Semester: V		
SOFTWARE ENGINEERING AND PROJECT MANAGEMENT (Theory)		
Course Code:	**MVJ21SPM51**	**CIE Marks:50**
Credits:	**3**	**SEE Marks: 50**
Hours:		**SEE Duration: 3 Hrs**
Course Learning Objectives: The students will be able to		
1	Understand principles, concepts, methods, and techniques of the software engineering approach to producing quality software (particularly for large, complex systems).	
2	Impart skills in the design and implementation of efficient software systems across disciplines.	
3	Familiarize engineering practices and standards used in developing software products and components.	
4	Gather knowledge on various software testing, maintenance method4s.	

UNIT-I	
INTRODUCTION TO SOFTWARE ENGINEERING: The Evolving nature of software engineering, Changing nature of software engineering, Software engineering Layers, The Software Processes, Software Myths. **PROCESS MODELS:** A Generic Process Model, Waterfall Model, Incremental Process Models, Evolutionary Process Models, Spiral Model, the Unified Process, Personal and Team Process Models, the Capability Maturity Model Integration (CMMI). **Laboratory Sessions/ Experimental learning:** To write the SRS for the given real time application using report writing tools. **Applications:** In Software development process. 1. **Video link / Additional online information:** https://nptel.ac.in/courses/106105182/	**Hrs 8**
UNIT-II	
REQUIREMENTS ENGINEERING: Functional and Non-Functional Requirements, The Software requirements Document, Requirements Specification,	**Hrs 8**

requirements Engineering, Requirements Elicitation and Analysis, Requirement Validation, Requirement Management, System Modeling: Context Models, Interaction Models, Structural Models, Behavioral Model, Model-Driven Engineering. **DESIGN CONCEPTS:** The Design Process, Design Concepts, The Design Models, Architectural Design: Software Architecture, Architectural Genres, Architectural Styles. **Applications:** In Software development process. **Video link / Additional online information:** 1. https://www.coursera.org/lecture/client-needs-and-software-requirements/3-2-4-use-cases-bZNCr	
UNIT-III	
DESIGN AND IMPLEMENTATION: The Object Oriented Design with UML, Design Patterns, Implementation Issues, Open Source Development. User Interface Design: The Golden Rules, User Interface Analysis and Design, Interface Analysis, Interface Design Steps, Design Evaluation. **SOFTWARE TESTING STRATEGIES:** A Strategic approach to Software Testing, Strategic Issues, Test Strategies for Conventional Software, Validation Testing, System Testing, The Art of Debugging, White-Box Testing, Black Box Testing. **Laboratory Sessions/ Experimental learning:** Using Selenium IDE write a test suite containing minimum 4 test cases. **Applications:** In Software development process. • **Video link / Additional online information:** https://www.youtube.com/watch?v=T3q6QcCQZQg	**Hrs 8**
UNIT-IV	
PRODUCT METRICS: A Frame Work for Product Metrics, Metrics for the Requirements Model, Metrics for Design Model, Metrics for Source Code, Metrics for Testing. **PROCESS AND PROJECT METRICES:** Metrics in the Process and Project Domains, Software Measurements, Metrics for Software Quality, Risk Management: Risk verses Proactive Risk Strategies, Software Risks, Risk Identification, Risk	**Hrs 8**

Projection, Risk Refinements, Risk Mitigation Monitoring and Management (RMMM), The RMMM Plan. **Laboratory Sessions/ Experimental learning:** Create a project using MS projects for any real time scenario. **Applications:** In Software development process. • **Video link / Additional online information:** https://youtu.be/tIZ1dg4pxCE	
UNIT-V	
QUALITY MANAGEMENT: Quality Concepts, Software Quality, Software Quality Dilemma, Achieving Software Quality, Review Techniques, Reviews: A Formal spectrum, Informal Reviews, Formal Technical Reviews, **SOFTWARE QUALITY ASSURANCE:** Background Issues, Elements of Software Quality Assurance, Tasks, Goals and Metrics, Software Reliability, the ISO 9000 Quality Standards. **Laboratory Sessions/ Experimental learning:** Estimation of test coverage metrics using manual test metrics. **Applications:** In Software development process. 1. **Video link / Additional online information:** https://nptel.ac.in/courses/110105039/	**Hrs 8**

Course Outcomes: After completing the course, the students will be able to	
CO1	Understand various Process Models.
CO2	Investigate various requirements engineering and apply design concepts.
CO3	Identify numerous Software Testing Strategies.
CO4	Evaluate Process and Project Metrices.
CO5	Illustrate Quality Management and Software Quality Assurance Concepts

Text Books	
1.	Roger S. Pressman (2011), Software Engineering, A Practitioner's approach, 7 th edition, McGraw Hill International Edition, New Delhi
2.	Sommerville (2001), Software Engineering, 9 th edition, Pearson education, India

Reference Books:	
1.	K. K. Agarval, Yogesh Singh (2007), Software Engineering, 3rd edition, New Age International Publishers, India.
2.	Lames F. Peters, Witold Pedrycz(2000), Software Engineering an Engineering approach, John Wiely & Sons, New Delhi, India
3	Shely Cashman Rosenblatt (2006), Systems Analysis and Design, 6th edition, Thomson Publications, India

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.

Semester End Examination (SEE):

Total marks: 50+50=100

SEE for 50 marks is 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.

CO-PO/PSO Mapping														
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	2	2	-	-	1	2	2	2	-	2	-
CO2	2	2	2	2	2	1	-	1	2	2	2	1	2	2
CO3	2	2	2	2	2	1	-	1	2	2	2	-	3	-
CO4	1	2	2	2	2	1	-	1	2	2	2	1	2	2
CO5	1	2	2	1	2	1	2	1	2	2	2	2	1	-

High-3, Medium-2, Low-1

Semester: V

THEORY OF COMPUTATION (Theory)		
Course Code: MVJ21CS52		**CIE Marks:100**
Credits: L:T:P:S: 3:0:0:0		**SEE Marks: 100**
Hours: 40L		**SEE Duration: 3 Hrs**
Course Learning Objectives: The students will be able to		
1	To have a knowledge of regular languages and context free languages.	
2	To have an understanding of finite state and pushdown automata.	
3	To make a study of the programming capabilities of Turing machines.	

UNIT-I	
Finite Automata: Mathematical preliminaries and notations – Central concepts of automata theory – Finite automata -Deterministic Finite Automata - Nondeterministic Finite Automata – Equivalence of DFA and NFA –Finite Automata with Epsilon transitions - Application of FA **Video link / Additional online information (related to module if any):** https://nptel.ac.in/courses/106/105/106105196/	**8 Hrs**
UNIT-II	
Regular Expressions: Regular languages: Regular Expressions – Finite Automata and Regular Expressions –Applications of Regular Expressions - Regular Grammars. **Video link / Additional online information (related to module if any):** https://www.youtube.com/watch?v=OA8EY3HKZoc	**8 Hrs**
UNIT-III	
Regular Languages: Properties of regular languages: Pumping lemma for regular languages – Closure properties of regular languages –Equivalence and Minimization of Finite Automata. C **Video link / Additional online information (related to module if any):** https://www.youtube.com/watch?v=ganHwe4DU7A	**8 Hrs**
UNIT-IV	
Context Free Grammar: Context Free languages: Context Free Grammars – Parse Trees - Ambiguity in Grammars and languages– Applications of Context Free Grammars – Pushdown automata (PDA) – Languages of a PDA -Equivalence of PDA‘s and CFG‘s **Video link / Additional online information (related to module if any):** • https://www.youtube.com/watch?v=FjGrU7vczyg	**8 Hrs**

https://www.youtube.com/watch?v=b3OPl5wS4AQ	
UNIT-V	
Context Free Languages: Properties of Context Free Languages: Normal Forms (CNF, GNF) for Context Free Grammars - Pumping lemma for CFL's - Closure properties of CFL **Turing Machines:** Turing Machines- Programming Techniques for Turing Machines – Multitape Turing Machines. **Video link / Additional online information (related to module if any):** https://www.youtube.com/watch?v=IhyEGNn-7Uo	**8 Hrs**

Course Outcomes: After completing the course, the students will be able to	
CO1	Design Finite automata for different Problems
CO2	Understand about Regular Expressions
CO3	Apply pumping lemma to Regular languages and Context Free languages
CO4	Design Push down automata and write CFG for different problems
CO5	Analyze the properties of Context free languages and Turing Machine

Reference Books	
1.	J.E.Hopcroft, R.Motwani and J.D Ullman," Introduction to Automata Theory, Languages and Computations", 3rd Edition, Pearson Education, 2011
2.	J.Martin, "Introduction to Languages and the Theory of Computation", 3rd Edition, TMH, 2007.
3.	H.R.Lewis and C.H.Papadimitriou, "Elements of the theory of Computation", 2nd Edition, Pearson Education/PHI, 2003
4.	Micheal Sipser, –Theory and Computatio, 7th Edition, Thomson Course Technology, 2008

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.

Semester End Examination (SEE):

Total marks: 50+50=100

SEE for 50 marks is 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.

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

Semester: V		
DATABASE MANAGEMENT SYSTEMS AND LAB (Theory and Practice)		
Course Code:	**MVJ21CS53**	**CIE Marks:50+50**
Credits:	**4**	**SEE Marks: 50 +50**
Hours:		**SEE Duration: 03+03 Hours**
Course (Theory) Learning Objectives: The students will be able to		
1	Provide a strong foundation in database concepts, technology, and practice.	
2	Practice SQL programming through a variety of database problems.	
3	Demonstrate the use of concurrency and transactions in database.	
4	Design and build database applications for real world problems.	
Course (Practice) Learning Objectives: The students will be able to		
1	Foundation knowledge in database concepts, technology and practice to groom students into well-informed database application developers.	
2	Strong practice in SQL programming through a variety of database problems.	
3	Develop database applications using front-end tools and back-end DBMS.	

UNIT-I

Introduction to Databases: Introduction; An example; characteristics of the database approach; actors on the scene; workers behind the scene; advantages of using the DBMS approach; A brief history of database Applications; when Not to use a DBMS. **Overview of Database Languages and Architectures:** Data Models, Schemas, and Instances. Three schema architecture and data independence, database languages, and interfaces, The Database System environment. **Modelling using Entities and Relationships:** Entity types, Entity sets, attributes, roles, and structural constraints, Weak entity types, ER diagrams, examples. **Laboratory Sessions/ Experimental learning:** Draw ER diagram for database applications (logical database design). **Applications:** Library Management system, Banking, Universities and colleges, credit card transactions, social media sites, Telecommunications, Finance, Military, online shopping, Human Resource Management, Manufacturing, Airline Reservation systems. **Video link / Additional online information (related to module if any):** • https://nptel.ac.in/courses/106106093/ • https://nptel.ac.in/courses/106105175/ • https://www.youtube.com/watch?v=WSNqcYqByFk	**Hrs 8**
UNIT-II	
Relational Model: Relational Model Concepts, Relational Model Constraints and relational database schemas, Update operations, dealing with constraint violations. **Relational Algebra:** Unary and Binary relational operations, additional relational operations (aggregate, grouping, etc.) Examples of Queries in relational algebra. **Mapping Conceptual Design into a Logical Design:** Relational Database Design using ER-to-Relational mapping. **SQL:** SQL data definition and data types, specifying constraints in SQL, retrieval queries in SQL, INSERT, DELETE, and UPDATE statements in SQL.	**Hrs 8**

Laboratory Sessions/ Experimental learning: programs to perform set operations, arithmetic operations, joins, selection, projection, create tables for real world db applications and insert values to it. **Applications:** RDBMS, enterprise level software solution(except light weight web applications) **Video link / Additional online information (related to module if any):** • https://nptel.ac.in/courses/106106093/ https://nptel.ac.in/courses/106105175/	
UNIT-III	
SQL: Advances Queries: More complex SQL retrieval queries, Specifying constraints as assertions and action triggers, Views in SQL, Schema change statements in SQL. **Database Application Development:** Accessing databases from applications, An introduction to JDBC, JDBC classes and interfaces, SQLJ, Stored procedures, Embedded SQL**.** **Laboratory Sessions/ Experimental learning:** Mini-projects to develop connections between front end and backend(database) using JDBC. Write SQL queries for the given schema. **Applications:** Java Programming, In Server to reduce network traffic and to provide security(Stored procedure) **Video link / Additional online information (related to module if any):** • https://www.youtube.com/watch?v=64szTfLNu3o https://www.digimat.in/nptel/courses/video/106105175/L11.html	**Hrs 8**
UNIT-IV	
Normalization: Database Design Theory – Introduction to Normalization using Functional and Multivalued Dependencies: Informal design guidelines for relation schema, Functional Dependencies, Normal Forms based on Primary Keys, Second and Third Normal Forms, Boyce-Codd Normal Form, Multivalued Dependency and Fourth Normal Form, Join Dependencies and Fifth Normal Form. Dependency theory - functional dependencies, Armstrong's axioms for FD's, closure of a set of FD's, minimal covers.	**Hrs 8**

Laboratory Sessions/ Experimental learning: Draw schema diagram which satisfy all forms of normalization for all db real world application **Applications:** to optimize database design **Video link / Additional online information (related to module if any):** • https://nptel.ac.in/courses/106106093/ • https://nptel.ac.in/courses/106105175/ https://www.youtube.com/watch?v=YD8dhOmuVnY	
UNIT-V	
Transaction Processing: Introduction to Transaction Processing, Transaction and System concepts, Desirable properties of Transactions, Characterizing schedules based on recoverability, Characterizing schedules based on Serializability, Transaction support in SQL. **Concurrency Control in Databases:** Two-phase locking techniques for Concurrency control, Concurrency control based on Timestamp ordering. **File Organizations and Indexes:** Introduction, Hashing techniques, Indexing, Structures for Files. **Laboratory Sessions/ Experimental learning:** Develop banking and other financial applications. **Applications:** systems that manage sales order entry, airline reservations, payroll, employee records, manufacturing, and shipping. Operating system(deadlock) **Video link / Additional online information (related to module if any):** • https://nptel.ac.in/courses/106106093/ • https://nptel.ac.in/courses/106105175/ https://www.youtube.com/watch?v=5ammL5KU4mo	**Hrs 8**
LABORATORY EXPERIMENTS	

	SL. NO.	EXPERIMENT	HRS	
	1	**The following relations keep track of airline flight information**: **FLIGHTS** (no: integer, from: string, to: string, distance: integer, departs: time, arrives: time, price: real) **AIRCRAFT** (aid: integer, aname: string, cruisingrange: integer)	3	

		CERTIFIED (eid: integer, aid: integer) **EMPLOYEES** (eid: integer, ename: string, salary: integer) Note that the Employees relation describes pilots and other kinds of employees as well; every pilot is certified for some aircraft, and only pilots are certified to fly. Write each of the following queries in SQL. i. Find the names of aircraft such that all pilots certified to operate them have salaries more than Rs.80, 000. ii. For each pilot who is certified for more than three aircrafts, find the eid and the maximum cruisingrange of the aircraft for which she or he is certified. iii. Find the names of pilots whose salary is less than the price of the cheapest route from Bengaluru to Frankfurt. iv. For all aircraft with cruising range over 1000 Kms, .find the name of the aircraft and the average salary of all pilots certified for this aircraft. v. Find the names of pilots certified for some Boeing aircraft. vi. Find the aids of all aircraft that can be used on routes from Bengaluru to New Delhi.		
	2	**Consider the Schema for a banking enterprise:** **BRANCH**(branch-name:string,branch-city:string,assets:real) **ACCOUNT**(accno:int, branch-name:string, balance:real) **DEPOSITOR**(customer-name:string, accno:int) **CUSTOMER**(customer-name:string, customer-Street:string, customer-city:string) **LOAN**(loan-number:int, branch-name:string, amount:real) **BORROWER**(customer-name:string, loan-number:int) i. Create the above tables by properly specifying the primary keys and the foreign keys ii. Enter at least five tuples for each relation iii. Find all the customers who have at least two accounts at the Main branch.	**3**	

		iv. Find all the customers who have an account at all the branches located in a specific city. Demonstrate how you delete all account tuples at every branch located in a specific city.		
	3	**Consider the schema for College Database:** **STUDENT**(USN,SName, Address, Phone, Gender) **SEMSEC**(SSID, Sem, Sec) CLASS(USN, SSID) **SUBJECT**(Subcode, Title, Sem, Credits) IAMARKS(USN, Subcode, SSID, Test1, Test2, Test3, FinalIA) Write SQL queries to 1. List all the student details studying in fourth semester 'C' section. 2. Compute the total number of male and female students in each semester and in each section. 3. Create a view of Test1 marks of student USN '1MJ15CS101' in all subjects. 4. Calculate the FinalIA (average of best two test marks) and update the corresponding table for all students. 5. Categorize students based on the following criterion: If FinalIA = 17 to 20 then CAT = 'Outstanding' If FinalIA = 12 to 16 then CAT = 'Average' If FinalIA< 12 then CAT = 'Weak' Give these details only for 8th semester A, B, and C section students.	**3**	

	4	**Consider the schema for Company Database:** **EMPLOYEE**(SSN, Name, Address, Sex, Salary, SuperSSN, DNo) **DEPARTMENT**(DNo, DName, MgrSSN, MgrStartDate) **DLOCATION**(DNo,DLoc) **PROJECT**(PNo, PName, PLocation, DNo) **WORKS_ON**(SSN, PNo, Hours) Write SQL queries to 1. Make a list of all project numbers for projects that involve an employee whose last name is 'Scott', either as a worker or as a manager of the department that controls the project. 2. Show the resulting salaries if every employee working on the 'IoT' project is given a 10 percent raise. 3. Find the sum of the salaries of all employees of the 'Accounts' department, as well as the maximum salary, the minimum salary, and the average salary in this department 4. Retrieve the name of each employee who works on all the projects controlled by department number 5 (use NOT EXISTS operator). 5. For each department that has more than five employees, retrieve the department number and the number of its employees who are making more than Rs. 6,00,000.	**3**	
		STUDY EXPERIMENT For any problem selected, write the ER Diagram, apply ER-mapping rules, normalize the relations, and follow the application development process. Make sure that the application should have five or more tables, at least one trigger and one stored procedure, using suitable front-end tool. **Indicative areas include; health care, education, industry, transport, supply chain etc.**	**2**	

Course (Theory) Outcomes: After completing the course, the students will be able to	
CO1	Identify, analyse and define database objects, enforce integrity constraints on a database using RDBMS.
CO2	Use Structured Query Language (SQL) for database manipulation.
CO3	Design and build simple database systems.

CO4	Apply the concepts of Normalization and design database which possess no anomalies.
CO5	Develop application to interact with databases.
Course (Practice) Outcomes: After completing the course, the students will be able to	
CO1	Demonstrate the creation of relational tables using DDL/DML
CO2	Design and demonstrate the execution of simple queries retrieve information
CO3	Demonstrate the execution of complex queries
CO4	Design and implement a front end using modern tools
CO5	Implement, analyze and evaluate the project developed for an application.

Text Books	
1	Fundamentals of Database Systems, Ramez Elmasri and Shamkant B. Navathe, 7th Edition, 2017, Pearson
2	Database management systems, Ramakrishnan, and Gehrke, 3rd Edition, 2014, McGraw Hill
Reference Books:	
1	Silberschatz Korth and Sudharshan, Database System Concepts, 6th Edition, McGraw Hill, 2013.
2	Database Principles Fundamentals of Design, Implementation and Management, Cengage Learning 2012.
3	Raj Kamal, Embedded System, Tata McGraw-Hill Publishers, 2nd Edition, 2008.

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):

CO-PO/PSO Mapping (Practical)														
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	1	3	1	2	1	-	1	-	-	2	2	-
CO2	3	3	2	3	2	2	-	-	1	-	-	2	2	1
CO3	3	3	2	3	2	1	-	-	1	-	-	2	1	-
CO4	3	3	2	2	2	1	-	-	-	-	-	2	1	3
CO5	3	3	2	2	1	1	1	-	-	-	-	2	1	3

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.

Laboratory- 50 Marks

Experiment Conduction with proper results is evaluated for 40 marks and Viva is for 10 marks. Total SEE for laboratory is 50 marks.

CO-PO/PSO Mapping (Theory)														
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	3	3	2	3	-	-	-	1	-	-	2	2	-
CO2	3	3	3	2	2	-	-	-	1	-	-	2	1	-
CO3	3	3	3	2	2	-	-	-	1	-	-	2	2	2
CO4	2	3	3	2	2	-	-	-	1	-	-	2	2	3
CO5	2	3	3	3	3	-	-	-	2	-	-	2	-	1

High-3, Medium-2, Low-1

Semester: V		
WEB PROGRAMMING AND LAB (Theory and Practice)		
Course Code:	**MVJ21CS54**	**CIE Marks:50+50**
Credits:	**4**	**SEE Marks: 50 +50**
Hours:		**SEE Duration: 03+03 Hours**
Course (Theory) Learning Objectives: The students will be able to		
1	Understand different kind of Internet Technologies.	
2	Learn java-specific web services architecture.	
3	Understand the SQL and JDBC.	
4	Learn the AJAX and JSON.	
Course (Practice) Learning Objectives: The students will be able to get practical experience in design, develop, implement, analyze and evaluation of		

1	Web pages and Style sheet creation.
2	Client side programming and Java script
3	PHP and Database creation.

UNIT-I	
Website Basics, HTML5, CSS 3, Web 2.0: Web Essentials: Clients, Servers and Communication, The Internet, Basic Internet protocols, World wide web, HTTP Request Message , HTTP Response Message, Web Clients, Web Servers, HTML5 : Tables, Lists, Image, HTML5 control elements , Semantic elements , Drag and Drop, Audio, Video controls, CSS3: Inline, embedded and external style sheets, Rule cascading, Inheritance, Backgrounds, Border Images, Colours, Shadows, Text, Transformations. **Laboratory Sessions/ Experimental learning:** Create a simple website with following effects on Text and images 1. Add Background image/s 2. Colors effect. 3. Shadows and transformation. **Real Time Applications:** Animation website **Video link / Additional online information (related to module if any):** ● https://youtu.be/FPtLsZ62pdA ● https://nptel.ac.in/courses/106/106/106106222/ ● https://youtu.be/vCo6p7zrbt4 https://nptel.ac.in/courses/106/106/106106223	**Hrs 8**
UNIT-II	
Client side Programming: An Introduction to java Script, JavaScript DOM Model, Date and Object, Regular Expression, Exception Handling, Validation, Built-in Objects, Event Handling, DHTML with JavaScript, JSON introduction, Syntax, Function Files, Http Request, SQL. **Laboratory Sessions/ Experimental learning:** • SQL and DOM model creation in website as created in module 1. **Real Time Applications:** Students results / Application form in online **Video link / Additional online information (related to module if any):**	**Hrs 8**

• https://nptel.ac.in/courses/106/105/106105084/ • https://youtu.be/uUhOEj4z8Fo (NPTEL) • https://youtu.be/3uxp7mqUIfk (NPTEL) https://youtu.be/tfPfwDrfSP8 (NPTEL)	
UNIT-III	
Server Side Programming: Java Servlet Architecture, Servlet Life Cycle, Form GET and POST actions, Session handling, Installing and Configuring Apache Tomcat Web Server, Database Connectivity: JDBC perspectives, JDBC Program Example, JSP: Understanding Java server page, JSP Standard Tag Library (JSTL), Creating HTML form using JSP Code. **Laboratory Sessions/ Experimental learning:** Write a servlet program to display a message "Welcome to Java World" and deploy the process using GET and POST actions. **Real Time Applications:** Online ordering using any E-Commerce site. Video link / Additional online information (related to module if any): • https://nptel.ac.in/courses/106/105/106105224/ • https://youtu.be/J6qfWtQ54Ig • https://nptel.ac.in/courses/106/105/106105084/	**Hrs 8**
UNIT-IV	
PHP and XML: Introduction to PHP, PHP using PHP, Variables, Program Control, Built-in Functions, Form Validation, Basic command with PHP examples, Connection to server, creating Database, Selecting Database, Listing Database, listing table names Creating a table, Inserting data, deleting data and tables, altering tables. XML: Document type definition, XML Schema DOM and presenting XML, XML Parser and Validations, XSL and XSLT Transformation. **Laboratory Sessions/ Experimental learning:** Design, Develop and Implement a student/Employee table and perform the following operations using PHP. 1. Insert a row 2. Delete a row 3. Alter the table. **Video link:**	**Hrs 8**

• https://youtu.be/XlryaovT_3k • http://www.digimat.in/nptel/courses/video/106106127/L49.html http://www.nptelvideos.in/2012/11/internet-technologies.html	

UNIT-V

AJAX and Web Services: AJAX: Ajax client server architecture, Xml HTTP request object, Call back methods. Advanced JavaScript and jQuery, JavaScript Pseudo-Classes, jQuery Foundations, Web Services: Introduction, Java web services Basics, Creating, Publishing, Testing and Describing a web services, Database driven web service from an application, SOAP. **Laboratory Sessions/ Experimental learning:** • jQuery process and AJAX services. **Video link/Lecturer/Tutorials:** • https://www.w3schools.com/xml/ajax_intro.asp (Practical examples) • https://youtu.be/jMdHE4qInU4 https://youtu.be/FBDHe5T7quI	**Hrs 8**

LABORATORY EXPERIMENTS

SL. NO.	EXPERIMENT	Hrs
1	Create a web page with the following. a. Cascading style sheets. b. Embedded style sheets. c. Inline style sheets. Use our college information (Department of CSE) for the web pages.	3
2	Design HTML form for keeping student record and validate it using Java script.	3
3	Write an HTML program to design an entry form of student details and send it to store at database server like SQL, Oracle or MS Access.	3
4	Write a JavaScript code that displays text “TEXT-GROWING” with increasing font size in the interval of 100ms in RED COLOR, when the font size reaches 50pt it displays “TEXT-SHRINKING” in BLUE color. Then the font size decreases to 5pt.	3

	5	Assume four users user1, user2, user3 and user4 having the passwords pv pwd2, pwd3 and pwd4 respectively. Write a servlet for doing the followin 1.Create a Cookie and add these four user id's and passwords to this Cool 2. Read the user id and passwords entered in the Login form and authenticate with the values available in the cookies.	**3**	
	6	Write a JSP which insert the details of the 3 or 4 users who register with the web site by using registration form. Authenticate the user when he submits the login form using the user name and password from the database.	**3**	
	7	Validate the form using PHP regular expression. PHP stores a form data in to database	**3**	
	8	Write a PHP program to display a digital clock which displays the current time of the server.	**3**	
	9	Creating simple application to access data base using JDBC Formatting HTML with CSS.	**3**	
	10	Write a Program for manipulating Databases and SQL with real time application	**3**	

Course (Theory) Outcomes: After completing the course, the students will be able to	
CO1	Learn web essentials, HTML5 and CSS3.
CO2	Understand about Client-side programming, DHTML and JSON
CO3	Comprehend server-side programming and JSP.
CO4	Learn PHP, functions, and XML.
CO5	Analyze the concepts of AJAX and web services.
Course (Practice) Outcomes: After completing the course, the students will be able to	
CO1	Construct Web pages using HTML/XML and style sheets.
CO2	Build dynamic web pages with validation using Java Script objects and by appl different event handling mechanisms.
CO3	Develop dynamic web pages using server side scripting.
CO4	Use PHP programming to develop web applications

CO5	Use JDBC and SQL to develop web applications

Text Books	
1	Jean-Paul Tremblay & Paul G. Sor Deitel and Deitel and Nieto,Internet and World Wide Web,How to Program, Prentice Hall, 5th Edition, 2011.
2	Randy Connolly, Ricardo Hoar, "Fundamentals of Web Development",1stEdition, Pearson Education India. (ISBN:978-9332575271)
3	Robert W. Sebesta, Programming the World-Wide Web, 8thEdition, University of Colorado, Colorado Springs. ©2015 |Pearson
Reference Books:	
1	Stephen Wynkoop and John Burke –Running a Perfect Website‖, QUE, 2nd Edition,1999.
2	Chris Bates, Web Programming – Building Intranet Applications, 3rd Edition, Wiley publications, 2009.
3	Jeffrey C and Jackson, –Web Technologies A Computer Science Perspective‖, Pearson Education, 2011.
4	UttamK.Roy, –Web Technologies‖, Oxford University Press, 2011
5	Gopalan N.P. and Akilandeswari J., –Web Technology, Prentice Hall of India, 2011.

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.

Laboratory- 50 Marks

Experiment Conduction with proper results is evaluated for 40 marks and Viva is for 10 marks. Total SEE for laboratory is 50 marks.

CO-PO/PSO Mapping (Theory)														
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	-	1	-	-	-	-	-	-	2	1	-
CO2	3	3	3	-	1	-	-	-	1	-	1	2	3	-
CO3	2	2	2	1	3	-	-	-	-	-	1	3	-	-
CO4	3	2	3	-	2	-	-	-	-	2	3	2	1	-
CO5	3	2	3	-	3	-	-	-	-	2	3	2	3	2

CO-PO/PSO Mapping (Practical)														
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	-	3	3	-	-	3	-	3	2	1	-
CO2	3	3	2	-	3	3	-	-	3	-	3	2	1	2
CO3	3	3	2	-	3	3	-	-	3	-	3	2	1	2
CO4	3	3	2	-	3	3	-	-	3	-	3	2	1	3
CO5	3	3	2	-	3	3	-	-	3	-	3	2	2	3

High-3, Medium-2, Low-1

Semester: V		
MOBILE COMPUTING		
Course Code:	**MVJ21CS551**	**CIE Marks:50**
Credits:	**3**	**SEE Marks: 50**
Hours:		**SEE Duration: 3 Hrs**
Course Learning Objectives: The students will be able to		
1	Understand the concept of mobile computing terminology and basics	
2	Understand the wireless protocols.	
3	Realize various routing mechanisms.	

UNIT-I	
Introduction: Mobile Communications, Mobile Computing – Paradigm, Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices. **Global System for Mobile Communication(GSM):** Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, New Data Services, GPRS Architecture, GPRS Network Nodes. **Video link / Additional online information (related to module if any):** • https://www.youtube.com/watch?v=bur9hq_abog (NPTEL VIDEO)	**Hrs 8**
UNIT-II	
Medium Access Control (MAC) : Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), Wireless LAN/(IEEE 802.11) architecture, key IEEE802.11 a/b/c/d/e/g/i/n/T/ac/ standards.	**Hrs 8**

Wireless Application Protocol (WAP): The Mobile Internet standard, WAP Gateway and Protocols, wireless mark up Languages (WML). Wireless Local Loop(WLL): Introduction to WLL Architecture, wireless Local Loop Technologies. **Video link / Additional online information (related to module if any):** • https://www.youtube.com/watch?v=sx0UPzztC5o (NPTEL VIDEO)	
UNIT-III	
Mobile Network Layer : IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization using Soft computing techniques – ANT Bee colony, Support Vector Machine, Particle Swarm Optimization and Genetic Algorithm. **Video link / Additional online information (related to module if any):** • https://www.youtube.com/watch?v=0QLRULNfbFg	**Hrs 8**
UNIT-IV	
Mobile Transport Layer : Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP. **Third Generation (3G) Mobile Services**: Introduction to International Mobile Telecommunications 2000 (IMT 2000) vision, Wideband Code Division Multiple Access (W- CDMA) and CDMA 2000, Quality of services in 3G. **Video link / Additional online information (related to module if any):** • https://www.youtube.com/watch?v=KCcdF4IVrQk • https://www.youtube.com/watch?v=ymnQ5rpcYA&list=PLbMVogVj5nJSi8FUsvglRxLtN1TN9y4nx	**Hrs 8**
UNIT-V	
Mobile Ad hoc Networks (MANETs) : Introduction, Applications & Challenges of a MANET, Routing, Classification of Routing Algorithms, Algorithms such as DSR, AODV, DSDV, etc. , Mobile Agents, Service Discovery ,case study using NS2 –traffic analysis using CBR and VBR. **Wireless Enterprise Networks:** Introduction to Virtual Networks, Blue tooth technology, Blue tooth Protocols. **Video link:** • https://nptel.ac.in/courses/106/105/106105160/	**Hrs 8**

• https://www.digimat.in/nptel/courses/video/106105160/L01.html	

Text Books:	
1	Jochen Schiller, –Mobile Communications‖, PHI, Second Edition, 2009.
2	Raj Kamal, "Mobile Computing", Oxford University Press, 2007, ISBN: 0195686772

Course Outcomes: After completing the course, the students will be able to	
CO1	Able to interpret GSM architecture and its services.
CO2	Analyze the various wireless application protocols and its different concepts for various mobile applications.
CO3	Learn the representation of mobile network layer protocols and its functionalities.
CO4	Understand, analyze & develop any existing or new models of mobile environments for 3G networks.
CO5	Understand, evaluate and create the platforms, protocols and related concepts along with along with mobile in mobile environment.

Reference Books:	
1	Dharma Prakash Agarval, Qing and An Zeng, "Introduction to Wireless and Mobile systems",Thomson Asia Pvt Ltd, 2005.
2	Martin Sauter, "From GSM to LTE-Advanced: An Introduction to Mobile Networks and Mobile Broadband," Second Edition, Wiley.
3	William.C.Y.Lee,–Mobile Cellular Telecommunications-Analog and Digital Systems‖, Second Edition,TataMcGraw Hill Edition ,2006.

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.

Semester End Examination (SEE):

Total marks: 50+50=100

SEE for 50 marks is 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.

CO-PO/PSO Mapping														
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	2	2	-	1	-	-	-	-	1	-	-
CO2	2	3	2	1	3	-	-	-	-	1	-	1	2	-
CO3	2	2	3	1	2	-	-	-	-	-	1	1	1	-
CO4	3	2	2	2	1	-	1	-	-	-	1	1	3	2
CO5	2	2	2	2	-	-	-	-	-	-	-	2	3	2

High-3, Medium-2, Low-1

Semester: V		
VISUALIZATION TECHNIQUES		
Course Code:	**MVJ21CS552**	**CIE Marks:50**
Credits:	**3**	**SEE Marks: 50**
Hours:		**SEE Duration: 3 Hrs**
Course Learning Objectives: The students will be able to		
1	learn the value of visualization, specific techniques in information visualization and scientific visualization, and how understand how to best leverage visualization methods	

UNIT-I	
Introduction –Visualization Stages –Computational Support –Issues –Different Types of Tasks –Data representation –Limitation: Display Space, Rendering Time, Navigation Link.	**Hrs 8**
UNIT-II	
Human Factors –Foundation for a Science of Data Visualization –Environment-Optics – Optimal Display –Overview about Lightness, Brightness, Contrast, Constancy, Color –Visual Attention that Pops Out –Types of Data –Data Complexity –The Encoding of Values – Encoding of Relation –Relation and Connection –Alternative Canvass.	**Hrs 8**
UNIT-III	
Human Vision –Space Limitation –Time Limitations –Design –Exploration of Complex Information Space –Figure Caption in Visual Interface –Visual Objects and Data Objects – Space Perception and Data in Space –Images, Narrative and Gestures for Explanation	**Hrs 8**
UNIT-IV	
Norman‟s Action Cycle –Interacting with Visualization –Interaction for Information Visualization –Interaction for Navigation –Interaction with Models –Interacting with Visualization –Interactive 3D Illustrations with Images and Text –Personal View –	**Hrs 8**

Attitude – user perspective –Convergence –Sketching –Evaluation.	
UNIT-V	
Design –Virtual Reality: Interactive Medical Application –Tactile Maps for visually challenged People –Animation Design for Simulation –Integrating Spatial and Nonspatial Data –Innovating the Interaction –Small Interactive Calendars – Selecting One from Many– Web Browsing Through a Key Hole –Communication Analysis –Archival Galaxies	**Hrs 8**

Course Outcomes: After completing the course, the students will be able to	
CO1	Understand the fundamentals of data visualization
CO2	Acquire knowledge about the issues in data representation
CO3	Visualize the complex engineering design.
CO4	Design real time interactive information visualization system
CO5	Apply the visualization techniques in practical applications

Text/Reference Books:	
1	Robert Spence, “Information Visualization:An Introduction”, Third Edition, Pearson Education, 2014.
2	Colin Ware, “Information Visualization Perception for Design”, ThirdEdition, Morgan Kaufmann, 2012.
3	Robert Spence, “Information Visualization Design for Interaction”, Second Edition, Pearson Education, 2006
4	Benjamin B. Bederson, Ben shneiderman, “The Craft of Information Visualization”, Morgan Kaufmann, 2003.
5	Thomas Strothotte, “Computational Visualization: Graphics, Abstraction and Interactivity”, Springer, 1998.
6	Matthew O.Ward, George Grinstein, Daniel Keim, “Interactive Data Visualization: Foundation, Techniques and Applications”, Second Edition, A.K.Peters/CRC Press,2015.
7	JoergOsarek, “Virtual Reality Analytics”, Gordon‟s Arcade, 2016.

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.

Semester End Examination (SEE):

Total marks: 50+50=100

SEE for 50 marks is 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.

CO-PO/PSO Mapping														
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	-	-	1	-	-	-	-	-	-	2	2	-
CO2	3	3	3	2	-	-	-	-	1	-	1	2	2	2
CO3	2	2	2	1	3	-	-	-	-	-	1	3	2	2
CO4	3	2	3	2	1	-	-	-	-	2	3	2	2	3
CO5	3	2	3	1	-	-	-	-	-	2	3	2	2	-

High-3, Medium-2, Low-1

Semester: V		
ETHICAL HACKING		
Course Code:	**MVJ21CS553**	**CIE Marks:50**
Credits:	**3**	**SEE Marks: 50**
Hours:		**SEE Duration: 3 Hrs**
Course Learning Objectives: The students will be able to		
1	Understand numerous methods of real-world information intelligence	
2	Learn about vulnerability scanners	
3	Understand techniques used to sniff traffic across a network	
4	Familiarize with the methodologies that can be used to hack into a target.	
5	Appreciate the wide variety of attacks that can be performed against a wireless network	

UNIT-I	
INTRODUCTION TO HACKING : Terminologies, Categories of Penetration Test, Writing Reports, Structure of a Penetration Testing Report, Vulnerability Assessment Summary, Risk Assessment, Methodology, Linux Basics: File Structure, Cron Job, Users, Common Applications , BackTrack, Services. **Applications:** Network packet analysis, Password guessing and cracking **Video link / Additional online information (related to module if any):** • https://www.tutorialspoint.com/ethical_hacking/ethical_hacking_process.htm • https://www.tutorialspoint.com/ethical_hacking/ethical_hacking_hacker_types.htm	**Hrs 8**
UNIT-II	
INFORMATION GATHERING, TARGETENUMERATION AND PORT SCANNING TECHNIQUES Active, Passive and Sources of information gathering, Copying Websites Locally, NeoTrace, Cheops-ng, Intercepting a Response, WhatWeb, Netcraft, Basic Parameters, Xcode Exploit Scanner, Interacting with DNS Servers, Fierce, Zone	**Hrs 8**

Transfer with Host Command and Automation, DNS Cache Snooping- Attack Scenario, Automating Attacks, SNMP - Problem, Sniffing Passwords, Solar Winds Toolset, sweep, Brute Force and Dictionary- Tools , Attack, Enumeration, Intelligence Gathering Using Shodan, Target enumeration and Port Scanning Techniques. Applications: Session hijacking, Session spoofing Video link / Additional online information (related to module if any): •https://www.tutorialspoint.com/ethical_hacking/ethical_hacking_enumeration.htm •https://www.tutorialspoint.com/ethical_hacking/ethical_hacking_sniffing.htm	
UNIT-III	
VULNERABILITY ASSESSMENT & NETWORKSNIFFING : Introduction to Vulnerability Assessment - Pros and Cons, NMap, Updation of database, Testing SCADA Environments with Nmap, Nessus, Sniffing: Types, Hubs versus Switches, Modes, MITM Attacks, ARP Protocol Basics- working, Attacks, DoS Attacks, Dsniff tool, Using ARP Spoof to Perform MITM Attacks, Sniffing the Traffic with Dsniff, Sniffing Pictures with Drifnet, Urlsnarf and Webspy, Sniffing with Wireshark, Ettercap- ARP Poisoning, Hijacking Session with MITM Attack, ARP Poisoning with Cain and Abel, Sniffing Session Cookies with Wireshark, Hijacking the Session, SSL Strip: Stripping HTTPS Traffic, Requirements, Automating Man in the Middle Attacks, DNS Spoofing, DHCP Spoofing Applications: Network traffic sniffing, Denial of Service attacks Video link / Additional online information (related to module if any): •https://www.tutorialspoint.com/ethical_hacking/ethical_hacking_sniffing.htm •https://www.tutorialspoint.com/ethical_hacking/ethical_hacking_tcp_ip_hijacking.htm	**Hrs 8**
UNIT-IV	
Understanding Network Protocols: Attacking Network Remote Services, Common Target Protocols, tools for cracking network remote services, Attacking SMTP, Attacking SQL Servers, Client Side Exploitation Methods: E-Mails Leading to Malicious Attachments & Malicious Links, Compromising Client Side Update, Malware Loaded on USB Sticks	**Hrs 8**

Post exploitation: Acquiring Situation Awareness, Privilege Escalation, Maintaining Access, Data Mining, Identifying and Exploiting Further Targets, Windows Exploit Development Basics. **Applications:** Exploiting buffer overflow vulnerabilities **Video link / Additional online information (related to module if any):** • https://www.tutorialspoint.com/ethical_hacking/ethical_hacking_sql_injection.htm • https://www.tutorialspoint.com/ethical_hacking/ethical_hacking_exploitation.htm	
UNIT-V	
WIRELESS & WEB-HACKING **Wireless Hacking :** Requirements , Aircracking , Hidden SSIDs , Monitor Mode , Monitoring Tool- Beacon Frames on Wireshark ,Airodump-ng , Wireless Adapter in Monitor Mode , Determining the Target , Cracking a WPA/WPA2 Wireless Network Using Aircrack-ng , Capturing Packets and Four-Way Handshake. **Web Hacking :** Attacking the Authentication , Brute Force and Dictionary Attacks , Types of Authentication , Crawling Restricted Links , Testing for the Vulnerability , Authentication Bypass with Insecure Cookie Handling , SQL injection, XSS – DOM based,BeEF,CSRF, Bypassing CSRF and BeEF with XSS, Vulnerability in FCKeditor, efront. **Applications:** Cross Site Scripting, Firewall **Video link / Additional online information (related to module if any):** • https://www.tutorialspoint.com/ethical_hacking/ethical_hacking_ddos_attacks.htm • https://www.tutorialspoint.com/ethical_hacking/ethical_hacking_wireless.htm	**Hrs 8**

Course Outcomes: After completing the course, the students will be able to	
CO1	Understand the core concepts related to malware, hardware and software vulnerabilities and their causes
CO2	Understand ethics behind hacking and vulnerability disclosure

CO3	Appreciate the Cyber Laws and impact of hacking Exploit the vulnerabilities related to computer system and networks using state of the art tools and technologies
CO4	Learn & understand different network protocols and attack strategies
CO5	Understanding the usefulness of wireless & web hacking

Text Books	
1	Rafay Baloch ,–Ethical Hacking and Penetration Testing Guide‖, CRC Press, 2015.
2	Patrick Engebretson, –The Basics of Hacking and Penetration Testing : Ethical Hacking and Penetration Testing Made Easy‖, Syngress Media, Second Revised Edition, 2013.

Reference Books:	
1	Michael T. Simpson, Kent Backman, James E. Corley, –Hands On Ethical Hacking

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.

Semester End Examination (SEE):

Total marks: 50+50=100

SEE for 50 marks is 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.

CO-PO/PSO Mapping														
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	1	-	-	-	-	1	-	-	-	3	2	-

CO2	3	3	1	-	-	-	-	2	-	1	-	3	2	-
CO3	3	3	1	2	-	-	-	-	-	1	-	3	-	2
CO4	3	3	3	3	-	3	2	2	2	2	-	3	2	-
CO5	3	3	3	3	-	3	2	2	3	2	-	3	2	-

High-3, Medium-2, Low-1

Semester: V		
COMPILER DESIGN		
Course Code:	**MVJ21CS554**	**CIE Marks:50**
Credits:	**3**	**SEE Marks: 50**
Hours:		**SEE Duration: 3 Hrs**
Course Learning Objectives: The students will be able to		
1	Learn the various parsing techniques and different levels of translation.	
2	Learn how to obtain specific object code from source language.	
3	Learn how to optimize the code and schedule for optimal performance.	

UNIT-I	
FRONT END OF COMPILERS: The Structure of Compiler – Lexical Analysis: Role of Lexical Analyzer, Specification and Recognition of Tokens, Syntax Analysis: Top Down Parsing, Bottom up Parsing, LR Parsers: SLR, CLR, and LALR. **Video Links :** •https://www.youtube.com/watch?v=yxnbvS2t_QA	**Hrs 8**
UNIT-II	
INTERMEDIATE CODE GENERATION: Syntax Directed Definitions, Evaluation Orders for Syntax Directed Definitions, Syntax Directed Translation Schemes, Intermediate Languages: Syntax Tree, Three Address Code, Postfix Code, Declarations, Translation of Expressions, Type Checking, Back Patching. • **Video Links:** https://www.youtube.com/watch?v=EpAzj7zXrbk	**Hrs 8**
UNIT-III	
RUNTIME AND OBJECT CODE GENERATION: Storage Organization, Stack Allocation Space, Access to Non-local Data on the Stack, Heap Management - Issues in Code Generation - Design of Code Generator - Register Allocation and	**Hrs 8**

Assignment – Instruction Selection by Tree Rewriting – Optimal Code Generation for Expressions – Dynamic Programming Code Generation. • **Video Links:** https://www.youtube.com/watch?v=lRvaRhPsqOo	
UNIT-IV	
CODE OPTIMIZATION: Basic Blocks and Flow Graphs – Optimization of Basic Blocks – Principal Sources of Optimizations – Data Flow Analysis – Constant Propagation – Partial Redundancy Elimination – Peephole Optimizations. • **Video Links**: https://nptel.ac.in/courses/106/108/106108113/	**Hrs 8**
UNIT-V	
SCHEDULING AND OPTIMIZING FOR PARALLELISM: Code Scheduling Constraints – Basic Block Scheduling – Global Code Scheduling - Basic Concepts in Parallelization – Parallelizing Matrix Multiplication – Iteration Spaces – Affine Array Indexes. **Video Links**: • https://www.youtube.com/watch?v=-yMWgtTeQgY	**Hrs 8**

Course Outcomes: After completing the course, the students will be able to	
CO1	Design compiler phases from language specification.
CO2	Design code generators for the specified machine.
CO3	Analyze Object Code Generation techniques.
CO4	Apply the various optimization techniques.
CO5	Understand the Optimizing for Parallelism

Text Books	
1	Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, ―Compilers: Principles, Techniques and Tools‖, Second Edition, Pearson Education, 2009.
2	Randy Allen, Ken Kennedy, ―Optimizing Compilers for Modern Architectures: A Dependence based Approach‖, Morgan Kaufmann Publishers, 2002.

Reference Books:	
1	Keith D Cooper and Linda Torczon, –Engineering a Compiler‖, Morgan Kaufmann Publishers Elsevier Science, 2004
2	V. Raghavan, –Principles of Compiler Design‖, Tata McGraw Hill Education Publishers, 2010.
3	Allen I. Holub, –Compiler Design in C‖, Prentice-Hall Software Series, 1993.
4	Steven S. Muchnick, –Advanced Compiler Design and Implementation‖, Morgan Kaufmann Publishers - Elsevier Science, India, Indian Reprint 2003.

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.

Semester End Examination (SEE):

Total marks: 50+50=100

SEE for 50 marks is 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.

CO-PO/PSO Mapping														
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3	1	2	-	-	-	-	-	-	-	2	1	-
CO2	3	3	2	3	1	-	-	-	-	-	-	2	2	2
CO3	3	3	2	3	1	-	-	-	-	-	-	2	3	-
CO4	3	3	2	3	2	-	-	-	-	-	-	2	3	-

CO5	3	3	2	3	2	-	-	-	-	-	-	2	3	1

High-3, Medium-2, Low-1

Semester: V		
DIGITAL FORENSICS		
Course Code:	**MVJ21CS555**	**CIE Marks:50**
Credits:	**3**	**SEE Marks: 50**
Hours:		**SEE Duration: 3 Hrs**
Course Learning Objectives: The students will be able to		
1	Understand the basic digital forensics and techniques for conducting the forensic examination on different digital devices.	
2	Examine digital evidences such as the data acquisition, identification analysis.	

UNIT-I	
Computer forensics fundamentals, Benefits of forensics, computer crimes, computer forensics evidence and courts, legal concerns and private issues. **Laboratory Sessions/ Experimental learning:** Familiarization with any one digital forensics tool **Video link / Additional online information:** • https://www.youtube.com/watch?v=2ESqwX3qb94- •https://nptel.ac.in/courses/106/104/106104119/	**Hrs 8**
UNIT-II	
Understanding Computing Investigations – Procedure for corporate High-Tech investigations, understanding data recovery work station and software, conducting and investigations. **Laboratory Sessions/ Experimental learning:** Case Study on cybercrime Investigation	**Hrs 8**

Video link / Additional online information: • https://www.coursera.org/lecture/cyber-conflicts/introduction-to-cybercrime-and-fundamental-issues-xndSq • https://www.youtube.com/watch?v=VoeLc5295XU • https://www.youtube.com/watch?v=l77AgiphUQo	
UNIT-III	
Data acquisition- understanding storage formats and digital evidence, determining the best acquisition method, acquisition tools, validating data acquisitions, performing RAID data acquisitions, remote network acquisition tools, other forensics acquisitions tools. **Laboratory Sessions/ Experimental learning:** Studying different cases where IPR and laws are applied. **Video link / Additional online information:** • https://www.youtube.com/watch?v=qJ693ZlvceA • https://www.youtube.com/watch?v=6vNxslcf9AE	**Hrs 8**
UNIT-IV	
Processing crimes and incident scenes, securing a computer incident or crime, seizing digital evidence at scene, storing digital evidence, obtaining digital hash, reviewing case. **Laboratory Sessions/ Experimental learning:** Case study on protection of copyright on cyberspace **Video link / Additional online information:** • https://nptel.ac.in/courses/109/105/109105112/ • https://nptel.ac.in/courses/109/105/109105112/ • https://nptel.ac.in/courses/106/106/106106129/	**Hrs 8**
UNIT-V	
Current computer forensics tools- software, hardware tools, validating and testing forensic software, addressing data-hiding techniques, performing remote acquisitions, E-Mail investigations- investigating email crime and violations, understanding E-Mail servers, specialized E-Mail forensics tool. **Laboratory Sessions/ Experimental learning:**Email Forensics **Video link / Additional online information:**	**Hrs 8**

• https://www.lawctopus.com/video-lectures-law-sudhir-law-review/ • https://www.youtube.com/watch?v=wV2OiOM3q3k	

Course Outcomes: After completing the course, the students will be able to	
CO1	Analyze Computer Crime and Criminals and Liturgical Procedures
CO2	Apply the laws and regulations to the applications
CO3	Analyze the email tracking cyber applications
CO4	Understanding the protection of Intellectual Property Rights
CO5	To be well-trained as next-generation computer crime investigators.

Text Books	
1	Warren G. Kruse II and Jay G. Heiser, "Computer Forensics: Incident Response Essentials", Addison Wesley, 2002.
2	Nelson, B, Phillips, A, Enfinger, F, Stuart, C., "Guide to Computer Forensics and Investigations, 2nd ed., Thomson Course Technology, 2006, ISBN: 0-619-21706-5.

Reference Books:	
1	Vacca, J, Computer Forensics, Computer Crime Scene Investigation, 2nd Ed, Charles River Media, 2005, ISBN: 1-58450-389.

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.

Semester End Examination (SEE):
Total marks: 50+50=100

SEE for 50 marks is 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.

CO-PO/PSO Mapping														
CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	-	3	-	2	-	2	-	-	-	2	2	-
CO2	3	3	-	3	2	2	-	3	-	-	-	2	2	-
CO3	2	2	2	2	-	3	3	3	-	-	-	2	3	-
CO4	3	3	2	3	-	-	-	3	-	-	-	-	3	-
CO5	3	3	-	3	-	-	-	3	-	-	-	2	-	-

High-3, Medium-2, Low-1

Semester: V		
ENVIRONMENTAL STUDIES		
Course Code: MVJ21CV56		**CIE Marks: 50**
Credits: L:T:P: 1:0:0		**SEE Marks: 50**
Hours: 15 L		**SEE Duration: 2 Hrs.**

Course Learning Objectives: The students will be able to	
1	Relate interdisciplinary approach to complex environmental problems using basic tools of the natural and social sciences including geo-systems, biology, chemistry, economics, political science and international processes
2	Study drinking water quality standards and to illustrate qualitative analysis of water.
3	Critically evaluate the science and policy ramifications of diverse energy portfolios on air and water quality, climate, weapons proliferation and societal stability.

UNIT-I	
Introduction to environmental studies, Multidisciplinary nature of environmental studies; Scope and importance; Concept of sustainability and sustainable development. **Ecosystems (Structure and Function):** Forest, Desert, Rivers, Ocean **Biodiversity:** Types, Hot spots; Threats and Conservation of biodiversity, Deforestation**.** Video link: https://nptel.ac.in/courses/127/106/127106004/	**3 Hrs**
UNIT-II	
Advances in Energy Systems (Merits, Demerits, Global Status and Applications): Hydrogen, Solar, Tidal and Wind. **Natural Resource Management (Concept and case-study):** Disaster Management, Sustainable Mining and Carbon Trading. Video link: https://nptel.ac.in/courses/121/106/121106014/	**3 Hrs**
UNIT-III	
Environmental Pollution: Surface and Ground Water Pollution, Noise pollution,	**3 Hrs**

Soil Pollution and Air Pollution. **Waste Management & Public Health Aspects:** Bio-medical Waste, Solid waste, Hazardous waste and E-waste. Video link: • https://nptel.ac.in/courses/122/106/122106030/ • https://nptel.ac.in/courses/105/103/105103205/ • https://nptel.ac.in/courses/120/108/120108005/ • https://nptel.ac.in/courses/105/105/105105160/	
UNIT-IV	
Global Environmental Concerns (Concept, policies, and case-studies): Global Warming, Climate Change, Acid Rain, Ozone Depletion and Fluoride problem in drinking water. Video link: • https://nptel.ac.in/courses/122/106/122106030/ • https://nptel.ac.in/courses/120108004/ • https://onlinecourses.nptel.ac.in/noc19_ge23/preview	**3 Hrs**
UNIT-V	
Latest Developments in Environmental Pollution Mitigation Tools (Concept and Applications): G.I.S. & Remote Sensing, Environment Impact Assessment, Environmental Management Systems. Video link: • https://nptel.ac.in/courses/105/102/105102015/ • https://nptel.ac.in/courses/120/108/120108004/	**3 Hrs**

Course Outcomes: After completing the course, the students will be able to	
CO1	Describe the principles of ecology and environmental issues that apply to air, land, and water issues on a global scale.
CO2	Develop critical thinking and/or observation skills, and apply them to the analysis of a problem or question related to the environment.
CO3	Demonstrate ecology knowledge of a complex relationship between biotic and Abiotic components.
CO4	Apply their ecological knowledge to illustrate and graph a problem
CO5	Describe the realities that managers face when dealing with complex issues.

Reference Books	
1.	Principals of Environmental Science and Engineering, Raman Siva kumar, Cengage learning, Singapur, 2nd Edition, 2005.
2.	Environmental Science – working with the Earth G.Tyler Miller Jr. Thomson Brooks /Cole, 11th Edition, 2006
3.	Textbook of Environmental and Ecology, Pratiba Singh, Anoop Singh & Piyush Malaviya , ACME Learning Pvt. Ltd. New Delhi, 1st Edition.

Continuous Internal Evaluation (CIE):

Theory for 50 Marks

CIE for 50 marks, executed by way of tests (T) and assignments. A minimum of three quizzes are conducted along with tests. Test portion is evaluated for 40 marks and assignment is evaluated for 10 marks. The three tests are conducted for 40 marks each and the average of all the tests are calculated for 40. The marks for the assignments are 10 (2 assignments for 5 marks each). The marks obtained in test and assignment are added and report CIE for 50 marks.

Semester End Examination (SEE):

SEE for 50 marks, executed by means of an examination. The Question paper contains objective type questions for 100 marks covering the entire syllabus having same complexity in terms of COs and Bloom's taxonomy level.

Total marks: 50+50=100

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

High-3, Medium-2, Low-1

Semester: V		
UNIVERSAL HUMAN VALUES		
Course Code: MVJ21UHVI58		**CIE Marks: 50**
Credits: L:T:P: 2:0:0		**SEE Marks: 50**
Hours: 30 L		**SEE Duration: 3 Hrs.**

Course Learning Objectives: The students will be able to	
1	Appreciate the essential complementarily between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
2	Facilitate the development of a Holistic perspective among students towards life and profession as well as towards happiness and prosperity based on a correct understanding of the Human reality and the rest of existence. Such a holistic perspective forms the basis of Universal Human Values and movement towards value-based living in a natural way.
3	Highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually fulfilling human behaviour and mutually enriching interaction with Nature.

Prerequisites: Universal Human Values I	
UNIT-I	
Review on Right Understanding, Relationship and Physical Facility (Holistic Development and the Role of Education), Self-exploration as the Process for Value Education, Happiness and Prosperity – Current Scenario, **Value Education:** Understanding Value Education, Continuous Happiness and Prosperity – the Basic Human Aspirations, , Method to Fulfill the Basic Human Aspirations, **Practical Sessions:** Sharing about Oneself (Tutorial 1), Exploring Human Consciousness (Tutorial 2), Exploring Natural Acceptance (Tutorial 3) **Video link:** • https://www.youtube.com/watch?v=85XCw8SU084 • https://www.youtube.com/watch?v=E1STJoXCXUU&list=PLWDeKF97v9SP_Kt6jqz A3p Z3yA7g_OAQz • https://www.youtube.com/channel/UCQxWr5QB_eZUnwxSwxXEkQw	**Hrs 8**
UNIT-II	

Review on Understanding Human being as the Co-existence of the Self and the Body, The Body as an Instrument of the Self, Harmony of the Self with the Body. Harmony in the Human Being: Distinguishing between the Needs of the Self and the Body, Understanding Harmony in the Self, Programme to ensure self-regulation and Health. **Practical Sessions:** Exploring the difference of Needs of Self and Body (Tutorial 4), Exploring Sources of Imagination in the Self (Tutorial 5), Exploring Harmony of Self with the Body (Tutorial 6). **Video link:** • https://www.youtube.com/watch?v=GpuZo495F24 • https://www.youtube.com/channel/UCQxWr5QB_eZUnwxSwxXEkQw	**Hrs 8**
UNIT-III	
Review on Harmony in the Family – the Basic Unit of Human Interaction, Other Feelings, Justice in Human-to-Human Relationship, Understanding Harmony in the Society. **Harmony in the Family and Society:** Trust' – the Foundational Value in Relationship, 'Respect' – as the Right Evaluation, Vision for the Universal Human Order, **Practical Sessions:** Exploring the Feeling of Trust (Tutorial 7), Exploring the Feeling of Respect (Tutorial 8), Exploring Systems to fulfil Human Goal (Tutorial 9). **Video link:** • https://www.youtube.com/watch?v=F2KVW4WNnS8 • https://www.youtube.com/channel/UCQxWr5QB_eZUnwxSwxXEkQw	**Hrs 8**
UNIT-IV	
Harmony in the Nature/Existence: Understanding Harmony in the Nature, Interconnectedness, self-regulation and Mutual Fulfillment among the Four Orders of Nature, Realizing Existence as Co-existence at All Levels, The Holistic Perception of Harmony in Existence. **Practical Sessions:** Exploring the Four Orders of Nature (Tutorial 10), Exploring Co-existence in Existence (Tutorial 11). **Video link:** • https://www.youtube.com/watch?v=1HR-QB2mCF0 • https://www.youtube.com/watch?v=lfN8q0xUSpw	**Hrs 8**

• https://www.youtube.com/channel/UCQxWr5QB_eZUnwxSwxXEkQw	
UNIT-V	
Review on Natural Acceptance of Human Values,Basis for Humanistic Education, Humanistic Constitution and Universal Human Order, Holistic Technologies, Production Systems and Management Models-Typical Case Studies. **Implications of the Holistic Understanding – a Look at Professional Ethics:** Definitiveness of (Ethical) Human Conduct, Competence in Professional Ethics, Strategies for Transition towards Value-based Life and Profession **Practical Sessions:** Exploring Ethical Human Conduct (Tutorial 12), Exploring Humanistic Models in Education (Tutorial 13), Exploring Steps of Transition towards Universal Human Order (Tutorial 14). **Video link:** • https://www.youtube.com/watch?v=BikdYub6RY0 • https://www.youtube.com/channel/UCQxWr5QB_eZUnwxSwxXEkQw	**Hrs 8**

Course Outcomes: After completing the course, the students will be able to	
CO1	Explore themselves, get comfortable with each other and with the teacher.
CO2	Enlist their desires and the desires are not vague.
CO3	Restate that the natural acceptance (intention) is always for living in harmony, only competence is lacking.
CO4	Differentiate between the characteristics and activities of different orders and study the mutual fulfillment among them.
CO5	Present sustainable solutions to the problems in society and nature.

Reference Books	
1.	AICTE SIP UHV-I Teaching Material, https://fdp-si.aicte india.org/ AicteSipUHV _download.php
2.	A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1
3.	Teachers' Manual for A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-53-2
4.	Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010

Continuous Internal Evaluation (CIE):
CIE for 50 marks 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.

Semester End Examination (SEE):
SEE for 50 marks is 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.

Total marks: 50+50=100

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

High-3, Medium-2, Low-1