics of RAVE visualizations

**TEXT BOOKS:**
1. IBM Cognos Business Intelligence 10: The Official Guide
2. IBM Cognos 10 Report Studio Cookbook, Second Edition
3. IBM Cognos 10 Report Studio: Practical Examples

# Shri Vaishnav Vidyapeeth Vishwavidyalaya,Indore
## Shri Vaishnav Institute of Information Technology
## B.Tech. (CSE-Big Data Analytics/Cloud and Mobile Computing/Artificial Intelligence/Data Science/Full Stack Development & Block chain-IBM)
## Choice Based Credit System (CBCS)-2021-25
## SEMESTER-IV

| COURSE CODE | CATEGORY | COURSE NAME | TEACHING&EVALUATION SCHEME | | | | | L | T | P | CREDITS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | THEORY | | | PRACTICAL | | | | | |
| | | | ENDSEM University Exam | Two Term Exam | Teachers Assessment* | ENDSEM University Exam | Teachers Assessment* | | | | |
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## REFERENCES:
1. IBM Material for Business intelligence

## LIST OF EXPERIMENTS:

1. Examine list reports ,Group data ,Include list headers and footers ,Format list columns , Enhance a list report, Understand fact/measure data ,Understand aggregate data, Understand difference in aggregation ,Explore data aggregation ,Use shared dimensions to create multi-fact queries ,Create a multi-fact query in a list report ,Add repeated information to reports Create a mailing list report ,Focus reports using filters ,Create filters ,Filter your data with advanced detail filters , Apply filters to a report, Determine when to apply a filter with aggregation , Apply a detail filter on fact data in a report ,Filter your data with summary filters ,Apply a summary filter to a report Using Rational Rose do the following for a given source code. Apply pre-defined source filters , Create a report focused on top performing product types and product lines.

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2. Create a Crosstab report ,Add measures to Crosstab reports ,Data sources for Crosstabs ,Create a simple Crosstab report ,Create complex Crosstab reports ,Create Crosstab nodes and Crosstab node members ,Create complex Crosstab reports ,Format Crosstab reports ,Sort and format a Crosstab report

3. Create a Visualization report ,Different chart options ,Create charts containing peer and nested items, Create and reuse custom chart palettes ,Add data-driven baselines and markers to charts, Create and format a chart report , Show the same data graphically and numerically ,Customize charts ,RAVE , Display RAVE visualizations , Create a dashboard report.

4. Examine parameters and prompts ,Create a parameter item on the report, Build a prompt page, Add a prompt item to a report ,Create a prompt by adding a parameter.

5. Identify prompt type, Add a value prompt to a report ,Add pages to a report ,Add a Select & search prompt to a report ,Create a cascading prompt, Create a cascading prompt, Focus a report using value prompts.

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| **BTDSE412N** | DSE | **Information Storage and Management** | 60 | 20 | 20 | 0 | 0 | 3 | 0 | 0 | 3 |

**Legends**: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
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**Course Objectives:**
1. An ability to understand various storage architecture & technologies.
2. An ability to understand various technologies used to provide backup & recovery.
3. An ability to understand various techniques used to provide security.
4. Ability to identify information storage system requirements.
5. An ability to develop policy for information storage system.
6. An ability to develop policy for backup& recovery.

**Course Outcomes:**
On completion of the course students will be able to:
1. Describe & apply storage technologies.
2. Identify storage technologies that provide cost effective IT solution for medium to large scale businesses & data centers.
3. Manage Virtual Server & Storage between Remote locations.
4. Design analysis and manage clusters of resources

**Syllabus:**

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### UNIT-I

**Introduction:** Digital data and its types, Information storage, Key characteristics of data center, Evolution of computing platforms. Introduction to storage technology: Data Proliferation, evolution of various storage technologies, Overview of storage infrastructure components, Information life Cycle Management, Data categorization.

### UNIT II

**Storage System Architecture:** Intelligent disk subsystems overview, Contrast of integrands modular array, Component Architecture of Intelligent disk subsystems, Disk physical structure components, properties, performance, and specifications, RAID levels & parity algorithms, hot sparing, Front end to host storage provisioning, mapping and operation.

### UNIT III

**Introduction to network storage:** JBOD, DAS, NAS, SAN & CAS evolution and comparison, Applications, Elements, Connectivity, standards, management, security and limitations of DAS, NAS, CAS & SAN

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## UNIT IV

**Hybrid storage solutions and virtualization:** memory, network, server, storage & appliances. Data centre concepts & requirements, Backup and disaster recovery. Industry Management standards, standard framework applications, Key management metrics.

## UNIT-V

**Information storage on clouds:** concept of cloud, cloud computing, storage on cloud, Cloud benefits, Cloud computing evolution. Application & services on cloud, cloud service providers, cloud deployment models, Essential characteristics of cloud computing.

## Text Books:
1. G.Somasundaram & Alok Shrivastava editors, ISM: Storing, Managing, and Protecting Digital Information; Wiley India

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| ShriVaishnavVidyapeeth | ShriVaishnavVidyapeeth | Vishwavidyalaya, Indore | Vishwavidyalaya, Indore |
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**Reference Books:**
1. Saurabh; Cloud Computing: Insight into New era Infrastructure; Wiley India.
2. Ulf Troppens, Wolfgang Mueller-Friedt, Rainer Erkens, Rainer Wolafka, Nils Haustein; Storage Network explained: Basic and application of fiber channels, SAN, NAS, ISESI, INFINIBAND and FCOE, Wiley India.
3. Sosinsky, Cloud Computing Bible, Wiley India.

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| | | | ENDSEM University Exam | Two Term Exam | Teachers Assessment* | ENDSEM University Exam | Teachers Assessment* | L | T | P | CREDITS |
| BTDSE411N | DSE | Principles of Distributed Systems | 60 | 20 | 20 | 0 | 0 | 3 | 0 | 0 | 3 |

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## Course Objectives:
### The student will have ability to:
1. Observe the principles, architectures, algorithms, and programming models used in distributed system.
2. Analyze state-of-the-art distributed system, such as Google File System.
3. Model and implement sample distributed system.
4. Summarize the functionality of Distributed System.

## Course Outcomes:
The students will be able to:

1. Understand architecture and communication systems in Distributed Systems.
2. Understand synchronization and various election algorithms in Distributed Systems.
3. Discuss different Distributed File System.

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4. Evaluate Distributed Shared Memory.
5. Analyze various consistency and replication protocols and methods.
6. Understand various types of Distributed Systems.
7. Determine performance evaluation of various types of Distributed System.

**Syllabus:**

**UNIT I**                                                                                                                                        **10HRS**
**Characterization of Distributed System:** Introduction, Examples of Distributed Systems, Resource Sharing and the Web, Challenges.
**System Models:** Introduction, Architectural Models, Fundamental Models.

**UNIT II**                                                                                                                                        **9HRS**
**Time and Global States:** Introduction, Clocks Events and Process States, Synchronizing Physical Clocks, Logical Time and Logical Clocks, Global States, Distributed Debugging.
**Coordination and Agreement:** Introduction, Distributed Mutual Exclusion, Elections, Multicast Communication, Consensus and Related Problems

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## UNIT III                                                                                    8**HRS**
**Inter Process Communication:** Introduction, the API for the Internet Protocols, External Data Representation and Marshalling, Client-Server Communication
**Distributed Computing Paradigms**: Basic Message Passing Model – The Client Server, Message Passing, RPC basics, RPC implementation, RPC communication and issues, Remote Procedure Call Model – RPC in conventional languages and in Java - The Distributed Objects – The Collaborative Application

## UNIT IV                                                                                    7**HRS**
**Distributed File Systems:** File system, DFS- definition, Characteristics, Goals, File Service Architecture.
**Name Services:** Introduction, Name Services and the Domain Name System, Directory Services, Case Study of the Global Name Services.
**Distributed Shared Memory:** Introduction, Design and Implementation Issues, Sequential Consistency, Release Consistency, , Other Consistency Models.

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**UNIT V**                                                                                                                          **8HRS**
**Transactions and Concurrency Control**: Introduction, Transactions, Nested Transactions, Locks, Optimistic Concurrency Control, Timestamp Ordering, Comparison of Methods for Concurrency Control.
**Distributed Transactions:** Introduction, Flat and Nested Distributed Transactions, Atomic Commit Protocols, Concurrency Control in Distributed Transactions, Distributed Deadlocks, Transaction Recovery.

**Textbooks:**

1. Distributed Systems, Principles and Paradigms, Andrew S. Tanenbaum, Maarten Van Steen, 3rd Edition 2017, PHI.

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**References:**

1. Distributed Systems, Concepts and Design, George Coulouris, J Dollimore and Tim Kindberg, Pearson Education, 5th Edition. 2017.
2. Distributed Systems, An Algorithm Approach, Sukumar Ghosh, hapman&Hall/CRC, Taylor & Fransis Group, 2014.
3. P. K. Sinha, Distributed Operating Systems: Concepts and Design, IEEE press 3rd Edition, 2009
4. M. Singhal and N. G. Shivaratri, Advanced Concepts in Operating Systems, McGraw-Hill, 2011.

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| | | | ENDSEM University Exam | Two Term Exam | Teachers Assessment* | ENDSEM University Exam | Teachers Assessment* | L | T | P | CREDITS |
| BTDSE413N | DSE | Wireless networks | 60 | 20 | 20 | 0 | 0 | 3 | 0 | 0 | 3 |

**Legends**: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
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## Course Objectives:
### The student will have ability to:
1. Understand the fundamental of wireless communication system.
2. Describes wireless channel effects.
3. Able how to model different wireless communication scenarios.
4. An ability to explain multiple access techniques for Wireless Communication.
5. Evaluate the performance of various schemes for wireless communications.
6. Analyze fundamental concept of cellular radio concepts.
7. Apply various wireless communication network systems, standards, and applications.

## Course Outcomes:
The students will be able to:

1. Demonstrates wireless communication systems design and working.
2. Determine various advanced techniques for wireless communications.
3. Develop models to understand various characteristics of wireless communications.
4. Analyze design architectures for different Wireless Systems.
5. Evaluates the emerging trends in Wireless communication.
6. Able to Apply concepts of radio communications
7. Understands the applications of wireless communications tools.

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**Syllabus:**

**UNIT I**                                                                                                    **10HRS**
Introduction to Wireless Communication System: Evolution of mobile communications, Types of Wireless communication System, Comparison of Common wireless system, Third Generation (3G) Wireless Networks, Wireless Local Loop (WLL), Wireless Local Area network (WLAN),

**UNIT II**                                                                                                   **9HRS**
The Cellular Concept- Cellular system, Hexagonal geometry cell and concept of frequency reuse Distance to frequency reuse ratio, Channel & co-channel interference reduction factor, Umbrella Cell Concept, Cell sectorization, Repeaters, Micro cell zone concept, Channel antenna system

**UNIT II**I                                                                                                  8**HRS**
Mobile Radio Propagation Model, Small Scale Fading and diversity: Large scale path loss:- Free Space Propagation loss equation, Reflection, Ray ground reflection model, Diffraction, Scattering, Link budget design, Indoor and outdoor propagation models, Small scale multipath propagation, Impulse model for multipath channel, Delay spread, Feher‟s delay spread.

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## UNIT IV                                                                                                7HRS
Mobile Network And Transport Layers :Mobile IP , Dynamic Host Configuration Protocol, Mobile Ad Hoc Routing Protocols, Multicast routing, TCP over Wireless Networks , Indirect TCP , Snooping TCP, Mobile TCP .Wireless Systems: GSM system architecture, Protocols, Authentication and security in GSM, GSM speech coding,  GPRS system architecture.

## UNIT V                                                                                                 8HRS
Introduction to Wi-Fi, WiMAX, Zig-Bee Networks, Software Defined Radio, UWB Radio, Wireless Adhoc Network and Mobile Portability, Security issues and challenges in a Wireless network. Application Layer :WAP Model, Mobile Location based services ,WAP Gateway ,WAP protocols wireless bearers for WAP , WML ,WMLScripts

## Textbooks:
1. Jochen Schiller, "Mobile Communications", Second Edition, Pearson Education,
2. William Stallings, "Wireless Communications and Networks", Pearson Education.

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**References:**
1. Kaveh Pahlavan, Prasanth Krishnamoorthy, "Principles of Wireless Networks", First Edition, Pearson Education,
2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, "Principles of Mobile Computing", Springer,
3. C.K.Toh, "AdHoc Mobile Wireless Networks", First Edition, Pearson Education, 2002.
4. Wireless digital communication, KamiloFeher, PH.
5. William D Stanley : Network Analysis with Applications, Pearson Education.
6. Roy Choudhary D: Network and systems, New Age Publication.
7. Wireless Communication, Theodore S. Rappaport, Prentice hall

# Shri Vaishnav Vidyapeeth Vishwavidyalaya,Indore
## Shri Vaishnav Institute of Information Technology
## B.Tech. (CSE-Big Data Analytics/Cloud and Mobile Computing/Artificial Intelligence/Data Science/Full Stack Development & Block chain-IBM)
## Choice Based Credit System (CBCS)-2021-25
## SEMESTER-IV

| COURSE CODE | CATEGORY | COURSE NAME | TEACHING&EVALUATION SCHEME | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | | | THEORY | | | PRACTICAL | | | | | |
| | | | ENDSEM University Exam | Two Term Exam | Teachers Assessment* | ENDSEM University Exam | Teachers Assessment* | L | T | P | CREDITS |
| BTIBM403N | DCC | Application Development Using Python | 0 | 0 | 0 | 50 | 0 | 0 | 0 | 2 | 1 |

**Legends**: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
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**Course Objectives:**

The student will have ability to:
1. To understand why Python is a useful scripting language for developers.
2. To learn how to design and program Python applications.
3. To define the structure and components of a Python program.

**Course Outcomes:**

Upon completion of the subject, students will be able to:
1. To use lists, tuples, and dictionaries in Python programs.
2. To identify Python object types.
3. To use indexing and slicing to access data in Python programs.
4. To write loops and decision statements in Python.
5. To write functions and pass arguments in Python.
6. To build and package Python modules for reusability.
7. To read and write files in Python.

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8. To design object-oriented programs with Python classes.
9. To data handling and use cases diagrams
10. To use class inheritance in Python for reusability.
11. To use exception handling in Python applications for error handling

## Syllabus

**UNIT-I Introduction to Python**                                            **8HRS**
What is Python?, Advantages and disadvantages, Downloading and installing, Which version of Python Running Python Scripts and using the interpreter interactively.

**UNIT–II Using variables, String types**:                                    **8HRS**
normal, raw and Unicode, String operators and expressions, Math operators and expressions, Writing to the screen, Reading from the keyboard and Indenting is significant.

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**UNIT–III**                                                                 **8HRS**
The if and elif statements, While Loops, Using List, Dictionaries, Using the for statement, Opening, reading and writing a text file, Using Pandas, the python data analysis library and data frames Grouping, aggregating and applying, merging and joining. Dealing with syntax errors, Exceptions, Handling exceptions with try/excep

**UNIT–IV**                                                                  **8HRS**
RE Pattern Matching, Parsing Data, Introduction to Regression, Types of Regression, Use Cases, Exploratory data analysis, Correlation Matrix, Visualization using Metplotlib, Implementing linear regression

**UNIT–V**                                                                   **8HRS**

Machine Learning – Algorithm, Algorithms – Random forest, Super vector Machine, Random Forest, Build your own model in python, Comparison between random forest and decision tree

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**TEXT BOOKS:**

1. John V Guttag. "Introduction to Computation and Programming Using Python", Prentice Hall of India
2. Allen Downey, Jeffrey Elkner and Chris Meyers "How to think like a Computer Scientist, Learning with Python", Green Tea Press.
3. Mark Lutz "Learning Python" O'Reilly Media; 5 edition.
4. David Beazley "Python Cookbook, Third edition" O'Reilly Media

**REFERENCES:**

1. Python Essential Reference, 4th Edition Addison-Wesley Professional.
2. Mark Lutz "Programming Python: Powerful Object-Oriented Programming "David Beazley "Python Cookbook" Third edition, O'Reilly Media

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## List of Practical:

1.  Implement to use lists, tuples, and dictionaries in Python programs.
2.  Implement to identify Python object types.
3.  Implement to use indexing and slicing to access data in Python programs.
4.  Implement structure and components of a Python program.
5.  Implement to write loops and decision statements in Python.
6.  Implement to write functions and pass arguments in Python.
7.  Implement to build and package Python modules for reusability.
8.  Implement to read and write files in Python.
9.  Implement to design object-oriented programs with Python classes.
10. Implement data handling and use cases diagrams
11. Implement to use class inheritance in Python for reusability.
12. Implement to use exception handling in Python applications for error handling