YEAR-WISE AND SEMESTER-WISE DISTRIBUTION OF SUBJECTS
DEPARTMENT OF B.SC COMPUTER SCIENCE & CLOUD COMPUTING
THIRD SEMESTER
ACADEMIC YEAR 2024-25 OF 2023-26 BATCH (CBCS)

Sl. No.	Part	Subject Code	Title of the Subject	Hours /Week	Duration of Exam (hrs.)	Marks			Credits
						Internal	External	Total	
	THEORY								
1	I	ES23301	Environmental Studies and Gender Sensitization (AECC-5)	3	3	40	60	100	3
2	II	G23CSCC1T	Web Programming (GE-2)(IDE)	2	2	40	60	100	2
3	II	BS23301	Database Management Systems(Core-7)	5	3	40	60	100	4
4	II	BS18335	Discrete Mathematics (SEC-2)	5	3	40	60	100	4
5	II	CSCC23301	Distributed Systems(Core-8)	4	3	40	60	100	4
6	II	CSCC23304	Java Programming (Core-9)	5	3	40	60	100	4
	PRACTICALS								
7	II	G23CSCC1P	Web Programming (GE-2)(IDE)	2	3	40	60	100	1
8	II	CSCC23302	Database Management Systems (SEC-2)	2	3	40	60	100	1
9	II	CSCC23303	Java Programming (Core-9)	2	3	40	60	100	1
	Total			**30**	**-**	**360**	**540**	**900**	**24**

***Generic Elective (GE)** ***Inter-Disciplinary Elective(IDE)**
***Ability Enhancement Compulsory Course (AECC)** ***Skill Enhancement Course (SEC)**

GENERIC ELECTIVE
(INTER-DEPARTMENTAL/INTER-DISCIPLINARY)
UG COURSES 2022-23

S. No	Name of the Department	GE Course
1	B.Sc. Chemical Technology	Solar Processing Technologies
2	B.Sc. Agricultural Science and Rural Development	Principles of Organic farming
3	B.Sc. Computer Science and Engineering	PC Operating Systems
4	B.Com Honors	Taxation
5	B.Sc. Computer Systems and Engineering	PC Hardware and Software Installation
6	B.Com Marketing	Principles of Marketing
7	B.Sc. Biotechnology, Genetics and Chemistry	Medical Lab Technology
8	B.Com Business Studies	Banking
9	B.A Mass Communication	Photography
		Film Appreciation
10	B.Sc. Food Technology and Management	Food Processing and Quality Control
11	B A Psychology, English Literature& Journalism	Communication Skills
		Career Skills
		Psychology for Living
12	B.Sc. Mathematics, Statistics & Computer Science	Quantitative Aptitude
		Data Analysis
13	B.Sc. Multimedia and Animation	Creative Arts
14	B.Com Computers	Accounting
15	Bachelor of Business Administration	Principles of Management
16	B.Com International Accounting and Finance	Project Management
17	B.Sc. Computer Data Science & Data Analytics Engg.	Python programming
18	B.Com Strategic Finance	Goods and Services Tax (GST)
19	B.Com Business Process Management	Financial Markets
20	B.Sc. Food Science, Nutrition and Dietetics	Nutrition and Dietetics
21	B.Sc. Computer Science & Cognitive Systems	Introduction to Worksheet
22	B.Com Business Analytics	Principles of Insurance
23	B.Sc. Computer Science and Artificial Intelligence	LISP Programming
24	B.Sc. Computer Science and Cyber Security	Principles of Information Security
25	B.A Economics Public Administration and Computer App.	Human Rights
26	B.Com Information Systems	Human Resource Management
27	BBA Entrepreneurship Development	Startup Management
28	B.Sc Computer Science & Cloud Computing	Web Programming
29	B.Sc Computer Science & Internet of Things	Introduction to IOT using Arduino
30	BBA Retail Operations Management	Consumer Behaviour
31	BBA Tourism	Tourism Management
32	B.Sc Computer Science & Machine Learning	Machine Learning For Every One

ENVIRONMENTAL STUDIES & GENDER SENSITIZATION

Credits : 3 **Semester: III**
Course Code: ES23301 **No. of Lecture Hours: 45**

Objectives:

- To understand the importance of ecological balance for Sustainable Development
- To understand the impacts of developmental activities and mitigation measures
- To understand the environmental policies and regulations.
- To develop students sensibility with regard to issues of gender in contemporary India
- To provide a perspective on the socialization of men and women
- To expose the students to debate on the politics and economic works and on gender violence

Course Outcomes:

CO1: **Understand** the importance of Environmental education, conservation of natural resources & understand the importance of ecosystems and biodiversity.
CO2: Understand the pollution problems and apply the environmental science knowledge on solid waste management, disaster management.
CO3: **Apply** the environmental science knowledge to improve the resources and Evaluate and understand the sustainable environmental conditions and control methods.
CO4: **Identify** the interactions and intersections of identities (e.g., gender, race, ethnicity, class, sexuality, and so on) and assess the ways in which they contribute to instances of privilege and power dynamics across cultures, space, and time and their problems.
CO5: **Understand** the gender problems and ways of addressing them, including interactions across local to global scales in communities and overcome inequalities with legislations

UNIT- I **9Hrs**

NATURAL RESOURCES, ECOSYSTEMS, & BIODIVERSITY

- Definition, Scope and importance of environmental studies. Need for public awareness.
- Renewable & Non Renewable resources, Brief account on Forests, Water, Minerals and Energy (Solar, Wind, and Geo-thermal & Bio-energy).
- Definition of Ecosystem, Structure and functions—food chains, food webs, ecological pyramids, producers, consumers and decomposers. Energy flow and example ecosystems--- Forest, Desert, Aquatic ecosystems.
- Definition of Biodiversity, types (Genetic, Species, Ecosystem), India- mega diversity Nation.
- Hotspots, Threats to biodiversity, Conservation of biodiversity (In-Situ and Ex-Situ).

UNIT-II **9Hrs**

ENVIRONMENTAL POLLUTION

- Definition of Environmental pollution
- Brief account of causes, effects, prevention and control measures of
  - Air pollution
  - Water Pollution
  - Soil pollution
  - Noise pollution
  - Marine Pollution
- Solid Waste Management: Causes, Effects & Control measures of urban and industrial wastes
- Disaster Management: floods, Earth quakes, and Cyclones.

UNIT-III **9Hrs**

Social Issues and Environment

- Rain-Water Harvesting, Water-shed Management, and From Unsustainable to Sustainable Development.
- Global Warming, Ozone depletion, and Acid rains
- Environmental Legislation: Air Act, Water Act, Environmental Protection Act, Forest Act, Wildlife Act.
- Environmental & Human Health---- HIV/AIDS
- Welfare Programs---- Family, Women & Child Welfare, Population Explosion
- Role of Information Technology in Environmental Studies.

UNIT-IV **9Hrs**

Gender Studies

- Why should we study gender issues?
- Socialization- Making women and making men
- Being together as equals-Through the lens of gender
- Missing women: Gender selection and its consequences
- Health issues of Women

UNIT-V **9Hrs**

Gender & Labour -Gender Violence & Law

1. House work : The invisible labour- my mother doesn't work "share the load"
2. Women's Work: Role in Politics and Economics Fact and Fiction. Unrecognized and Unaccounted work. Wages and Conditions of Work.
3. Sexual harassment – say no eve teasing – the caste based violence –Nirbhaya Act
4. Domestic violence - Is home a safe place? - Blaming the victim.-Domestic violence Act
5. Forums of justice-Hindu Inheritance Act(2005)

SUGGESTED READING

1. A. Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu. 201. **Towards a World of Equals : A Bilingual Text on Gender**. Hyderabad: Telugu Akademi.
2. Rajagopalan R. 2015. **Environmental Studies-from Crisis to Cure.** Third Edition. Chennai: Oxford University Press.
3. Dr D K Asthana and Dr Meera Asthana. 2014. **A Text Book of Environmental Studies** Revised Edition. New Delhi: S. Chand & Company.
4. Anubha Kaushik and C.P. Kaushik Published. 2016. **Perspectives in Environmental Studies.** Fifth Edition. New Delhi: New Age International.

(For Gender Sensitization)

5. Sen Amartya **More Than One Million Women Are Missing.** New York Review of Books 37.20 (20 December 1990). Print. **We Were Making History...Life Stories of Women in the Telangana People's Struggle**. New Delhi: Kali for Women. 1998.
6. Tripti Lahiri. **By the Numbers: Where Indian Women Work. Women's Studies Journal .** *(*14 November 2012). Available online at: <http://blogs.wsj.com/ India real time/2012/11/14/by – the numbers-where-Indian-women-work/>
7. K. Satyanarayana and Susie Tharu. Ed. **Steel Nibs Are Sprouting : New Dalit Writing From South India, Dossier 2: Telugu and Kanada** Code=3732.
8. Vimala. **Vantillu (The Kitchen)". Women Writing in India: 600 Bc to the Present. Volume II.** The 20th Century. Ed. Suise Tharu and K.Laltitha. Delhi: Oxford University Press, 1995.599-601.
9. Shatrughna, Veena. **Women's Work and its Impact on Child Health and Nutrition.** Hyderabad: National Institute of Nutrition, Indian Council of Medical Research .1993.

WEB PROGRAMMING
(GE Inter-disciplinary)

Credits : 2 **Semester: III**
Course Code : G23CSCC1T **No. of Lecture Hours: 30**

Objectives:
- Support the development of web pages
- Effectively incorporate JavaScript in a web page

Course Outcomes:
CO1: **Understand** HTML tags and JavaScript Language programming concepts and techniques.
CO2: To develop the ability to logically plan and develop web pages.
CO3: **To learn** to write, test, and debug web pages using HTML and JavaScript.
CO4: **To develop** web pages using the HTML and CSS features with different layouts as per need of applications
CO5: **Use** the JavaScript to develop the dynamic web pages.

UNIT – I	**6HRS**
1. Introduction to internet, www, web browsers, web servers and URLs	1
2. Introduction and Features of HTML, Structure of HTML	1
3. Header tags, basic text formatting tags, Text Styles	2
4. List definition and Types of Lists , Working with Images	2

UNIT – II	**6HRS**
1. Working with tables and hyperlinks (Internal and External links, images as hyperlinks) Marquee Tag,	2
2. Working with Forms and Interactive Elements	2
3. Working with Frames(Vertical & Horizontal frames, Named frames)	2

UNIT– III	**6HRS**
1. Overview of CSS, External, Internal and Inline Style sheets,	1
2. Selector Forms – Simple Selector Forms, Class Selectors, generic Selectors, id selectors, universal selectors and pseudo classes	2
3. Property Value forms – Font Properties, List Properties, Color, Alignment of text, Background images	2
4. DIV and SPAN tags	1

UNIT– IV **6HRS**

1. JavaScript-Overview, Features, Object Orientation & Java Script, General Syntactic Characteristics 1
2. Primitives, Variables, Operators and Expressions 2
3. Control Statements – if and types of if, switch-case, while, do-while and for loops 2
4. Arrays 1

UNIT – V **6HRS**

1. Functions, Recursive Function 2
2. Events in JavaScript, Handling events from Body Elements, from Button Elements, from Textbox and Password Elements 2
3. DOM, Element access in Java Script 2

ESSENTIAL READINGS

1. **Sebasta W. Robert, Programming the Worls Wide Web.** 4th Edition Pearson Publications.

SUGGESTED READINGS

1. Deitel H.M. **Internet & World Wide Web, How to Program**. 4th Edition Pearson Publications

DATABASE MANAGEMENT SYSTEMS

Credits : 4 **Semester: III**
Course Code: BS23301 **No. of Lecture Hours: 75**

Objective: To form the basis for bulk management of data. This marks the beginning and maintenance of the databases. It offers the power to logically present the databases to individual usage as well. Provides facilities for data access, enforcing data integrity, managing concurrency and restoring the data from backups.

Course Outcome: Students will be able to
CO1: To **describe** Entity Relationship and Enhanced ER model.
CO2: To **understand** the relational model, reduction to relation schema, relational algebra and normalization.
CO3: To **use** SQL- the standard language of relational databases and PL/SQL programming.
CO4: To **understand** the storage and file structure, storage access, indexing and hashing techniques of the database.
CO5: To **understand** the need for NoSQL databases and their characteristics, the concepts of NoSQL databases

UNIT – I	**15hrs**
1. Database-System Applications, Purpose of Database Systems	1
2. View of Data, Database Languages, DDL, DML	2
3. Relational Databases, Object-Based and Semistructured Databases	2
4. Data Storage and Querying, Transaction Management	2
5. Database Architecture, Database Users and Administrators	2
6. Enhanced entity relationship model : Generalization, Specialization, Aggregation, Design Considerations.	2
7. **E-R Model**: Entity Relationship Model, Constraints	1
8. Entity Relationship Diagrams, Design Issues	2
9. Weak Entity Sets, Extended E-R Features	1

UNIT – II	**15hrs**
1. Relational Model :Structure of Relational Databases	2
2. Fundamental Relational-Algebra Operations	2
3. Additional Relational Algebra Operations	2
4. Extended Relational- Algebra Operations	2
5. Null Values, Modification of the Database	1
6. Normalization: First, second	3
7. Third Normal forms and BCNF	3

UNIT – III	**15hrs**
1. **SQL** : Data Definition, Basic Structure of SQL queries	1
2. Set operations, Aggregate functions.	2
3. Null Values, Nested Sub queries	1
4. Joins, Modifications of the database, Views	1
5. Integrity Constraints	2
6. **PL/SQL** : Functions, Procedures	1
7. Triggers, Cursors, Exception Handling, Packages	2
8. Authorization in SQL, Granting, Revoking of privileges, Roles	2
9. Authorization on Views, Functions and Procedures, Audit Trail	2
10. Application Security	1

UNIT – IV	**15hrs**
1. **Storage and File Structure**: Overview of Physical Storage Media	1
2. Magnetic Disks, Physical Characteristics of Disks	2
3. Performance Measures of Disks, Optimization of Disk-Block Access	2
4. **Storage Access:** Buffer Manager, Buffer Replacement Policies	2
5. File Organization, Organization of Records in Files	1
6. **Indexing and Hashing**: Basic Concepts, Ordered Indices	1
7. B+ Tree Index Files-Structure of a B+ Tree, Queries on B+ Trees	2
8. Updates on B+ Trees, B+ Tree File Organization	2
9. Static Hashing, Dynamic Hashing	1
10. Comparison Ordered Indexing and Hashing	1

UNIT – V	**15hrs**
1. **Why NO SQL:** The Value of relational Databases, Impedance Mismatch, Application & Integration Databases, Attack of the clusters, The Emergence of NoSQL	3
2. Aggregate Data Models: Aggregates, Column-Family Stores, Summarizing Aggregate-Oriented Databases	3
3. More Details on Data Models: Relationships, Graph Databases, Schemaless Databases, Materialized Views, Modeling for Data Access	3
4. **Distribution Models:** Single Server, Sharding, Master-Slave Replication, Peer-to-Peer Replication, Combining Sharding and Replication	3
5. **Consistency:** Update Consistency, Read Consistency, Relaxing Consistency, Relaxing Durability, Quorums	3

ESSENTIAL READING

1. Silberschatz, Abraham. Korth, H.F. Sudharshan, S.**Database System Concepts**. 5th Edition. New York: McGraw Hill.
2. Bayross, Ivan.SQL,PL/SQL (The programming language of oracle).3rd RevisedEdition. Mumbai:BPB Publications.
3. Pramod J. Sadalage, Martin Fowler. NoSQL Distilled, Addison Wesley 2013

SUGGESTED READING

1. Mc Fadden,FredR. Hoffer,Jeffrey A.Prescott, Mary B. 1999. **Modern Database Management**. 5th Edition. Amsterdam: Addison-Wesley Longman.

DISCRETE MATHEMATICS

Credits : 4 **Semester: III**
Course Code: BS18335 **No. of Lecture Hours: 75**

Objective:

- To introduce lattices, Graph theory and to familiarize with the basic concepts of Number theory.

Course Outcomes:
CO1: Develop understanding of Logic Sets and Functions
CO2: **Evaluate** and apply the fundamental concepts in graph theory
CO3: **Develop** an understanding of how graph and tree concepts are used to solve problems arising in the computer science.
CO4: Express the concepts and results of Number Theory.
CO5: **Identify** methods and techniques used in number theory.

UNIT- I **15Hrs**
LATTICES

1. Relations and ordering 3
2. Partial order relations - Partially ordered sets 3
3. Hasse diagrams 3
4. Lattices - Properties of lattices 3
5. Types of Lattices 3

UNIT II **15Hrs**
GRAPH THEORY – I

1. Definition of a graph, Degree of vertex 3
2. First theorem of graph theory Paths and connection 3
3. Isomorphism of graphs 3
4. Some special simple graphs 6

UNIT III **15Hrs**
GRAPH THEORY – II

1. Trees and their properties 9
2. Binary trees, Binary search trees, Spanning trees, Kruskal's Algorithm, Prim's Algorithm, Planar graphs, Euler's formula 6

UNIT IV **15Hrs**

GRAPH THEORY-III

1. Euler graphs 5
2. Hamiltonian graphs- Grinberg theorem 5
3. Chromatic numbers 5

UNIT-V **15Hrs**

ELEMENTS OF NUMBER THEORY

1. Divisibility- Division algorithm 1
2. Euclid' algorithm 2
3. Properties of G.C.D 2
4. Primes – Fundamental theorem of Arithmetic. 2
5. Congruence's – Properties 2
6. Fermat's theorem and its Applications 3
7. Wilson's theorem and its Applications 3

ESSENTIAL READING

1. Tremblay Jean, P. and Manohar, R. 2007. **Discrete Mathematical Structures with Applications to Computer Science.** New Delhi: McGraw-Hill. (For Unit I)
2. Mott Joe, L. Kandel Abraham. And Baker Theodore, P. 1999. **Discrete Mathematics for Computer Scientists and Mathematicians.** 2nd Edition. New Delhi: PHI (For Units II,III and IV)
3. Burton David, M. 2010. **Elementary Number Theory**. 7th Edition. New Delhi: McGraw-Hill. (For Unit V)

DISTRIBUTED SYSTEMS

Credits : 4 **Semester: III**
Course Code: CSCC23301 **No. of Lecture Hrs: 60**

Objectives:

- This course is an introduction to the design of distributed systems and algorithms that support distributed computing. It aims to provide a practical exposure into the design and functioning of existing distributed systems

Course Outcomes:

CO 1 Understand the design principles in distributed systems and the architectures for distributed systems.
CO 2 Apply various distributed algorithms related to clock synchronization, concurrency control, deadlock detection, load balancing, voting etc.
CO 3 Analyze fault tolerance and recovery in distributed systems and algorithms for the same.
CO 4 Analyze the design and functioning of existing distributed systems and file systems.
CO 5 Implement different distributed algorithms over current distributed platforms

UNIT-I	**12hrs**
1. Introduction: Goals and Types of Distributed Systems	2
2. Architectures: Architectural Styles, System Architectures, Architectures versus Middleware, and Self-Management in Distributed Systems.	4
3. Processes: Threads, Virtualization, Clients, Servers, and Code Migration.	3
4. Communication: Fundamentals, Remote Procedure Call, Message-Oriented Communication, Stream-Oriented Communication, and Multicast Communication.	3

UNIT-II	**12hrs**
1. Naming: Names, Identifiers and Addresses, Flat Naming, Structured Naming, and Attribute-Based Naming.	3
2. Synchronization: Clock Synchronization, Logical Clocks, Mutual Exclusion, Global Positioning of Nodes, and Election Algorithms.	3
3. Consistency and Replication: Introduction, Data-Centric Consistency Models, Client-Centric Consistency	4
4. Models, Replica Management, and Consistency Protocols.	2

UNIT-III	**12hrs**
1. Fault Tolerance: Introduction to Fault Tolerance, Process Resilience, Reliable Client-Server Communication, Reliable Group Communication, Distributed Commit, and Recovery.	6
2. Distributed Object-Based Systems: Architecture, Processes, Communication, Naming, Synchronization, Consistency and Replication, Fault Tolerance, and Security.	6

UNIT-IV **12hrs**

1. Distributed File Systems: Architecture, Processes, Communication, Naming, Synchronization, Consistency and Replication, Fault Tolerance, and Security. 6
2. Distributed Web-Based Systems: Architecture, Processes, Communication, Naming, Synchronization, Consistency and Replication, Fault Tolerance, and Security. 6

UNIT-V **12hrs**

1. Distributed Coordination-Based Systems: Introduction to Coordination Models, Architecture, Processes, 4
2. Communication, Naming, Synchronization, Consistency and Replication, Fault Tolerance, and Security. 4
3. Map-Reduce: Example, Scaling, programming model, Apache Hadoop, Amazon Elastic Map Reduce,Mapreduce.net, Pig and Hive. 4

Essential Readings:

1. Andrew S. Tanenbaum and Maarten Van Steen, **Distributed Systems**, PHI 2nd Edition, 2009.
2. R. Hill, L. Hirsch, P. Lake, S. Moshiri, Guide to Cloud Computing, Principles and Practice‖, Springer, 2013.
3. R. Buyya, J. Borberg, A. Goscinski, Cloud Computing-Principles and Paradigms, Wiley, 2013.

JAVA PROGRAMMING

Credits : 4 **Semester: III**
Course Code : CSCC23304 **No. of Lecture Hours: 75**

Objectives:

- To help the students understand the fundamentals of object-oriented programming.
- To emphasize on learning important principles of software development and provide practice in developing small-scale programs.

Course Outcomes:

CO1: **Differentiate** between object-oriented programming and procedure-oriented programming
CO2: **Apply** object-oriented programming features for solving a given problem.
CO3: **Select** an appropriate exception handling depending on application.
CO4: **Design** file operations using java standard library
CO5: **Develop** interactive programs using applet and swing

UNIT – I	**15Hrs**
1. **Object-Oriented Programming:** Introduction, Object Oriented Paradigm	1
2. Basic concepts	2
3. Benefits of OOP, Applications of OOP	1
4. Introduction to Java, , Features of Java,	1
5. Simple Java Program, Java Program Structure	1
6. Java Tokens, Java Statements, JVM	2
7. Variables, Data types, Operators and Control statements	2
8. Java Program structure, Simple Java program	1
9. **Classes, Objects and Methods:** Defining Class, Adding Variables, Methods	2
10. Creating Objects, Accessing Class Members	1
11. Constructors, finalize() method	1

UNIT – II	**15Hrs**
1. Method Overloading, Static Members, Nesting of Method	2
2. Inheritance, Overriding Methods, Final Variables and Methods, Final Classes	3
3. Abstract Methods and Classes ,Visibility Control	1
4. Arrays, Strings and Vectors, Wrapper classes	3
5. **Interfaces:** Defining Interfaces , Extending and Implementing Interfaces	2
6. Accessing Interface variables	1
7. **Packages:** Java API Packages, Using system Packages	1
8. Naming Conventions, Creating Packages	1
9. Accessing a Package , Using a Package, Adding a Class to a Package	1

UNIT – III	**15Hrs**
1. **Exception Handling:** Types of Errors, Exceptions	2
2. Uncaught Exceptions, Using try and catch	2
3. Multiple Catch Statements, Nested try statements , throw, throws and finally	3
4. Java's Built in Exceptions, User Defined Exceptions	1
5. **Multithreaded Programming:** Creating Threads, Extending the Thread Class, Stopping and Blocking a Thread	3
6. Life Cycle of a Thread	1
7. Using Thread Methods , Thread Exceptions, Thread Priority, Synchronization	3

UNIT – IV	**15Hrs**
1. **Input/output Files:** Introduction, Concept of Streams, Stream Classes, Byte Stream Classes	2
2. Character Stream Classes, Using the File Class, Input-Output Exception	4
3. Creation of Files, Bytes, Handling Primitive Data Types	2
4. Random Access Files, Simple Input/Output	2
5. **Spring Boot:** Introduction to Spring Boot—Goals and Important Features.	1
6. Create Spring Applications Prior to Spring Boot.	2
7. Creating a Spring Boot Application with Spring Initializr.	2

UNIT –V	**15Hrs**
1. **Event and Event Handling:** Event handling mechanisms, Sources of Events	2
2. **Event Classes:** Action Event, Mouse Event, Window Event, Item Event, Key Event	3
3. Event Listeners,-Action listener, Mouse Listener, Mouse Motion Window Listener, Key Listener, Handling Events.	3
4. **Swing Controls:** Label and ImageIcon, JButton,JRadioButton, JCheckbox, JTable, JList, JToggleButton,	4
5. JTree, JCombobox, JTextField, JOptionPane	3

ESSENTIAL READING

1. Schildt Herbert. 2002. **Java 2: The Complete Reference.** 5th Edition. New Delhi: McGraw-Hill.

SUGGESTED READING

1. Deitel Paul, J and Deitel Harvey, M. 2012. **Java: How to Program**. 6th Edition. New Delhi: PHI.
2. Gaddis Tony. 2015. **Starting Out With Java**. 6th Edition. New Delhi: Pearson

WEB PROGRAMMING LAB
(GE Inter-disciplinary)

Credits : 1 **Semester : III**
Course Code : G23CSCC1P **No. of Practical Hours: 30**

Objective:

- To enable students to understand the principles of creating effective web pages

Course Outcome:

- Students will be able to design and create web pages using CSS and Java Script.

Programs	No. Of hours
1. Header and font tags	
2. Text formatting and text styles	
3. Ordered and Unordered lists	
4. Nesting of ul and ol tags	
5. Changed list items marker	4
6. Display of semester subjects using ul and ol tags	
7. Change in back ground color	
8. To demonstrate definition list	
9. To print table	
10. To display Railway chart	
11. Image tag	4
12. External hyperlink	
13. Internal link	
14. Image as hyperlink	
15. Frames	
16. Forms and Input Controls	4
17. Inline Cascading Style Sheets	
18. Internal Cascading Style Sheets	
19. External Cascading Style Sheets	
20. various styles using internal Style Sheets	
21. Marquee Tag	
22. Pseudo Elements	
23. Pseudo Classes	4
24. SPAN & DIV tags	

25. Using Generic Classes/Selectors
26. Simple java script
27. Prompt and Alert dialog box
28. Using Ternary Operators
29. Using Arithmetic Operators 4
30. To print sum of 1st 10 Natural numbers using for loop
31. To print sum of 1st 10 Natural numbers using while loop
32. To print sum of 1st 10 Natural numbers using do-while loop
33. To Print numbers from 1 to 10
34. Illustrating if-else statement
35. Illustrating switch statement
36. Sum of elements of an array 5
37. Greatest number in an array
38. Factorial using function
39. To find square and cube using functions
40. Program for onload event
41. Program for onerror event 5

DATA BASE MANAGEMENT SYSTEMS LAB

Credit : 1 **Semester: III**
Course Code: CSCC23302 **No. of Practical Hours: 30**

Objective:

- To present the concepts and techniques relating to query processing by SQL

Course Outcome:

- Students will be able to use commercial relational database system (Oracle) bywriting Queries using SQL and implement PL/SQL

1. Creation, Altering and Dropping of tables and inserting rows into a table (use constraintswhile creating tables) examples using SELECT command.

2. Queries (along with sub Queries) using ANY, ALL, IN, EXIST, NOTEXISTS, UNION, INTERSECT, Constraints.
   Example: - Select the roll number and name of the student who secured fourth rank inthe class.

3. Queries using Aggregate Functions (COUNT, SUM, AVG, MAX and MIN), GROUPBY, HAVING and Creation and Dropping of Views.

4. Queries using Conversion Functions (to_char, to_number and to_date), string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), datefunctions (Sysdate, next_day, add_months, last_day, months_between, least, greatest, trunc,round, to_char, to_date)

5. i)Creation of simple PL/SQL program which includes Declaration section, Executablesection and Exception–Handling sections (Ex. Student marks can be selected from thetable and printed for those who secured first class and an exception can be raised if norecords were found)

   ii)Insert data into student table and use COMMIT, ROLLBACK and SAVEPOINT inPL/SQL block.

6. Develop a program that includes the features IF, IF-ELSE, NESTED IF, CASE.

7. Program development using WHILE LOOPS, FOR LOOPS, Nested Loops. UsingERROR Handling, BUILT –IN Exceptions, User defined Exceptions.

8. Program development using creation of procedures, passing parameters IN and OUT of Procedures.

9. Program development using creation of stored Functions, invoke functions in SQLStatements and write complex functions.

10. Develop programs using parameters in a CURSOR, FOR UPDATE CURSOR, WHERECURRENT of clause and CURSOR variables.

11. Develop programs using BEFORE and AFTER Triggers, Row and Statement Triggers.

12. Installation of NoSQL Databases: Redis,MongoDB, Cassandra, Neo4j on Windows & Linux

13. Practice CRUD (*Create*, *Read*, *Update*, and *Delete)* operations on the four databases: Redis, MongoDB, Cassandra, Neo4j

JAVA PROGRAMMING LAB

Credits : 1 **Semester: III**
Course Code: CSCC23303 **No. of Practical Hours: 30**

Objectives:

- To strengthen problem solving ability by applying the characteristics of an object oriented approach in Java.
- To build software for real world applications.
- To implement frontend of an application

Course Outcome:

- Students will be able to develop applications using object-oriented concepts of varying complexities.

Programs	**No. Of hours**
1. Program to print student details by class concept.	
2. Program to add two numbers using method overloading.	
3. Program to demonstrate application of constructors.	4
4. Program to implement single inheritance.	
5. Program to implement method overriding.	
6. Program to demonstrate abstract class.	
7. Program to implement packages.	4
8. Program to implement interfaces.	
9. Program to illustrate interface extending another interface.	
10. Program to implement try and catch statements	
11. Program to illustrate multiple catch blocks	4
12. Program to implement nesting of try block.	
13. Program to implement finally statement.	
14. Program to implement throw in exception handling.	
15. Program to implement throw using user defined exception.	4
16. Program to implement a simple multithreading program.	
17. Program to implement runnable interface.	
18. Program to implement thread priority.	4
19. Program to read and write characters.	
20. Program to count no. of characters, words and lines in a file.	
21. Program to read and write primitive data.	
22. Program to implement Random Access files.	4
23. Program for animation in applet.	
24. Program for reading parameter through applet.	
25. Program for graphics class.	

26. Develop an Applet to compute factorial value when the button “Compute” is clicked.
27. Develop an Applet to computer Arithmetic operations when the button is clicked.
28. Program that handles all mouse events and shows the event name at the center of the window when a mouse event is fired. (Use adapter classes). 3
29. An applet program on (i) JCombobox, (ii) JToggleButton (iii) JList (iv) JTabbedpane (v) JTree (vi) JTable
30. An applet program for validating user credentials. 3

YEAR-WISE AND SEMESTER-WISE DISTRIBUTION OF SUBJECTS
DEPARTMENT OF B.SC COMPUTER SCIENCE & CLOUD COMPUTING
FOURTH SEMESTER
ACADEMIC YEAR 2024-25 OF 2023-26 BATCH (CBCS)

Sl. No.	Part	Subject Code	Title of the Subject	Hours /Week	Duration of Exam (hrs.)	Marks			Credits
						Internal	External	Total	
	THEORY								
1	II	BS23401	Probability & Statistics	4	3	40	60	100	4
2	II	CSCC23401	Machine Learning	4	2	40	60	100	4
3	II	CSCC23402	Python Programming	4	3	40	60	100	4
4	II	CSCC23403	Web Technologies	3	3	40	60	100	3
5	II	CSCC23404	Cloud Computing Architecture	4	3	40	60	100	4
6	II	CSCC23405	Software Engineering	4	3	40	60	100	4
	PRACTICALS								
7	II	CSCC23406	Python Programming	2	3	40	60	100	1
8	II	CSCC23407	Web Technologies	2	3	40	60	100	1
9	II	CSCC23408	Cloud Computing Architecture	2	3	40	60	100	1
	Total			**29**	**-**	**360**	**540**	**900**	**26**

***Generic Elective (GE)** ***Inter-Disciplinary Elective(IDE)**
***Ability Enhancement Compulsory Course (AECC)** ***Skill Enhancement Course (SEC)**

PROBABILITY & STATISTICS

Credits : 4 **Semester: IV**
Course Code: BS23401 **No. of Lecture Hours: 60**

Objective:

- To teach concepts and applications of Statistics in real life situations**.**

Course Outcome:

CO1: Calculate the mean, median, and mode of a set of data and **identify** the importance of measures of dispersion.

CO2: Use discrete and continuous probability distributions, including requirements and making decisions.

CO3: Employee the principles of linear regression and correlation, including least square method, predicting a particular value of Y for a given value of X and significance of the correlation coefficient.

CO4: **Knowledge** about formulating and testing a hypothesis, using critical values to draw conclusions and determining probability of making errors in hypothesis tests, and about large sample tests.

CO5: Understand and **analyze** various methods of small sample tests.

NOTE: APPLICATION ORIENTED ONLY. NO MATHEMATICAL DERIVATIONS.

UNIT – I **12hrs**

1. Various measures of Central Tendency – Mean, Median & Mode
   Definitions, Merits, Demerit, Problems(grouped and ungrouped data)
2. Various measures of dispersion - Standard Deviation and Variance
   Definitions, Merits, Demerit, Problems(grouped and ungrouped data)
3. Probability Basic terminology, Addition theorem problems, Multiplication theorem problems,
4. Bayes theorem problems (Derivations for theorems not included)

UNIT – II **12hrs**

Random Variable:

1. Discrete Random variable & Continuous Random variable
2. Probability Mass & Density functions.

Mathematical Expectation:

3. Mathematical Exception, Addition Theorem of expectation,
   Multiplication theorem of expectation. (Excluding Derivations – Problems only)

Theoretical Distributions:

4. Discrete distributions: Binomial distribution, fitting of binomial distribution
5. Poison distributions, fitting of poisson distribution
6. Normal Distribution : Chief characteristics of the normal distribution, area of a property, Importance and fitting of a normal distribution.

(Excluding derivations – Applications only for all distributions mentioned above)

UNIT – III **12hrs**

Correlation and Regression:

1. Simple correlations(definitions and types)
2. Karl Pearson coefficient of correlation
3. Rank correlation
4. Regression and regression lines (Problems only)

UNIT – IV **12hrs**

Testing of Hypothesis

1. Sampling distribution, the null hypothesis and type I and II errors,
2. Critical region and level of significance.

Tests of significance for large samples:

3. Test of single proportion
4. Test of significance of difference of proportions
5. Test of significance for single mean and difference of means
6. Test of significance for difference of standard deviations.

UNIT – V **12hrs**

Small Sample Tests

Chi – Square test:

1. Population Variance
2. Goodness of fit
3. Independence of attributes (Problems only)

T- test :

4. Single Mean
5. Difference means and paired t-test (Problems only)

F-test:

6. Test of significance based on equality of two variances(Problems only)

ESSENTIAL READING

1. Gupta, S. C. (2011). ***Fundamentals of statistics*** (pp. 18-1). New Delhi, India: Himalaya publishing house.
2. Gupta, S. P. (1978). **Statistical Methods** 1978. 46th Edition.

SUGGESTED READING

1. Deovre, J. (1987). **Probability and statistics for engineering and science**. *Brooks/Cole, Belmont, CA.*
2. Richard A. Johnson, Miller, Freund. **Probability & Statistics for Engineers**. PHI Publications

MACHINE LEARNING

Credits : 4 **Semester:IV**
Subject Code: CSCC23401 **No. of Lecture Hours : 60**

Objective: To understand the state of art machine learning algorithms

Course Outcomes:
CO1: Illustrate various machine learning algorithms
CO2: Apply basic concepts of mathematics for machine learning
CO3: Examine various regression models for supervised learning
CO4: Choose appropriate classifier for performing classification.
CO5: Design model for clustering

UNIT-I	**12Hrs**
1. Machine learning: Introduction, applications, life cycle	2
2. AI vs Machine Learning	1
3. Types of data sets, sources for machine learning datasets	2
4. Data Pre-processing in Machine learning	2
5. Types of machine learning,Supervised vs Un Supervised learning	2
6. Types of machine learning algorithms	3

UNIT-II	**12Hrs**
1. Confusion matrix, Cross validation, Overfitting, Underfitting	2
2. Regularization, P-Value	2
3. Feature selection techniques	2
4. Bias and variance, Label Encoding and Onehot Encoding	2
5. Gradient descent, linear algebra for machine learning	2
6. Feature engineering, Epoch, Anomaly detection in ML	2

UNIT-III	**12Hrs**
SUPERVISED LEARNING	
1. Regression analysis in machine learning, types of regression	2
2. Linear regression	2
3. Simple and multiple linear regression	3
4. Backward elimination, polynomial regression	2
5. Logistic regression	2
6. Linear vs Logistic regression	1

UNIT-IV **12Hrs**

CLASSIFICATION

1. Introduction toclassification, classification algorithm 2
2. classification vs regression 1
3. K-NN algorithm, Support vector machine algorithm 2
4. Naïve Bayes classifier, linear discriminant analysis 3
5. Decision tree algorithm, Random Forest algorithm 4

UNIT-V **12Hrs**

1. Principal component analysis 2
2. Clustering in machine learning 2
3. Hierarchical clustering, K-means clustering 4
4. Association Rule learning 2
5. Apriori algorithm in machine learning 2

Essential Readings:

1. DuttSaikat, Chandra Mouli Subramanian, Das Amit Kumar. 2019. **Machine Learning.** 1st Edition. Pearson India Education Pvt Ltd. India: New Delhi
2. Jose, Jeeva. 2020. **Introduction to Machine Learning Using Python**. 1st Edition. Khanna Book Publishing Co. Pvt Ld. India: New Delhi.

PYTHON PROGRAMMING

Credits : 4 **Semester: IV**
Course Code: CSCC23402 **No. of Lecture Hours : 60**

Objective:

- To offer an easy syntax compared to Perl and the Unix/Linux "shell languages" and it is easier to learn and maintain.

Course Outcomes: Students will be able to

CO1: **Implement** the structure and components of a Python program.
CO2: **Choose** appropriate data structures.
CO3: **Interpret** how to write classes and create objects.
CO4: **Explain** how to use Inheritance and Numpy with Python
CO5: **Understand** the data structures: data series and frames, PyPlot for visualization

UNIT –I **12hrs**

1. **Introduction to Python:** Python, Features of Python, Execution of a Python Program, Viewing the Byte Code, Flavors of Python, Python Virtual Machine, Frozen Binaries, Memory Management in Python, Garbage Collection in Python, Comparisons between C and Python, Comparisons between Java and Python. 3
2. **Writing Our First Python Program:** Writing Our First Python Program, Executing a Python Program - Using Python's Command Line Window, Using Python's IDLE Graphics Window, Running from System Prompt, Getting Help in Python, Getting Python Documentation Help. 2
3. **Data types in Python:** Comments in Python, Doc Strings, How Python Sees Variables, Data types in Python, Built-in Data Types, Bool Data type, Sequencesin Python, Sets, Literals in Python, Determining the Data type of a Variable What about Characters, User-defined Data types, Constants in Python, Identifiersand Reserved words, Naming Conventions in Python. 3
4. **Operators in Python:** Arithmetic Operators, Assignment Operators, Unary Minus Operator, Relational Operators, Logical Operators, Boolean Operators,Bitwise Operators, Membership Operators, Identity Operators, Operator Precedence and Associativity, Mathematical Functions, Using IDLE Window, Using Command Line Window. **Input and Output**: Output statements, Input Statements, Command Line Arguments 4

UNIT –II **12hrs**

1. **Control Statements**: The if Statement, A Word on Indentation, The if … else Statement, The if .. elif .. else Statement, The while Loop, The for Loop, Infinite Loops, Nested Loops, The else Suite, The break Statement, The continue Statement,The pass Pass Statement, The assert Statement, The return Statement. 3
2. **Arrays in Python**: Array, Advantages of Arrays, Creating an Array, Importing the Array Module, Indexing and Slicing on Arrays, Processing the Arrays,Types of Arrays. Working with Arrays using Numpy, Creating arrays with array(),linspace(),logspace(), arange(),zeros() and ones() functions 2
3. **Strings and Characters**: Creating Strings, Length of a String, Indexing in Strings, Slicing the Strings, Repeating the Strings, Concatenation of Strings, Checking Membership, Comparing Strings, Removing Spaces from a String, Finding Sub Strings, Counting Substrings in a String, Strings are Immutable, Replacing a String with another String, Splitting and Joining Strings, Changing Case of a String, Checking Starting and Ending of a String, String Testing Methods, Formatting the Strings, Working with Characters, Sorting Strings, Searching in the Strings, FindingNumber of Characters and Words, Inserting Sub String into a String, **Regular Expressions**, Sequence Characters, Quantifiers and Special Characters in Regular Expressions 3
4. **Functions**: Difference between a Function and a Method, Defining a Function, Calling a Function, Returning Results from a Function, Returning Multiple Values from a Function, Functions are First Class Objects, Pass by Object Reference, Formal and Actual Arguments, Positional Arguments, Keyword Arguments, DefaultArguments, Variable Length Arguments, Local and Global Variables, The Global Keyword, Passing a Group of Elements to a Function, Recursive Functions, Anonymous Functions or Lambdas, Function Decorators, Generators, Structured Programming, Creating our Own Modules in Python, The Special Variable name. 4

UNIT –III **12hrs**

1. **Lists and Tuples**: List, Creating Lists using range() Function, Updating the Elements of a List, Concatenation of Two Lists, Repetition of Lists, Membership inLists, Aliasing and Cloning Lists, Methods to Process Lists, Finding Biggest and Smallest Elements in a List, Sorting the List Elements, Number of Occurrences of an Element in the List, Finding Common Elements in Two Lists, Storing Different Types of Data in a List, Nested Lists, Nested Lists as Matrices, List Comprehensions. **Tuples**: Creating Tuples, Accessing the Tuple Elements, Basic Operations on Tuples, Functions to Process Tuples, Nested Tuples, Inserting Elements in a Tuple, Modifying Elements of a Tuple, Deleting Elements from a Tuple. 3
2. **Dictionaries**: OperationsonDictionaries, DictionaryMethods, Using for Loop withDictionaries, Sorting the Elements of a Dictionary using Lambdas, Converting Listsinto Dictionary, Converting Strings into Dictionary, Passing Dictionaries to Functions, Ordered Dictionaries. 2

3. **Introduction to OOPs:** Problem in Procedure Oriented Approach, Specialty of Python 3 Language, Features of Object Oriented Programming System(OOPs)- Classes and Objects, Encapsulation, Abstraction, Inheritance, Polymorphism.
4. **Classes and Objects**: Creating a Class, the Self Variable, Constructor, Types of Variables, Namespaces, Types of Methods- Instance Methods, Class Methods, StaticMethods, Passing Members of One Class to another Class, Inner Classes 4

UNIT-IV **12hrs**

1. **Inheritance and Polymorphism:** Constructors in Inheritance**,** Overriding Super Class Constructors and Methods, The super() Method, Types of Inheritance, Single Inheritance, Multiple Inheritance, Method Resolution Order(), Polymorphism, DuckTyping Philosophy of Python, Operator Overloading, Method Overloading, Method Overriding. 6
2. **Working with Tabular Numeric Data(Numpy with Python)**: NumPy Arrays Creation Using *array()* Function, Array Attributes, NumPy Arrays Creation with Initial Placeholder Content, Integer Indexing, Array Indexing, Boolean ArrayIndexing, Slicing and Iterating in Arrays, Basic Arithmetic Operations on NumPy Arrays, Mathematical Functions in NumPy, Changing the Shape of an Array, Stacking and Splitting of Arrays, Broadcasting in Arrays. 6

UNIT-V **12hrs**

1. **Working with Data Series and Frames:** Pandas Data Structures, Reshaping Data, Handling Missing Data, Combining Data, Ordering and Describing Data,Transforming Data, Taming Pandas File I/O 6
2. **Plotting**: Basic Plotting with PyPlot, Getting to Know Other Plot Types, Mastering Embellishments, Plotting with Pandas 6

ESSENTIAL READING

1. Rao, Dr. R. Nageswara. Core Python Proramming. 2nd Edition. Dreamtech Press.
2. Data Science Essentials in Python: Collect, Organize, Explore, Predict, Value. DmitryZinoriev, The Pragmatic Programmers LLC, 2016
3. Introduction to Python Programming**.** Gowrishankar S., Veena A. CRC Press, Taylor & Francis Group, 2019

SUGGESTED READING

1. Chun, Wesley J. **Core Python Programming.** 2nd Edition. USA: Pearson Education

WEB TECHNOLOGIES

Credits : 3 **Semester: IV**
Course Code: CSCC23403 **No. of Lecture Hours: 45**

Objectives:

- To design and develop web pages using HTML and CSS.
- To get familiarize with Node.js.

Course Outcomes:

CO1: **Illustrate** basic html scripts to design web pages
CO2: **Explain** about cascading style sheets
CO3: **Analyze** java script programming using operators, expressions, functions
CO4: **Classify** event handling in java script and introduction to xml
CO5: **Develop** applications using Node.js

UNIT-I **9Hrs**
HTML

1. Origin and Evolution of HTML and XHTML, basic syntax, Document structure 1
2. Basic text markup, Images 2
3. Hypertext links, lists 2
4. Tables, Forms 2
5. Frames 2

UNIT-II **9Hrs**
CASCADING STYLE SHEETS

1. Introduction, Levels of style sheets, style specification format 1
2. Selector forms, property value forms 1
3. Font properties, list properties 3
4. Color, alignment of text, the box model 3
5. Background images, the and tags 1

UNIT-III **9Hrs**
JAVASCRIPT

1. Overview, object orientation and JavaScript 1
2. General syntactic characteristics 1
3. Primitives, operations, expressions 2
4. Control statements, Screen output and keyboard input 2
5. Object creation and modification, Arrays, Functions 2
6. Pattern Matching using regular expressions 1

UNIT-IV **9Hrs**

EVENT HANDLING IN JAVA SCRIPT

1. Document Object model, Element Access in JavaScript 1
2. Events and Event Handling 1
3. Handling Events from Body, Button, text box and password Elements 2
4. Moving Elements, Element Visibility, Changing colors and fonts 2
5. **Angular Java Script Angular JS Expressions** 3
   Array, Objects, $eval, Strings, Angular JS Form Validation & Form Submission, Single Page Application development using Angular JS.

UNIT-V **9Hrs**

1. Node.js: Introduction, Advantages, Node.js Process Model, Node JS Modules. 2
2. Express.js: Introduction to Express Framework 1
3. Introduction to Nodejs , What is Nodejs, Getting Started with Express 2
4. Your first Express App, Express Routing, Implementing MVC in Express, 2
5. Middleware, Using Template Engines, Error Handling , API Handling , 2

ESSENTIAL READING

1. Sebesta, Robert W. 2008. **Programming the World Wide Web.** 4th Edition. New Delhi: Pearson Education
2. **Pro Mean Stack Development,** ELadElrom, Apress

CLOUD COMPUTING ARCHITECTURE

Credit : 4 **Semester: IV**
Course Code: CSCC23404 **No. of Lecture Hours: 60**

Objective:

- To impart knowledge in students with the concepts of Virtualization and Cloud Computing Architecture

Course Outcomes:

CO1: Apply various techniques used for computing virtualization.
CO2: Illustrate network virtualization and virtual machine migration services
CO3: Describe techniques for Desktop virtualization
CO4: Understand the fundamental ideas behind Cloud Computing, the evolution of the paradigm, its applicability; benefits, as well as current and future challenges;.
CO5: Explain the basic ideas and principles in data center design; cloud management techniques and cloud software deployment considerations;

UNIT-I **12Hrs**
Virtualization Technology (At Server)

1. Virtualization reference model, Advantages, Server/Compute virtualization 2
2. Need, advantages and techniques of Server/Computer Virtualization 2
3. Virtual clusters, Virtual machine and Hardware components, Hypervisor 2
4. Resource management tools 1
5. Physical machine to virtual machine conversion, logical partitioning 2
6. Types of virtualization- data center, server, storage, sensor 2
7. Storage Area Network, Network Attached Storage 1

UNIT-II **12Hrs**
Virtualization Technology (At Network)

1. Exploring Network Virtualization- tools and benefits 2
2. Features of Network components- Virtual switches, Virtual LANs 2
3. Traffic Management and Techniques 3
4. Virtual Machine Migration Services 2
5. Technology Examples: Xen, VM Ware and Hyper-V 3

UNIT-III **12Hrs**
Virtualization Technology (At Desktop and Application)

1. Desktop virtualization- advantages and Limitations 2
2. Drivers used in virtualization, Techniques for Desktop virtualization 3
3. Components of Desktop Virtualization, Application Virtualization 3
4. Hardware Virtual machine, machine imaging, VM provisioning 2

5. Virtual machine Migration Services management 2

UNIT-IV **12hrs**

1. **Overview of Cloud Computing** – Introduction & Essentials of Cloud Computing 1
2. Need Of Cloud Computing, History of Cloud Computing 2
3. Business and Information Technology Perspective, News on cloud and Benefits of Cloud Computing 2
4. Limitations of Cloud Computing 1
5. How to develop Cloud Infra Structure, Vendors of Cloud Computing 1
6. Elastic Computing, Social Networking, Enterprise Cloud Computing 1
7. **Factors that affect cloud computing**-Introduction, Cloud Data Center Requirements 2
8. Influence of Cloud Computing on Business Companies 1

UNIT-V **12hrs**

1. **Cloud Computing Architecture**-Introduction, Grid framework overview and architecture 2
2. Cloud Computing Architecture 2
3. Key Design Aspects of Cloud Architecture, Cloud Services and Applications 1
4. Characteristics of Cloud Computing 2
5. Cloud and Dynamic Infrastructure, Impediments to cloud adoption 2
6. Models Of Cloud Computing-Introduction, Cloud Service Models, Cloud Computing Subservice Models 3

Essential Readings

1. Singh. Shaliendra. 2018. **Cloud Computing**. New Delhi: Oxford University Press (All 5 Units)

Suggested Readings

1. Buyya, Raj Kumar, Vecchiola, Christian and Selvi, Thamaraj. 2012. **Mastering Cloud Computing**. New Delhi: TMH

Online resources: http://india.oup.com/orcs/9780199477388

SOFTWARE ENGINEERING

Credits : 4 **Semester: IV**
Course code: CSCC23405 **No. of Lecture Hours: 60**

Objectives:

- To enable students learn software engineering principles
- To learn the theoretical foundation from the view of object oriented concept.

Course Outcomes:

CO1: **Design** software through various process models.
CO2: **Analyze** Object Oriented concepts and various Models.
CO3: **Choose** different designs and architectures.
CO4: **Explain** components, golden rules and design evaluation.
CO5: **Select** testing techniques and determine its quality.

UNIT - I	**12Hrs**
1. The evolving role of software, software, changing nature of software	2
2. Legacy Software, Software Myths	2
3. Software engineering-layered technology, Process Framework	2
4. CMMI, Process patterns, Personal and Team Process models	1
5. Process Models: waterfall, incremental, evolutionary process models	2
6. Agile process models	3

UNIT- II	**12Hrs**
1. Requirements Engineering tasks, Initiating requirements engineering process	2
2. Eliciting requirements,	1
3. Developing Use Cases, Building analysis model	2
4. Negotiating and validating requirements	1
5. Requirements analysis, analysis modeling approaches, Data modeling Concepts	2
6. Object oriented analysis, Scenario based modeling, Flow oriented modeling	2
7. Class based modeling, creating behavioral model, Case Study	2

UNIT- III	**12Hrs**
1. Design Process and Quality	2
2. Design concepts and Design model	2
3. Pattern Based software design	2
4. Software architecture, Data design Architectural styles and Patterns	2
5. Architectural design, Assessing alternative architectural design	2
6. Managing Data flow into Software architecture	2

UNIT- IV	**12Hrs**
1. Introduction to Component, Designing class based components	2
2. Conducting component level design, Object constraint language	2
3. Design conventional components	2
4. Golden rules, User Interface Analysis and Design	2
5. Interface analysis, Interface design steps	2
6. Design Evaluation	2

UNIT- V	**12Hrs**
1. A Single approach to Software testing	1
2. Strategic issues, Test strategies for Conventional Software	1
3. Validation testing, System Testing	1
4. Testing fundamentals, Black box and White Box Testing	2
5. Basis Path Testing, Control Structure Testing	2
6. Software quality	1
7. Metrics for analysis model	2
8. Metrics for design model, Metrics for source code	1
9. Metrics for testing, Metrics for maintenance.	1

ESSENTIAL READING

1. Pressman, Rogers S. 2015. **Software Engineering, A practitioner's Approach.** 6th Edition**.** McGraw Hill Education

SUGGESTED READING

1. Deepak Jain. 2009. **Software Engineering.** New Delhi: Oxford University Press.
2. Rajib Mall. 2009. **Fundamentals of Software Engineering.** 3rd Edition. New Delhi: PHI.
3. Sommerville. 2007. **Software Engineering.** 7thEdition.New Delhi: Pearson Education.

PYTHON PROGRAMMING LAB

Credit : 1 **Semester: IV**
Subject Code: CSCC23406 **No. of Practical Hours: 30**

Objective: To develop applications using object oriented concepts of Python.

Outcome: Students will be able to demonstrate object oriented concepts of Python.

	Programs	No. Of Hours
1.	Fibonacci series up to a limit.	
2.	Sum and product of all the items in the list.	
3.	Multiplication table of a number.	
4.	Print largest and smallest of items in the list.	3
5.	Remove duplicates from a list.	
6.	Print a specified list after removing elements.	
7.	Add, subtract and multiply two matrices.	
8.	Transpose a matrix.	3
9.	Find second smallest and largest number in a list.	
10.	Count the number of elements in a list within a range.	
11.	Get the frequency of the elements in a list.	
12.	Illustrate functions.	3
13.	Check whether a string is palindrome or not.	
14.	Print a pattern.	
15.	Program that takes a list of words and returns the longest one.	
16.	Print date and time and current month calendar.	3
17.	Demonstrate pass by reference and pass by value.	
18.	Demonstrate types of formal arguments.	
19.	Demonstrate on functional programming.	
20.	Demonstrate on scope of variables.	3
21.	Program to work with directories.	
22.	Demonstrate on modules.	3
23.	Program on class and object (Take Student or Employee)	
24.	Program for inheritance.	3
25.	Display odd and even numbers using threads in a range.	
26.	Program on threads.	
27.	Program for accessing attributes in class.	
28.	Program for illustrating method overriding.	3
29.	Program for illustrating method overloading.	

30. Program for performing DML operations on table.
31. Write programs to create numpy arrays of different shapes and 3
from different sources, reshape and slice arrays, add array indexes,
and apply arithmetic, logic, and aggregation functions to some or all array elements

32. Write programs to use the pandas datastructures: Frames and series 3
as storage containers and for a variety of data-wrangling operations,
such as:
    - Single-level and hierarchical indexing
    - Handling missing data
    - Arithmetic and Boolean operations on entire columns and tables
    - Database-type operations (such as merging and aggregation)
    - Plotting individual columns and whole tables
    - Reading data from files and writing data to files

WEB TECHNOLOGIES LAB

Credits :1 **Semester : IV**
Course Code: CSCC23407 **No. of Practical Hours: 30**

Objective: To develop web applications using HTML,JavaScript, and XML.
Outcome: Students will be able to develop dynamic web pages using Java Script, gain knowledge in server side scripting with PHP language, and parsing XML.

No. of Hours	TOPICS
1-2.	Programs to demonstrate on basic HTML tags.
3-4.	Programs to demonstrate on different types of lists.
5-6.	Programs to demonstrate on frames, forms, table creation.
7	Programs to demonstrate on inline, external, embedded style sheets.
8-9.	Programs to demonstrate control structures.
10.	Programs to demonstrate on functions, arrays, regular expressions.
11-12.	programs on Angular JS concepts
13	Programs using Node.js
14-15	Programs using Express App

CLOUD COMPUTING ARCHITECTURE LAB

Credit: 1 **Semester: IV**
Course Code: CSCC23408 **No. of Practical Hours: 30**

Objectives:
The student should be made to:

- Be exposed to tool kits for grid and cloud environment.
- Be familiar with developing web services/Applications in grid framework
- Learn to run virtual machines of different configuration.

Course Outcomes:

CO1: To develop web applications in cloud
CO2: learn the design and development process involved in creating a cloud based application

LIST OF EXPERIMENTS:

1. Install Virtualbox / VMware Workstation with different flavours of linux or windows OS on top of windows7 or 8.
2. Install a C compiler in the virtual machine created using virtual box and execute Simple Programs
3. Install Google App Engine. Create hello world app and other simple web applications using python/java.
4. Use GAE launcher to launch the web applications.
5. Simulate a cloud scenario using CloudSim and run a scheduling algorithm that is not present in CloudSim.
6. Find a procedure to transfer the files from one virtual machine to another virtual machine
7. Find a procedure to launch virtual machine using trystack (Online Openstack Demo Version)
8. Implementation of Para-Virtualization using VM Ware‘s Workstation/ Oracle‘s Virtual Box and Guest O.S.
9. Case Study: PAAS(Facebook, Google App Engine)
10. Case Study: Amazon Web Services.
11. Implementation of SOAP Web services in C#/JAVA Applications