Course Title	Software Engineering & Project Management	Semester	V
Course Code	MVJ21CD51	CIE	50
Total No. of Contact Hours	40	SEE	50
No. of Contact Hours/week	4 (L : T : P :: 2 : 0 : 0)	Total	100
Credits	3	Exam. Duration	3 Hours

Course objective is to:

Describe the importance of management and functions of a manager.

Explain the process of planning and organizing.

Explain the requirements of direction and supervision and Explain the methods of establishing control.

Identify the role of entrepreneurs in the economic development of the nation and recognize the barriers of entrepreneurship.

Explain the importance of Intellectual property protection.

Module-1	L1,L2,L3	12 Hours

Syllabus Content:

Management: importance of management, definition, management functions, roles of a manager, levels of management, managerial skills, management and administration, management –a science or art, management – a profession, professional management v/s family management. Development of management thought; Early classical approaches, Neo classical approaches, modern approaches.

Application: Enterprises

Video Link: https://www.youtube.com/watch?v=mub7Z8Fl3ZU

Module-2	L1,L2,L3	12 Hours

Syllabus Content:

Planning: Nature, Importance of planning, forms, types of plans , steps in planning , limitations of planning, making planning effective , planning skills, strategic planning in Indian industry.

Organizing: Organization Meaning, process of organizing, span of management principles of organizing, Departmentation, organization structure, committees, teams.

Application: Industry

Video Link: https://www.youtube.com/watch?v=pCUs3UKwYpc

Module-3	L1,L2,L3	12 Hours

Syllabus Content:

Direction and supervision: Requirements of effective direction, giving orders, motivation, job satisfaction, morale , organizational commitment, first level supervision or front line supervision.

Controlling: Meaning and steps in controlling , Essential of a sound control system , Methods of establishing control

Application: Industry

Video Link: https://www.youtube.com/watch?v=MufenDklR8E

Module-4	L1,L2,L3	12 Hours

Syllabus Content:

Entrepreneurship: Meaning of Entrepreneur; Evolution of the Concept, Functions of an Entrepreneur, Types of Entrepreneur, Entrepreneur – an emerging Class. Concept of Entrepreneurship – Evolution of Entrepreneurship, Development of Entrepreneurship, Stages in entrepreneurial process; Role of entrepreneurs in Economic Development; Entrepreneurship in India; Entrepreneurship – its Barriers.

Application: Industry

Video Link: https://www.youtube.com/watch?v=aozlwC3XwfY

Module-5	L1,L2,L3	12 Hours

Syllabus Content:

Introduction to IPR, origin and concepts of IPR, Concept of property, Forms of IP protection: Patents, copyrights, trademarks, designs, Trade secrets,

Traditional knowledge, Geographical indications. Basic concepts and historical background of patent system and law- National and international scenario (American & European Patent Regimes). International Treaties/Conventions on IPR: Paris Convention, Berne convention, Madrid agreement, Rome convention, World Intellectual Property Organization (WIPO), World Trade Organization, TRIPS Agreement, Patent Co-operation Treaty

Application: Industry

Video Link: https://www.youtube.com/watch?v=hHQWCFE0J84

Practical Experiments:	L3	20 Hours

Case study on Enterprises:

Case study (Microsoft),

Case study (Captain G R Gopinath),

Case study (N R Narayana Murthy & Infosys)

Practical Sessions:

Idea Generation and Opportunity Recognition

Strategy and Business Model Analysis
Formulation of Project

Course outcomes:	
CO1	Describe the importance of management and functions of a manager.
CO2	Explain the process of planning and principles of organizing
CO3	Identify the role of entrepreneurs in the economic development of the nation.
CO4	Compare the different leadership styles.
CO5	Apply the ethical principles related to the intellectual property protection

Text/Reference Books:	
1.	Management and Entrepreneurship, N V R Naidu, T Krishna Rao 4th reprint.
2.	Law relating to Intellectual Property rights , B. L. Wadhera, 5th edition,Universal Law Publishing, 2011
3.	Principles of Management, P C Tripathi, P N Reddy, 5th edition, TataMcGraw Hill, 2012
4.	Dynamics of Entrepreneurial Development & Management, Vasant Desai, Himalaya publishing house, 2009

CIE Assessment:

CIE is based on quizzes, tests, assignments/seminars and any other form of evaluation. Generally, there will be: Three Internal Assessment (IA) tests during the semester (30 marks each), the final IA marks to be awarded will be the average of three tests

Quizzes/mini tests (4 marks)

Mini Project / Case Studies (8 Marks)

Activities/Experimentations related to courses (8 Marks)

SEE Assessment:

Question paper for the SEE consists two parts i.e. Part A and Part B. Part A is compulsory and consists of objective type or short answer type questions of 1 or 2 marks each for total of 20 marks covering the whole syllabus.

Part B also covers the entire syllabus consisting of five questions having choices and may contain sub-divisions, each carrying 16 marks. Students have to answer five full questions.

One question must be set from each unit. The duration of examination is 3 hours.

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2					2	2				2	
CO2	2					2	2				2	
CO3	2					2	2				2	
CO4	2					2			2		2	
CO5	2					2		2			2	

High-3, Medium-2, Low-1

Course Title	Data Communication & Computer Networks	Semester	V
Course Code	MVJ21CD52	CIE	50
Total No. of Contact Hours	50	SEE	50
No. of Contact Hours/week	4 (L : T : P :: 2 : 1 : 0)	Total	100
Credits	3	Exam. Duration	3 Hours

Course objective is to: *This course will enable students to*

Understand the Computer Networks and Data Transmissions

Learn Functions of different protocols in networked computers

Get details about Functions of Network layer, Router and deliver of data to host network

Learn the function of mobile networking and switching

Multimedia data transmission in network

Module-1	**L1,L2,L3**	**12 Hours**

Syllabus Content:

Application Layer: Principals of network applications, Network Application Architecture, Processing Communicating. Transport Services Available to Applications, Transport Services provided by the Internet, Application-Layer Protocols.

 The Web and HTTP: Overview of HTTP – Non-Persistent and Persistent Connections – HTTP Message Format – User-Server Interaction: Cookies – Web Caching.

Internet's Directory Service: Service Provided by DNS, Overview of How DNS Works, DNS Records and Messages – Peer-to-Peer File Distribution.

Application: Web Programming

Video Link:

https://www.geeksforgeeks.org/basics-computer-networking/

Module-2	**L1,L2,L3**	**12 Hours**

Syllabus Content:

Introduction and Transport-Layer Services: Relationship Between Transport and Network Layers. Overview of the Transport Layer in the Internet – Multiplexing and Demultiplexing: Connectionless Transport: UDP, UDP segment Structure, UDP Checksum, Principles of Reliable Data Transfer: Building a Reliable Data Transfer Protocol, Pipelined Reliable Data Transfer Protocols, Go-Back-N, Selective Repeat, Connection-Oriented Transport TCP: The TCP Connection, TCP Segment Structure, Round-Trip Time Estimation and Time out, Reliable Data Transfer, Flow Control, TCP Connection Management, Principles of Congestion Control: The

Causes and the Costs of Congestion Approaches to Congestion Control.

Application:

Video Link:

https://www.guru99.com/types-of-computer-network.html

Module-3	L1,L2,L3	12 Hours

Syllabus Content:

The Network Layer: What's inside a Router – Input Processing – Switching – Output Processing – Where Does Queuing Occur? – Routing Control plane – Ipv6, A Brief foray into IP Security.

Routing Algorithms: The Link-State (LS) Routing Algorithm – The Distance-Vector (DV) Routing Algorithm, Hierarchical Routing – Routing in the Internet – Intra -AS Routing in the Internet: RIP, Intra-AS Routing in the Internet: OSPF, Inter/AS Routing: BGP, Broadcast Routing Algorithms - Multicast.

Application: Router Programming – Simulation , Hands-on simulation – Sensor Networks (Simulation)

Video Link:

https://lecturenotes.in/notes/15491-note-for-computer-network-cn-by-vtu-rangers

Module-4	L1,L2,L3	12 Hours

Syllabus Content:

Circuit switched networks, Datagram networks, Virtual circuit networks, Structure of a Switch-Structure of Circuit Switches & Packet Switches, Data Link Layer-Detection and Correction-Introduction, Block Coding-Error Detection and Correction, Hamming Distance, Minimum Hamming Distance, Linear Block Codes, Cyclic Codes-CRC, Polynomials, Checksum

Module-5	L1,L2,L3	12 Hours

Syllabus Content:

1.   Data Link Layer – Data Link Control- Framing, Flow and error control, Protocols, Noiseless Channels, Noisy Channels, HDLC, Point-to-Point Protocol- Framing, Transition phases, Multiple Access- Random access-Aloha, CSMA, CSMA/CD, CSMA/CA, Controlled access- reservation, polling, token passing, Channelization -FDMA,TDMA,CDMA

Practical Experiments:

1. Study of LAN cables and other related devices.

2. Establishing LAN by assigning IP Address.

3. Implementation of FTP using java.

4. Implementation of TCP using java.

5. Implementation of UDP using java.

Course outcomes:	
CO1	Establish LAN and assigning IP address to each node
CO2	Can apply different protocols to transfer data between computers
CO3	Know how the network deliver the packets to destination network
CO4	Analyze flow control and Error control mechanism using standard data link layer protocols and Compare
CO5	Analyze different protocols used for Ethernet and various connecting devices used in networks.

Text/Reference Books:	
1.	Data Communication and Networking, Forth Edition, Behrouz A. Forouzan, , Mc Graw Hill.
2.	James F. Kurose and Keith W. Ross, Computer Networks A Top Down Approach, Sixth Edition, Pearson
3.	William Stallings, Data and Computer Communication, Tenth Edition, Pearson Education, 2013.
4.	WilliamStallings, " Data and Computer Communication", PearsonEducation, 10thEdition, 2014.

CIE Assessment:
CIE is based on quizzes, tests, assignments/seminars and any other form of evaluation. Generally, there will be: Three Internal Assessment (IA) tests during the semester (30 marks each), the final IA marks to be awarded will be the average of three tests Quizzes/mini tests (4 marks) Mini Project / Case Studies (8 Marks) Activities/Experimentations related to courses (8 Marks)
SEE Assessment:
Question paper for the SEE consists two parts i.e. Part A and Part B. Part A is compulsory and consists of objective type or short answer type questions of 1 or 2 marks each for total of 20 marks covering the whole syllabus. Part B also covers the entire syllabus consisting of five questions having choices and may contain sub-divisions, each carrying 16 marks. Students have to answer five full questions. One question must be set from each unit. The duration of examination is 3 hours.
CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12

CO1	2	2	2	2	2	2					3	3
CO2	2	2	2	2	2	2					2	3
CO3	2	2	2	2	2	2					3	2
CO4	2	2	2	2	2	2					3	3
CO5	2	2	2	2	2	2					3	3

High-3, Medium-2, Low-1

Course Title	Database Management System & Lab	Semester	V
Course Code	MVJ21CD53	CIE	50
Total No. of Contact Hours	50	SEE	50
No. of Contact Hours/week	4 (L : T : P :: 2 : 1 : 0)	Total	100
Credits	4	Exam. Duration	3 Hours

Course objective is to:

•	Provide Key Knowledge in database system concepts, applications and advantages.

•	To get knowledge about SQL programming

•	Design a database as redundant and error free

•	Students can build a database application for real world problems

•	Can derive the knowledge or pattern from real world data

Module-1	L1,L2,L3	8 Hours

Introduction: Database-System Applications – Purpose of Database – View of Data – Database Languages – Relational Databases – Database Design – Data Storage and Querying – Transaction Management – Database Architecture – Data mining and Information Retrieval – Specialty Databases – Database Users and Administrators.

Introduction to Relational Model: Structure of Relational Database – Database Schema – Keys – Schema Diagrams – Relational Query Languages – Relational Operations – Relational Algebra.

Application: This module will give basic knowledge of database and SQL.

Video Link: https://www.youtube.com/watch?v=X9bQsAoqmfI

Module-2	L1,L2,L3	8 Hours

Introduction to SQL: Overview of the SQL Query Languages – SQL Definition – Basic Structure of SQL Queries – Additional Basic Operations – Set Operations – Null Values – Aggregate Functions - Nested Subqueries – Modification of Database.

Intermediate SQL: Join Expressions – Views – Integrity Constraints – SQL Data types and Schemas – Authorization.

Advanced SQL: Functions and Procedures – Triggers.

Application: Students can learn more complex queries and can design error free database using constraints.

Video Link: https://www.youtube.com/watch?v=fRMv14j5XJU

Module-3	L1,L2,L3	8 Hours

Relational Database Design: Features of Good Relational Designs – Atomic Domains and First Normal Form – Decomposition Using Functional Dependencies – Functional-Dependency Theory – Algorithm for Decomposition – 2nd Normal Form, 3rd Normal Form, Boyce Codd Normal Form Decomposition using Multivalued Dependencies – 4th Normal Form and domain Key Normal Form.

Application: Students can learn how to divide the table without any data lose and can execute queries without any anomalies.

Video Link**:** https://www.youtube.com/watch?v=Ko_LE3TNO64&t=1s

https://www.youtube.com/watch?v=p62he-WUp9E

Module-4	L1,L2,L3	8 Hours

Transaction: Transaction Concept – A Simple Transaction Model – Transaction Atomicity and Durability – Transaction Isolation – Serializability – Isolation Levels – Implementation of Isolation Level –

Concurrency Control: Lock-Based Protocol – Timestamp-Based Protocols – Validation-Based Protocol.

Advanced SQL: Accessing SQL From a Programming Language.

Application design and Development: Application Programs and User Interfaces – Web Fundamentals – Servlet and JSP

Application: Students can develop a web-based application for accessing database.

Video Link: https://www.youtube.com/watch?v=w83Ug6IwVTw

https://www.youtube.com/watch?v=Thm0xW9oTow

https://www.youtube.com/watch?v=C_J6K8DodS8

Module-5	L1,L2,L3	8 Hours

Data Warehousing, Data Mining, and Information Retrieval: Data Warehousing and Mining – Data Warehousing – Data Mining – Classification – Association Rules – Data mining algorithms using Weka Tools.

Application: Students can develop an application using JAVA with Weka for data mining operations.

Video Link: https://www.youtube.com/watch?v=XlbM9ibjUuM

Course outcomes:

CO1	Understand the database requirements of real-world problems

CO2	Querying the data according to different requirements
CO3	Design database for real world problems like bank, commercial shops
CO4	Develop application program to real world problems
CO5	Database mining to derive pattern among different data sets

LABORATORY EXPERIMENTS	**(10 hours)**

1.a. Study of User privileges

 b. Experiments on All Data Definition Language (create, modify, drop table etc.,)

2. Experiments on All Data Manipulation Language (Insert, Delete, Update)

3. Experiments on Nested Sub-queries and Inner Queries

4. Experiments on All types of Joins

5. Experiment on Cursor, Assertion and Triggers

6. Experiments on PL\SQL and Procedure and Function

7. Implementation of Normal forms – (The faculty should give some set of attributes and students should solve by different normal forms)

8**.** Front-end & Back-end application 1 (Front end – any programming language, Back-end – any database software)

9. Front-end & Back-end application 2 (GUI Based)

10. Front-end & Back-end application 3 (GUI based application for shops, etc.,)

11. Implementation of Data mining Algorithms 1 – using Weka or Orange

Course Outcome for DBMS Laboratory:

CO1	Create table, insert data using sql commands
CO2	Execute queries for acquire data from database
CO3	Develop a program for commercial shop bill maintenance
CO4	Develop a web application to remote data processing
CO5	Implement data mining algorithms for derive patterns in data

Text/Reference Books:	
1.	Database System Concepts, Sixth Edition, by Abraham Silberschatz, Henery F. Korth, S. Sundarshan
2.	Fundamentals of Database Systems, Ramez Elmasri and Shamkant B. Navathe, 7th Edition, 2017, Pearson.
3.	Database Management System, Ramakrishnan and Gehrke, 3rd Edition, Mc-GrawHill, 2013.

| 4. | Data Mining Concepts and Techniques, Second Edition, by Jiawei Han and Micheline Kamber, Elsevier. |

Continuous Internal Evaluation (CIE):

Theory for 50 Marks

CIE is executed by way of quizzes (Q), tests (T) and assignments. A minimum of three quizzes are conducted along

with tests. Test portion is evaluated for 50 marks and quiz is evaluated for 10 marks. Faculty may adopt innovative

methods for conducting quizzes effectively. The number of quizzes may be more than three (conduct additional

quizzes and take best three). The three tests are conducted for 50 marks each and the average of all the tests are

calculated for 50. The marks for the assignments are 20 (2 assignments for 10 marks each). The marks obtained in

 test, quiz and assignment are added to get marks out of 100 and report CIE for 50 marks.

Laboratory- 50 Marks

The laboratory session is held every week as per the time table and the performance of the student is evaluated in

every session. The average of the marks over number of weeks is considered for 30 marks. At the end of the semester

a test is conducted for 10 marks. The students are encouraged to implement additional innovative experiments in the lab

and are awarded 10 marks. Total marks for the laboratory is 50.

Semester End Examination (SEE):

Total marks: 50+50=100

SEE for 50 marks are executed by means of an examination.

The Question paper for each course contains two parts, Part – A and Part – B. Part – A consists of objective type

Questions for 20 marks covering the entire syllabus. Part – B Students have to answer five questions, one from

each unit for 16 marks adding up to 80 marks. Each main question may have a maximum of three sub divisions.

 Each unit will have internal choice in which both questions cover entire unit having same complexity in terms

 of COs and Bloom's taxonomy level.

R Programming and Lab		
Course Code: MVJ21CD54		**CIE Marks:50+50**
Credits: L:T:P: 3:0:1		**SEE Marks: 50 +50**
Hours:40 L+ 26 P		**SEE Duration: 03+03 Hours**
Course Learning Objectives: The students will be able to		
1	To program in R and how to use R for effective data analysis	

2	To learn how to install and configure software necessary for a statistical programming environment
3	To discuss generic programming language concepts

UNIT-I	
Syllabus Content: Overview of R. What is R? What is S? Basic Features of R Free Software . Design of the R System. Limitations of R. R Resources.	**8 Hrs**

UNIT-II	
Syllabus Content: Entering Input, Evaluation, R Objects, Numbers, Attributes, Creating Vectors, Mixing Objects, Explicit Coercion, Matrices, Lists Factors, Missing Values, Data Frames Names.	**8 Hrs**

UNIT-III	
Syllabus Content: Getting Data In and Out of R , Reading and Writing Data , Reading Data Files with read.table() , Reading in Larger Datasets with read.table(), Calculating Memory Requirements for R Objects Using the readr Package , Using Textual and Binary Formats for Storing Data Using dput() and dump() , Binary Formats	**8 Hrs**

UNIT-IV	
Syllabus Content:Control Structures , if-else, for Loops , Nested for loops , while Loops , repeat Loops , next, break	**8 Hrs**

UNIT-V	
Syllabus Content: Functions in R , Your First Function , Argument Matching , Lazy Evaluation The ... Argument, Arguments Coming After the ... Argument, Loop Functions , Looping on the Command Line, lapply() , sapply() , split() Splitting a Data Frame , apply() , Col/Row Sums and Means , Other Ways to Apply mapply()	**8 Hrs**

CO-PO Mapping											
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1				2		2		2				1
CO2		3		2		2		2				2
CO3		3		2		2		2				3
CO4		3		2		2		2				2
CO5		3		2		2		2				3

LABORATORY EXPERIMENTS

1. To perform the basic mathematical operations in r programming
2. Implementation of vector and List data objects operations
3. Implementation of various operations on matrix, array and factors in R.
4. Implementation and perform the various operations on data frames in R.
5. Study and implementation of various control structures in R.
6. Data Manipulation
7. Simulating a Linear Model
8. Random Sampling in R
9. Data visualization with R and ggplot2
10. Working with CSV files in R

Course Outcomes: After completing the course, the students will be able to	
CO1	writing R functions, debugging, and organizing and commenting R code
CO2	Understand the basics in R programming in terms of constructs, control statements, string functions
CO3	Understand the use of R for Big Data analytics
CO4	Learn to apply R programming for Text processing
CO5	Able to appreciate and apply the R programming from a statistical perspective

Reference Books	
1.	Roger D. Peng: R Programming for Data Science ,[E-book]

Continuous Internal Evaluation (CIE):

Theory for 50 Marks

CIE is executed by way of quizzes (Q), tests (T) and assignments. A minimum of three quizzes are conducted along with tests. Test portion is evaluated for 50 marks and quiz is evaluated for 10 marks. Faculty may adopt innovative methods for conducting quizzes effectively. The number of quizzes may be more than three (conduct additional quizzes and take best three). The three tests are conducted for 50 marks each and the average of all the tests are calculated for 50. The marks for the assignments are 20 (2 assignments for 10 marks each). The marks obtained in test, quiz and assignment are added to get marks out of 100 and report CIE for 50 marks.

Laboratory- 50 Marks

The laboratory session is held every week as per the time table and the performance of the student is evaluated in every session. The average of the marks over number of weeks is considered for 30 marks. At the end of the semester a test is conducted for 10 marks. The students are encouraged to implement additional innovative experiments in the lab and are awarded 10 marks. Total marks for the laboratory is 50.

Semester End Examination (SEE):

Total marks: 50+50=100

SEE for 50 marks are executed by means of an examination.

The Question paper for each course contains two parts, Part – A and Part – B. Part – A consists of objective type questions for 20 marks covering the entire syllabus. Part – B Students have to answer five questions, one from each unit for 16 marks adding up to 80 marks. Each main question may have a maximum of three sub divisions. Each unit will have internal choice in which both questions cover entire unit having same complexity in terms of COs and Bloom's taxonomy level.

Professional Electives-v sem

Course Title	Advanced JAVA & J2EE	Semester	V
Course Code	MVJ21CD551	CIE	50

Total No. of Contact Hours	40	SEE	50
No. of Contact Hours/week	4 (L : T : P :: 2 : 1 : 0)	Total	100
Credits	3	Exam. Duration	3 Hours

Course objective is to: *: This course will enable students to*
Construct client-server applications using Java socket API
Identify the need for advanced Java concepts like Enumerations and Collections
Make use of JDBC to access database through Java Programs
Adapt servlets to build server side programs
Demonstrate the use of JavaBeans to develop component-based Java software

Module-1	L1,L2,L3	12 Hours

Syllabus Content:

Enumerations, Autoboxing and Annotations(metadata): Enumerations, Enumeration fundamentals, the values() and value Of() Methods, java enumerations are class types, enumerations Inherits Enum, example, type wrappers, Autoboxing, Autoboxing and Methods, Autoboxing/Unboxing occurs in Expressions, Autoboxing/Unboxing, Boolean and character values, Autoboxing/Unboxing helps prevent errors, A word of Warning. Annotations, Annotation basics, specifying retention policy, Obtaining Annotations at run time by use of reflection, Annotated element Interface, Using Default values, Marker Annotations, Single Member annotations, Built-In annotations

Application: choices on a menu, rounding modes, command line flags, etc. Autoboxing & Auto unboxing: Annotations

Video Link: https://www.youtube.com/watch?v=vJ-Zn4fo0MQ&t=608s

Module-2	L1,L2,L3	12 Hours

Syllabus Content:

The collections and Framework: Collections Overview, Recent Changes to Collections, The Collection Interfaces, The Collection Classes, Accessing a collection Via an Iterator, Storing User Defined Classes in Collections, The Random Access Interface, Working With Maps, Comparators, The Collection Algorithms, Why Generic Collections, The legacy Classes and Interfaces,

Parting Thoughts on Collections.

Application: Writing an application

Video Link: https://www.youtube.com/watch?v=Ma7u6KEKzPE

Module-3	L1,L2,L3	12 Hours

Syllabus Content:

String Handling :The String Constructors, String Length, Special String Operations, String Literals, String Concatenation, String Concatenation with Other Data Types, String Conversion and toString( ) Character Extraction, charAt( ), getChars( ), getBytes( ) toCharArray(), String Comparison, equals( ) and equalsIgnoreCase( ), regionMatches( ) startsWith( ) and endsWith( ), equals( ) Versus == , compareTo( ) Searching Strings, Modifying a String, substring( ), concat( ), replace( ), trim( ), Data Conversion Using valueOf( ), Changing the Case of Characters Within a String, Additional String Methods, StringBuffer , StringBuffer Constructors, length( ) and capacity( ), ensureCapacity( ), setLength( ), charAt( ) and setCharAt( ), getChars( ),append( ), insert( ), reverse( ), delete( ) and deleteCharAt( ), replace( ), substring( ), Additional StringBuffer Methods, StringBuilder

Application: Datatype

Video Link: https://www.youtube.com/watch?v=N63JCXwdd14

Module-4	L1,L2,L3	12 Hours

Syllabus Content:

Background; The Life Cycle of a Servlet; Using Tomcat for Servlet Development; A simple Servlet; The Servlet API; The Javax.servlet Package; Reading Servlet Parameter; The Javax.servlet.http package; Handling HTTP Requests and Responses; Using Cookies; Session Tracking. Java Server Pages (JSP): JSP, JSP Tags, Tomcat, Request String, User Sessions, Cookies, Session Objects

Application: java-based web application.

Video Link: https://www.youtube.com/watch?v=ewiOaDitBBw

Module-5	L1,L2,L3	12 Hours

Syllabus Content:

 JDBC Overview – JDBC implementation – Connection class – Statements - Catching Database Results, handling database Queries. Networking– InetAddress class – URL class- TCP sockets - UDP sockets, Java Beans –RMI.

Application: Connecting, storing, retrieving data between program and any database.

Video Link: https://www.youtube.com/watch?v=Cq4lwVE2Fzk

Course outcomes:	
CO1	Interpret the need for advanced Java concepts like enumerations and collections in developing modular and efficient programs
CO2	Build client-server applications and TCP/IP socket programs
CO3	Illustrate database access and details for managing information using the JDBC API
CO4	Describe how servlets fit into Java-based web application architecture
CO5	Develop reusable software components using Java Beans

Text/Reference Books:	
1.	Herbert Schildt: JAVA the Complete Reference, 7th/9th Edition, Tata McGraw Hill, 2007.
2.	Jim Keogh: J2EE-TheCompleteReference, McGraw Hill, 2007.
3.	Stephanie Bodoff et al: The J2EE Tutorial, 2nd Edition, Pearson Education,2004.
4.	Uttam K Roy, Advanced JAVA programming, Oxford University press, 2015.
5.	Herbert Schildt: JAVA the Complete Reference, 7th/9th Edition, Tata McGraw Hill, 2007.

CIE Assessment:

CIE is based on quizzes, tests, assignments/seminars and any other form of evaluation. Generally, there will be: Three Internal Assessment (IA) tests during the semester (30 marks each), the final IA marks to be awarded will be the average of three tests

Quizzes/mini tests (4 marks)

Mini Project / Case Studies (8 Marks)

Activities/Experimentations related to courses (8 Marks)

SEE Assessment:

Question paper for the SEE consists two parts i.e. Part A and Part B. Part A is compulsory and consists of objective type or short answer type questions of 1 or 2 marks each for total of 20 marks covering the whole syllabus.

Part B also covers the entire syllabus consisting of five questions having choices and may contain sub-divisions, each carrying 16 marks. Students have to answer five full questions.

One question must be set from each unit. The duration of examination is 3 hours.

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1			3	2	2	2		2				1
CO2		3	3	2	2	2		2				2

CO3		3	3	2	2	2		2				3
CO4		3	3	2	2	2		2				2
CO5		3	3	2	2	2		2				3

High-3, Medium-2, Low-1

Course Title	Cloud Computing	Semester	V
Course Code	MVJ21CD552	CIE	50
Total No. of Contact Hours	40	SEE	50
No. of Contact Hours/week	4 (L : T : P :: 2 : 1 : 0)	Total	100
Credits	3	Exam. Duration	3 Hours

Course objective is to:

understands cloud computing models and infrastructure for larger networks

Identify policies, mechanisms and scheduling for resource management, virtualization, and optimization of networks.

Compare multiple approaches to cloud system design and solve real world problems.

Illustrate storage concept and self-organizing capability for different cloud systems.

Understands cloud security and risk..

Module-1	L1,L2,L3	12 Hours

Defining a Cloud, Cloud Computing Reference Model , Characteristics and Benefits, Historical Developments, Building Cloud Computing Environments, Computing Platforms and Technologies, Eras of Computing, Parallel vs. Distributed Computing, Elements of Parallel Computing.

Application:

Art Applications

Business Applications

Data Storage and Backup Applications

Video Link**:**

https://www.youtube.com/watch?v=eaf_l9SBmyQ

Module-2	L1,L2,L3	12 Hours

Characteristics of Virtualized Environments, Taxonomy of Virtualization Techniques, Virtualization and Cloud Computing, Pros and Cons of Virtualization, Technology Examples, Xen, VMware, Microsoft Hyper-V, Cloud Reference Model and Architecture, Infrastructure as a Service, Platform as

a Service, Software as a Service, Types of Clouds, Economics of the Cloud, Open Challenges in Clouds.

Application:

- Big data analysis

- Storage

- Recovery

- Backup

Video Link**:**

https://www.youtube.com/watch?v=_pPlanX5wQY

Module-3	L1,L2,L3	12 Hours

Data-intensive computing Characterizing data-intensive computations, Challenges ahead, Historical perspective, Technologies for data-intensive computing – Storage systems, Programming platforms – Map Reduce. Public Cloud Infrastructures: Amazon Web Services - Compute, Storage, and Communication Services; Google App Engine – Architecture, Application Life-Cycle, Cost Model; and Microsoft Azure.

Application:

- Disaster recovery

Online File storage

Photo editing software

Digital video software

Twitter-related applications

Video Link:

https://www.youtube.com/watch?v=9C9VJh19YFs

https://www.youtube.com/watch?v=dB1R9XHAng0

Module-4	L1,L2,L3	12 Hours

ECG Data Analysis on Cloud, Protein Structure Prediction, Satellite Image Processing; Business and Consumer Applications – CRM, Social Networks, Media Applications, and Multiplayer Online Gaming. Advanced Topics in Cloud Computing, Energy efficiency in clouds, Energy-efficient and green cloud computing architecture, Market-based management of clouds, Market-oriented cloud computing, A reference model for MOCC,3 Technologies and initiatives supporting MOCC, Observations

Application:

Creating image-album
Web application for antivirus
Word processing application
Spreadsheets
Presentation software
Video Link:
https://www.youtube.com/watch?v=s9G2NQhvaKQ

Module-5	**L1,L2,L3**	**12 Hours**

Cloud security risks, Security: The top concern for cloud users, Privacy and privacy impact assessment, Trust, Operating system security, Virtual machine Security, Security of virtualization, Security risks posed by shared images, Security risks posed by a management OS, A trusted virtual machine monitor.

Application:

Finding a way on the map

E-commerce software

Miscellaneous applications

Video Link:

https://www.youtube.com/watch?v=0lw4KU5wHsk

Practical Experiments/ Case Study:

Creating a Warehouse Application in SalesForce.com.

Implementation of SOAP Web services in C#/JAVA Applications.

Installation and Configuration of Hadoop.

Case Study: Amazon Web Services

Case Study: PAAS(Facebook, Google App Engine)

Create an application (Ex: Word Count) using Hadoop Map/Reduce

Course outcomes:

CO1	Explore the basic concepts of cloud computing, cloud infrastructure, cloud models, cloud services, distributed computing, and other related concepts.
CO2	Understand Virtualization, and working of some of industrially popular Virtualization technologies.
CO3	Apply Map Reduce programming model to solve some data-intensive computing applications over public or private cloud platforms.

CO4	Analyzing the security risks in cloud from different perspectives and study some of the available solutions.
CO5	Explain Operating system security, Virtual machine Security and Security of virtualization.

Text/Reference Books:	
1.	Mastering Cloud Computing, Rajkumar Buyya, Christian Vecchiola, and ThamaraiSelvi, 2013, McGraw Hill, New Delhi, India, ISBN-13: 978-1-25-902995-0.
2.	2.Cloud Computing Theory and Practice, Dan C Marinescu, 1st Edition, 2013, Elsevier (MK), ISBN: 9780124046276. (Unit – 5)
3.	3.Distributed Computing and Cloud Computing, from parallel processing to internet of things, Kai Hwang, GeofferyC.Fox, Jack J Dongarra, 1st Edition, 2012, Elsevier(MK), ISBN: 978-0-12-385880-1.
4.	4.Cloud Computing Implementation, Management and Security,John W Rittinghouse, James F Ransome, 1st Edition, 2013, CRC Press, ISBN: 978-1-4398-0680-7.

CIE Assessment:
CIE is based on quizzes, tests, assignments/seminars and any other form of evaluation. Generally, there will be: Three Internal Assessment (IA) tests during the semester (30 marks each), the final IA marks to be awarded will be the average of three tests   Quizzes/mini tests (4 marks)   Mini Project / Case Studies (8 Marks)   Activities/Experimentations related to courses (8 Marks)

SEE Assessment:
i.   Question paper for the SEE consists two parts i.e. Part A and Part B. Part A is compulsory and consists of objective type or short answer type questions of 1 or 2 marks each for total of 20 marks covering the whole syllabus.   ii.   Part B also covers the entire syllabus consisting of five questions having choices and may contain sub-divisions, each carrying 16 marks. Students have to answer five full questions.   iii.   One question must be set from each unit. The duration of examination is 3 hours.

CO-PO Mapping											
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12

CO1	2	2		2	2							
CO2	2	2		2	2							
CO3	3	3		3	3							
CO4	2	2		2	2							
CO5	2	2		2	2							

High-3, Medium-2, Low-1

Course Title	Agile Technology	Semester	V
Course Code	MVJ21CD553	CIE	50
Total No. of Contact Hours	40	SEE	50
No. of Contact Hours/week	4 (L : T : P :: 2 : 1 : 0)	Total	100
Credits	3	Exam. Duration	3 Hours

Course objective is to:

Learn about operating system and interact through commands.

Understand texting based command and shell programming

Work with process and files

Understand how networking and client/server system works.

Learn 'perl' script cording

Module-1	L1,L2,L3	12 Hours

Unix Components/Architecture – Environment and Structure – Posix and Single Unix Specification – Login Prompt – Unix Commends and Structure – Commands Arguments Options – Basic Commands & Combining commands – *date, passwd*, and c*al* Command - Types of commands and locating it – man command – Unix online manual page – Knowing user terminal – displaying – setting – managing the non-uniform behaviour of terminals and keyboards – Root Login, etc/passwd and etc/shadow files – command for add, modify and delete users

Unix Files: File types - Organization - hidden files and standard directories – Parent and child relationship - Home Directory – File path with various options – Directory commands – *cat, mv, rm cp, wc* commands – *od, cmp* and *comm, diff* commands – File attributes and Permission – Directory Permission

Application: Students will get awareness about opensource platforms, Unix OS and commands.

Video Link: https://www.youtube.com/watch?v=3DA1grSp4mU

Module-2	L1,L2,L3	12 Hours

vi-basics – input mode command – navigation commands – searching for pattern (/ and ?) search and replace (:S) – shells interpretive cycle – Removing special meanings of wild cards – three standard files and redirections – connecting commands: PIPE, Splitting the output: tee – 'grep' and 'sed' command – command substitution – basic and extended regular expressions – examples involving different regular expression.

Shell Programming: Ordinary and environment variables – The .profile, .read and readonly commands – Command line arguments – logical operators – for conditional execution – exit and exit status of a command – test command and its shortcut – Control Statements – loop statements – 'if' statement examples – 'case' statement – sort command and its options – set and shift command – handling positional parameter – two special files /dev/null and dev/tty – Head and tail commands – cut and paste commands – unmask and default file permission.

Application: Students can learn basic Unix command and 'vi' editor for text processing.

Video Link: https://www.youtube.com/watch?v=OHCMfsNpqCc

Module-3	L1,L2,L3	12 Hours

The Process: The process and control – creating parent and child process – ps command its options – background processes – corn command crontab files – kill and find commands – batch command and priority – 'nice' command. Process identifiers – fork, vfork, exit, wait, waitpid, wait3, wait4 functions – race conditions – exec functions – changing user IDs and Group IDs – Interpreter Files – System function – Process Accounting – User Identification – Process times – I/O Redirection.

Process Relationship: Terminal login – network logins – process groups – sessions – Controlling Terminal – tcgetpgrp and tcsetpgrp functions – Job Control – Shell Execution of programs – Orphaned process groups.

Application: Students can learn process related commands and User privileges

Video Link: https://www.youtube.com/watch?v=9YRxhlvt9Zo

Module-4	L1,L2,L3	12 Hours

Inter-process Communication: Overview of IPC methods – Pipes – popen – pclose functions – Coprocesses, FIFOs – System V IPC – Message Queues – Semaphores. Shared Memory – Client-Server Properties – Stream Pipes – Passing File descriptors – An open server-Version 1, Client-Server Connection Functions.

Application: Students can learn how schedule process for run and inter-process communication.

Video Link: https://www.youtube.com/watch?v=lcRqHwIn5Dk

Module-5	L1,L2,L3	12 Hours

Structure of Perl script – Variables – Operators – String Handling functions – Range operators – lists and arrays - @variables and splice operators – File and File handling functions – Regular Expressions

– simple and multiple search patterns – match and substitute operators – defining and using subroutines.

Application: Students can learn to write shell script in Unix environment.

Video

Link:https://www.youtube.com/watch?v=ELp9ytLjupE&list=PLGqiLyfegVYDeHVG0qigvOK5liPnDi4B9

Practical experiments:
Basic Unix commands
Unix Shell Programming

Course outcomes:	
CO1	Easily interact with Unix shell through commands
CO2	Easily can work with text 'vi' editor for text processing
CO3	Create and execute programs to read/write data from files
CO4	Client/Server communication through network
CO5	Wirte 'perl' script for unix operating system

Text/Reference Books:	
1.	Sumitabha Das., Unix Concepts and Applications., 4th Edition., Tata McGraw Hill
2.	Terrence Chan Unix System Programming Using C++ , PHI, 1999.
3.	W.Richard Stevens, Stephen A. Rago, Advanced Programming in the UNIX Environment , 3rd edition, Pearson Education /PHI, 2005.
4.	Behrouz A. Forouzan, Richard F. Gilberg: Unix and Shell Programming – Cengage Learning – India Edition 2009
5.	M.G. Venkatesh Murth: Unix and Shell Programming, Pearson Education.

CIE Assessment:
CIE is based on quizzes, tests, assignments/seminars and any other form of evaluation. Generally, there will be: Three Internal Assessment (IA) tests during the semester (30 marks each), the final IA marks to be awarded will be the average of three tests Quizzes/mini tests (4 marks) Mini Project / Case Studies (8 Marks) Activities/Experimentations related to courses (8 Marks)
SEE Assessment:

Question paper for the SEE consists two parts i.e. Part A and Part B. Part A is compulsory and consists of objective type or short answer type questions of 1 or 2 marks each for total of 20 marks covering the whole syllabus.

Part B also covers the entire syllabus consisting of five questions having choices and may contain sub-divisions, each carrying 16 marks. Students have to answer five full questions.

One question must be set from each unit. The duration of examination is 3 hours.

CO-PO Mapping

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2	2	2	2	1	1	1	1	1	1	1	1
CO2	2	2	1	1	1	1	1	1	1	1	2	1
CO3	3	2	1	1	1	1	1	1	1	1	2	2
CO4	2	2	1	2	1	1	1	1	1	1	1	1
CO5	2	3	2	1	1	1	1	1	1	1	1	1

High-3, Medium-2, Low-1

Course Title	Business Intelligence	Semester	V
Course Code	MVJ21IS554	CIE	50
Total No. of Contact Hours	40	SEE	50
No. of Contact Hours/week	4 (L : T : P :: 2 : 1 : 0)	Total	100
Credits	3	Exam. Duration	3 Hours

Course objective is to:		
The objective of this course is to learn Business Intelligence.		
Module -1	L1,L2,L3	12 Hours

Introduction to Business Intelligence: Understanding the scope of today's BI solutions and how they fit into existing infrastructure Assessing new options such as SaaS and cloud-based technology. Describe BI, its components & architecture, previewing the future of BI Crafting a better experience for all business users, End User Assumptions, Setting up Data for BI, The Functional Area of BI Tools, Query Tools and Reporting, OLAP and Advanced Analytics, Supporting the requirements of senior executives, including performance management.

Module -2	L1,L2,L3	12 Hours

Elements of Business Intelligence Solutions: Reports & ad hoc queries; Analyse OLAP data; Dashboards & Scorecards development, Metadata Models; Automated tasks & events; Mobile & disconnected BI; Collaboration capabilities; Real time monitoring capabilities; Software development kit; Consume BI through portals, web applications, Desktop applications.

Module - 3	L1,L2,L3	12 Hours

Building the BI Project: Planning the BI project, Project Resources; Project Tasks, Risk Management and Mitigation, Cost-justifying BI solutions and measuring success,Collecting User Requirements, Requirements-Gathering Techniques; Prioritizing & Validating BI Requirements, Changing Requirements; BI Design and Development, Best Practices for BI Design; Post-Implementation Evaluations, Maintaining Your BI Environment.

Module-4	L1,L2,L3	12 Hours

Reporting authoring: Building reports with relational vs Multidimensional data models ; Types of Reports – List, crosstabs, Statistics, Chart, map, financial etc; Data Grouping & Sorting, Filtering Reports, Adding Calculations to Reports, Conditional formatting, Adding Summary Lines to Reports. Drill up, drill- down, drill-through capabilities. Run or schedule report, different output forms – PDF, excel, csv, xml etc.

Module-5	L1,L2,L3	12 Hours

BI Deployment, Administration & Security: Centralized Versus Decentralized Architecture, BI Architecture Alternatives, phased & incremental BI roadmap, System Sizing, Measurements and Dependencies, System Sizing, Measurements, and Dependencies. Setting Early Expectations and Measuring the Results. End-User Provisos. OLAP Implementations. Expanding BI Authentication Authorization, Access Permissions, Groups and Roles, Single-sign on Server Administration, Manage Status & Monitoring, Audit, Mail server & Portal integration, Back Up and Restore.

Course outcomes:

CO1	To gain knowledge of Business Intelligence
CO2	Business Intelligence is the ability to communicate one's analyses and recommendations to decision-makers
CO3	To build business projects
CO4	To generate and manage BI reports
CO5	do BI Deployment, Administration & Security.

Text/Reference Books:

1.	Business Intelligence (IBM ICE Publication).
2.	http://en.wikipedia.org/wiki/Business_intelligence.
3.	http://www.webopedia.com/TERM/B/Business_Intelligence.html.
4.	Http://www.cio.com/article/40296/Business_Intelligence_Definition_and_Solutions.

Course Title	**Web Technology**	**Semester**	**V**
Course Code	**MVJ21CD554**	**CIE**	**50**
Total No. of Contact Hours	**50**	**SEE**	**50**
No. of Contact Hours/week	**4 (L : T : P :: 2 : 1 : 0)**	**Total**	**100**
Credits	**4**	**Exam. Duration**	**3 Hours**

Course objective is to:

Teach students HTML and CSS for designing web pages.

Introduce students to the basics of JavaScript as a programming language.

Familiarize students with the Document Object Model and enable them to create dynamic web pages that react to user input.

Teach students about installing and configuring Apache Server and incorporating backend support for their web pages.

Introduce students to the newer features available as part of the HTML standard

Module -1	**L1,L2,L3**	**8 Hours**

Introduction, UI Design and UX : Internet, WWW, Web Servers and Browsers, URLs, MIME, HTTP, Basic Markup, Images, Hyperlinks, Lists, Tables, Forms, DataList, Canvas, Audio and Video, Geo-Location, Local Storage, Web Workers, Offline Web Applications, Drag and Drop.HTML Tables and Forms, Introducing Tables, Styling Tables, Introducing Forms, Form Control Elements, Table and Form Accessibility, Microformats

Application: To deliver data (HTML files, image files, query results) on the World Wide Web.

Video Link:

https://www.freecodecamp.org/

https://developer.mozilla.org/en-US/docs/Web/CSS

Module -2	L1,L2,L3	**8 Hours**

Style Sheets: CSS Introduction to Cascading Style Sheets-Features-Core Syntax-Style Sheets and HTML Style Cascading and Inheritance-Text Properties-Box Model Normal Flow Box Layout-Beyond the Normal Flow-Other Properties-Case Study. Client- Side Programming:

Application: Describing the presentation of Web pages, including colors, layout, and fonts

Video Link:

https://www.vogella.com/tutorials/CSS/article.html

https://nptel.ac.in/courses/106/105/106105084/

Module - 3	L1,L2,L3	**8 Hours**

JavaScript: Introduction to Client-Side Scripting, JavaScript Basics, Screen Input and Keyboard Output, Functions, Objects, Inheritance, Hoisting, Arrays, JavaScript Objects, Accessing and Modifying DOM, Events and Event Handlers - Load, Mouse, Synthetic Events, Key and Form Related Events, Event Bubbling, Cookies.

Application: Web Sites, Web Server Applications, Mobile Apps, Games Platform

Video Link:

https://www.udemy.com/courses/development/web-development/

https://javascript.info/hello-world#modern-markup

Module-4	L1,L2,L3	**8 Hours**

PHP Arrays and Superglobals, Arrays, $_GET and $_POST Superglobal Arrays, $_SERVERArray, $_Files Array, Reading/Writing Files, PHP Classes and Objects, Object-Oriented Overview, Classes and Objects in PHP, Object Oriented Design, Error Handling and Validation, What are Errors and Exceptions, PHP Error Reporting, PHP Error and Exception Handling

Application: e-Commerce Applications. Web Pages and Web-Based Applications

Video Link:

http://www.nptelvideos.com/video.php?id=2142&c=27

http://www.nptelvideos.com/video.php?id=2131&c=27

http://www.nptelvideos.com/video.php?id=2116&c=27

Module-5	L1,L2,L3	**8 Hours**

Bootstrap: Grid Systems, Layout, Tables and Forms, Buttons and Images, Progress Bar, Navigations.

jQuery: Usage, Selecting DOM Elements, Getting and Setting Attributes, Changing Styles, File Handling and System Calls, Arrays, Cookies, Sessions, Database Access.

Application: Bootstrap is a front-end framework used to create modern websites and web apps

Video Link:

https://getbootstrap.com/docs/4.5/examples/

https://www.w3schools.com/bootstrap/bootstrap_buttons.asp

Course outcomes:	
CO1	Outline the basic concepts of information and web architecture.
CO2	Design solutions for programming questions using JavaScript
CO3	Study Hyper Text markup language and create websites using HTML, CSS Codes.
CO4	Setup a web server and host a website with back end support.
CO5	Incorporate the latest HTML features in the web pages designed by them with fallback options wherever required.
Text/Reference Books:	
1.	Jeffrey C.Jackson, "Web Technologies--A Computer Science Perspective", Pearson Education, 2006.
2.	Robert. W. Sebesta, "Programming the World Wide Web", Fourth Edition, Pearson Education
3.	Deitel, Deitel, Goldberg, "Internet & World Wide Web How To Program", Third Edition, Pearson Education, 2006.
4.	Marty Hall and Larry Brown,"Core Web Programming" Second Edition, Volume I and II, Pearson Education, 2001
5.	Bates, "Developing Web Applications", Wiley, 2006.