

(An Autonomous College under VTU)

Department of Computer Science and Engineering

III to VIII Semesters

Scheme – 2020

Outcome-based Education and Choice-based Credit System

VISION

Create **globally competent professionals** through quality education in the field of Computer Science and Engineering.

MISSION

M1: Empowering students by imparting knowledge, latest technologies through practical approach and academic professionalism to fulfill the needs of the industry.

M2: Developing Technical proficiencies, communication skills and teamwork among the students.

M3: Inculcating ethics, social behavior, and universal human values for sustainable societal growth and environmental protection.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Apply the Computer Science and Engineering technical knowledge to fulfil the organizational needs.

PEO2: Inculcate proficiency, good communication skill, team building and problem-solving abilities.

PEO3: Pursue higher studies, research and to become entrepreneurs with good work ethics and professional behaviour.

PROGRAM OUTCOMES (POs)

Graduates of the Computer Science and Engineering Programme will be able to achieve the following POs:

PO1: Engineering Knowledge

Apply the knowledge of mathematics, science, engineering fundamentals, and Computer Science and Engineering principles to the solution of complex problems in Computer Science and Engineering.

PO2: Problem Analysis

Identify, formulate, research literature, and analyze complex Computer Science and Engineering problems reaching substantiated conclusions using first principles of mathematics and engineering sciences.

PO3: Design/Development of Solutions

Design solutions for complex Computer Science and Engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of Complex problems

Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions related to Computer Science and Engineering problems.

PO5: Modern Tool Usage

Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex Computer Science and Engineering activities with an understanding of the limitations.

PO6: The Engineer and Society

Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional Computer Science and Engineering practice.

PO7: Environment and Sustainability

Understand the impact of the professional Computer Science and Engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics

Apply ethical principles and commit to professional ethics and responsibilities and norms of the Computer Science and Engineering practice.

PO9: Individual and Team work

Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication

Communicate effectively on complex Computer Science and Engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project Management and Finance

Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage Computer Science and Engineering projects and in multidisciplinary environments.

PO12: Life Long Learning

Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: Professional Skills:

Ability to analyse, design and develop computer programs in the areas related to system software, multimedia, web design, big data analytics, and networking for efficient design of computer-based systems of varying complexity.

PSO2: Problem-Solving Skills:

Ability to apply standard practices and strategies in software project development using open-ended programming environments to deliver a quality product for business success.

PSO3: Foundation of mathematical concepts:

Ability to apply mathematical concepts to solve real world problems using appropriate datastructure and suitable algorithms.

SI.	Course	Course Name	Total	L:T:P:S	Duration in	CIE	SEE	Total
No.	Code	Course runne	Credits	(Hrs/Week)	Hours	Marks	Marks	Marks
1	20MAT31	Fourier Series, Transforms and Numerical Techniques	4	3:2:0:0	3	50	50	100
2	20CSI32	Data Structures Using C	4	3:0:2:0	3	50	50	100
3	20CSI33	Database Concepts Using SQL	3	2:0:2:0	3	50	50	100
4	20CSI34	Object Oriented Programming Using JAVA	4	3:0:2:0	3	50	50	100
5	20CST35	Operating Systems	3	2:2:0:0	3	50	50	100
6	20CST36	Logic Design & Computer Organization	3	2:2:0:0	3	50	50	100
7	20KBK38 /20KSK38	Balake Kannada/ Samskrutika Kannada	1	0:2:0:0	3	50	50	100
8	20CPH38	Constitution of India & Professional Ethics and Human Rights	1	0:2:0:0	3	50	50	100
9	20PEC39	Elements of Communication	2	1:0:2:0	3	50	50	100
			25	16: 10: 8:0		450	450	900

Third Semester B.E. – Scheme w.e.f. 2021-2022

Fourth Semester B.E.– Scheme w.e.f. 2020-2021

Sl. No.	Course Code	Course Name	Total Credits	L:T:P:S (Hrs/Week)	Duration in Hours	CIE Marks	SEE Marks	Total Marks
1	20MAT41	Applied Calculus and Probability Distribution	4	4:0:0:0	3	50	50	100
2	20CSI42	Design and Analysis of Algorithms (IC)	4	3:0:2:0	3	50	50	100
3	20CSI43	Web Programming (IC)	3	2:0:2:0	3	50	50	100
4	20CSI44	Python Programming (IC)	3	2:0:2:0	3	50	50	100
5	20CST45	Software Engineering	3	3:0:0:0	3	50	50	100
6	20CST46	Computer Networks	3	3:0:0:0	3	50	50	100
7	20UHV47	Universal Human Values-2	3	3:0:0:0	3	50	50	100
8	20PDE49	Professional Development of Engineers	2	1:0:2:0	3	50	50	100
			25	21:2:8:0	-	400	400	800

Note:	AICTE	Activity	points	(Mandatory))
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Sl. No.	Course Code	Course Name	Total Credits	L:T:P:S (Hrs/Week)	Duration in Hours	CIE Marks	SEE Marks	Total Marks
1	20CST51	Cloud Computing	3	3:0:0: 0	3	50	50	100
2	20CST52	System Modelling & Simulation	3	3:0:0: 0	3	50	50	100
3	20CSI53	Advanced JAVA(IC)	4	3:0:2: 0	3	50	50	100
4	20CSI54	Machine Learning(IC)	4	3:0:2: 0	3	50	50	100
5	20CST55	Theory of Computation	3	3:0:0: 0	3	50	50	100
6	20CST56X	Professional Elective-I	3	3:0:0: 0	3	50	50	100
7	20CSP57	Mini Project	3	0:0:0: 8	3	50	50	100
8	20PES58	Employability Skills & Aptitude Training	2	1:0:2: 0	3	50	50	100
			25	19:0:6:8		400	400	800

Fifth Semester B.E. – Scheme w.e.f. 2020-2021

Professional Elective-1

Sl. No.	Course Code	Course Name	Total Credits	Marks
1	20CST561	Wireless Sensor Networks	3	100
2	20CST562	Introduction to Data Science and Computing	3	100
3	20CST563	UNIX & Shell Programming	3	100

Sixth Semester B.E. – Scheme w.e.f. 2020-2021

Sl. No.	Course Code	Course Name	Total Credits	L:T:P:S (Hrs/Week)	Duration in Hours	CIE Marks	SEE Marks	Total Marks
1	20CST61	Compiler Design	3	3:0:0: 0	3	50	50	100
2	20CSI62	Android Application Development(IC)	3	2:0:2: 0	3	50	50	100
3	20CST63	Big Data Analytics	3	3:0:0: 0	3	50	50	100
4	20CST64	Artificial Intelligence	3	3:0:0: 0	3	50	50	100
5	20CSI65	Full Stack Development (IC)	4	3:0:2: 0	3	50	50	100
6	20CST66X	Professional Elective –II	3	3:0:0: 0	3	50	50	100
7	20ENV67	Environmental Science	1	1:0:0:0	3	50	50	100
8	20CST68X	Professional Elective –III	3	3:0:0: 0	3	50	50	100

9	20PET691	Employability Skills & Technical Aptitude -II	2	1: 0 : 2 : 0	3	50	50	100
			25	22:0:6:0	-	450	450	900

Professional Elective-II

SL. No.	Course Code	Course Name	Total Credits	Marks
1	20CST661	Advanced Algorithms	3	100
2	20CST662	User Interface Design	3	100
3	20CST663	Block Chain & Crypto Currencies	3	100

Professional Elective-III

SL. No	Course Code	Course Name	Total Credits	Marks
1	20CST681	Cryptography, Network Security and Cyber Laws	3	100
2	20CST682	Pattern Recognition	3	100
3	20CST683	Deep Learning	3	100

Seventh Semester B.E. – Scheme w.e.f. 2020-2021

Sl. No.	Course Code	Course Name	Total Credits	L:T:P:S (Hrs/Week)	Duration in Hours	CIE Marks	SEE Marks	Total Marks
1	20CSI71	Internet of Things(IC)	4	3:0:2: 0	3	50	50	100
2	20CSI72	Cyber Security Forensics (IC)	4	3:0:2: 0	3	50	50	100
3	20CST73X	Professional Elective -IV	3	3:0:0:	3	50	50	100
4	20CST74X	Professional Elective -V	3	3 : 0 : 0 : 0	3	50	50	100
5	20CST75X	Industrial Elective-I	3	3:0:0: 0	3	50	50	100
6	20CSP76	Project Phase-1	3	0:0:6: 0	3	50	50	100
			20	15:0:10:0	-	350	350	800

Professional Elective – IV

Sl. No.	Course Code	Course Name	Total Credits	Marks
1	20CST731	Advanced Cloud Computing	3	100
2	20CST732	Advanced Machine Learning Techniques	3	100
3	20CST733	Data Warehousing & Data Mining	3	100

Professional Elective – V

Sl. No.	Course Code	Course Name	Total Credits	Marks
1	20CST741	UML & Agile Practices	3	100
2	20CST742	Devops	3	100
3	20CST743	Management Entrepreneurship	3	100

Industrial Elective –I

Sl. No.	Course Code	Course Name	Total Credits	Marks
1	20CST751	Modern Tools & Development	3	100
2	20CST752	Software Testing & Quality Assurance	3	100
3	20CST753	Industry 4.0	3	100

Eight Semester B.E. – Scheme w.e.f. 2020-2021

Sl. No.	Course Code	Course Name	Total Credits	L:T:P:S (Hrs/Week)	Duration in Hours	CIE Marks	SEE Marks	Total Marks
1	20CSP81	Technical Seminar	1	0:0:2:0	3	50	50	100
2	20CSP82	Internship	3	0:0:6:0	3	50	50	100
3	20CSP83	Project Phase, Evaluation and Viva-Voce	11	0:0:18:8	9	100	100	200
		TOTAL	15	0:0:26:8	-	200	200	400

III SEMESTER COURSE SYLLABUS

FOURIER SERIES, TRANSFORMS AND NUMERICAL TECHNIQUES

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20MAT31	3:2:0:0	04	CIE:50 SEE:50	03 Hours	BS

Course Objectives:

This course will enable students to:

- > Have the efficiency in expressing a periodic function in terms of infinite trigonometric series.
- > Obtain the knowledge of Laplace Transforms.
- > Acquire the skill in solving the engineering applications problem using Laplace Transforms.
- > Get the ability to solve the engineering problem using Fourier Transforms.
- Develop the proficiency in solving algebraic and transcendental equations and interpolation using numerical methods

Module-I

Fourier Series: Periodic functions, Dirichlet's conditions, Euler's Formulae (without proof), Fourier series of periodic functions of period 21 and 2π , Half range Fourier series, Practical harmonic analysis problems.

08 Hours

Module – II

Laplace Transform: Definition, Laplace Transform of elementary functions. Properties transform of derivatives, multiplication by t^n and division by t - Problems. Laplace transforms of periodic functions, unit step functions and unit impulse function– Problems.

08 Hours

Module – III

Inverse Laplace Transforms: Inverse Laplace Transforms of standard functions. (Formulae only). Inverse Laplace transform by using completing the squares, partial fractions, shifting property and differentiation - problems. Convolution theorem - problems. Applications - solution of linear differential equations with initial conditions- problems. **08 Hours**

Module – IV

Fourier Transforms and Z - Transforms: Complex Fourier transforms, Fourier Sine and Cosine transforms and their inverse transforms problems .Z - Transforms of some standard functions, Damping and shifting rules - problems. Inverse Z – Transforms by partial fraction method.

08 Hours

Module-V

Numerical Methods: Numerical solutions of algebraic and transcendental equations- Regula Falsi Method and Newton Raphson Method (Formulae only) –Problems. Finite Differences-Forward and Backward differences, Newton's Forward and Newton's Backward interpolation formulae. Lagranges Interpolation formula (without proof)–Problems. Numerical Differentiation using Newton's forward and Backward interpolation formulae. – Problems.

08 Hours

Course Outcomes:

On completion of this course, the students are able to:

- **CO1:** Demonstrate Fourier series to study the behaviour of periodic functions and their applications in engineering problem.
- CO2: Find the Laplace transform of different types of functions.
- **CO3:** Use the Laplace transform and inverse Laplace Transform in solving various types engineering application problems.
- **CO4:** Make use of Fourier transform and Z-transform to illustrate discrete/continuous function arising in engineering applications.
- **CO5:** Determine the roots of Algebraic and Transcendental equations and Interpolation arising in engineering applications, using numerical methods

Text Books:

- Dr. B.S. Grewal: "Higher Engineering Mathematics", (Chapters 10, 21, 22, 28, 29, 30), Khanna
 a. Publishers, New Delhi, 42nd Edition, 2012, ISBN:9788174 091955.
- N.P. Bali and Dr. Manish Goyal: "A Text Book of Engineering Mathematics", (Chapters 10, 18, 20, 22, 24), Laxmi Publications (P) Ltd., New Delhi, 9thEdition, 2014, ISBN:9788131808320.

Reference Books:

 Erwin Kreyszig: "Advanced Engineering Mathematics", Wiley Pvt. Ltd. India, New Delhi, 9th Edition, 2011, ISBN 13: 9788126531356. B.V. Ramana: "Higher Engineering Mathematics", Tata Mc Graw –Hill Publishing Company Limited, New Delhi, 2nd Reprint, 2007, ISBN 13: 978-0-07063417-0.

E-Resources:

- 1) http://bookboon.com/en/essential-engineering-mathematics-ebook
- 2) <u>https://www.free-ebooks.net/ebook/essential-engineering-mathematics</u>
- 3) <u>https://archive.org/details/AdvancedEngineeringMathematics10thEdition</u>

DATA STRUCTURES USING C (IC)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CSI32	3:0:2:0	04	CIE:50 SEE:50	03 Hours	IC

Prerequisites:

A course on "Fundamental for C".

Course Objectives:

As a student will be able to learn:

- > Efficient storage mechanisms of data for an easy access.
- > To design and implementation of various basic and advanced data structures.
- > To introduces various techniques for representation of the data in the real world.
- > To develop application using data structures.
- > To improve the logical ability.

Module-I

Introduction to Data Structures: Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Double Linked List

08 Hours

Module – II

Stacks-Operations, array and linked representations of stacks, stack applications, Queues-operations, array and linked representations.

08 Hours

Module – III

Dictionaries and Hashing: Dictionaries: linear list representation, skip list representation, operations - insertion, deletion and searching. Hash Table Representation: hash functions, collision resolution-separate chaining, open addressing-linear probing, quadratic probing, double hashing and rehashing, extendible hashing. **08 Hours**

Module – IV

Trees: Search Trees: Binary Search Trees, Definition, Implementation, Operations- Searching, Insertion and Deletion, AVL Trees, Definition, Height of an AVL Tree, Operations – Insertion, Deletion and Searching, Red –Black, Splay Trees.

08 Hours

Module-V

Graphs and Sorting: Graphs: Graph Implementation Methods. Graph Traversal Methods. Sorting: Insertion Sort, Quick Sort, Merge Sort.

08 Hours

Lab Programs

1. Write a program that uses functions to perform the following operations on singly linked list.:

i)Creation ii) Insertion iii) Deletion iv) Traversal

2. Write a program that uses functions to perform the following operations on doubly linked list.:

i)Creation ii) Insertion iii) Deletion iv) Traversal

- 3. Write a program that implement stack (its operations) using i) Arrays ii) Pointers
- 4. Write a program that implement Queue (its operations) using i) Arrays ii) Pointers
- 5. Write a program that implements the following sorting methods to sort a given list of integers in ascending order i) Quick sort ii) Merge sort
- 6. Write a program to implement the graph traversal methods.

Course Outcomes:

- **CO1:** Choose appropriate data structure as applied to specified problem definition, perform operations like searching, insertion, deletion, traversing mechanism etc.
- **CO2:** Use linear and non-linear data structures like stacks, queues, and perform operations like searching, insertion, deletion, traversing mechanism etc.
- **CO3:** Assess efficiency trade-offs among different data structure implementations or combinations and design programs using a variety of data structures, including hash tables and Dictionaries.

CO4: Design programs using a variety of data structures, including binary and general tree structures, search trees, AVL-trees, red-black Trees and splay Trees.

CO5: Implement and know the application of algorithms for sorting and graphs.

Textbooks:

- 1) Fundamentals of Data Structures in C, 2nd Edition, E. Horowitz, S. Sahni and Susan Anderson Freed, Universities Press
- 2) Data Structures using C A. S. Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/Pearson Education.

Reference Books:

- 1) Data Structures: A Pseudocode Approach with C, 2nd Edition, R. F. Gilberg and B.A. Forouzan, Cengage Learning.
- 2) "Data Structures and Algorithm Analysis in C" by Weiss
- 3) "Data Structure Through C" by Yashavant P Kanetkar
- "Problem Solving in Data Structures and Algorithms Using C: The Ultimate Guide to Programming Interviews" by Hemant Jain
- 5) "Data Structures and Algorithms in C" by Adam Drozdek

Reference Online Resources:

- 1) Udacity's Intro to Algorithms
- 2) 2Algorithms and Data Structures by edX
- 3) Data Structures and Algorithms on Udemy
- 4) Coursera's Data Structures and Algorithms Specialization
- 5) Tutsplus.com
- 6) Geeksforgeeks.org
- 7) VisuAlgo.net
- 8) Tutorialspoint.com

DATABASE CONCEPTS USING SQL(IC)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CSI33	2:0:2:0	03	CIE:50 SEE:50	03 Hours	PCC

Prerequisites:

- 1. Students should know basics of Discrete Mathematics.
- 2. Students should know basic programming concepts.

Course Objectives: This course will enable students to:

- > Understand the fundamentals of Relational database management systems.
- Learn the basic queries and execute in SQL.
- > Understand the concepts of Disk storage and basic file structures indexing structures for files.
- > Describe database using ER-modelling, Normalization and querying the database using SQL.
- Explain the fundamentals of transactions, locking mechanisms, database recovery.

Module – I

Introduction to Database: Introduction, Three-schema architecture, Classification of Database Management systems. **Conceptual Modelling and Database Design:** Using High-Level Conceptual Data Models for Database Design, Relationship types of degree higher than two. Relational Model Concepts, ER Diagrams, Naming Conventions and Design Issues. **The Relational Data Model:** Relational Model Constraints and Relational Database Schemas; Update Operations, Transactions and dealing with constraint violations; Unary Relational Operations: SELECT and PROJECT; Relational Algebra Operations from Set Theory; Binary Relational Operations: JOIN and DIVISION; Additional Relational Operations; Examples of Queries in Relational Algebra.

08 Hours

Module – II

The Relational Data Model: Basic SQL:SQL Data Definition and Data Types: Specifying basic constraints in SQL; Schema change statements in SQL; Basic queries in SQL. More SQL Complex Queries, Triggers, Views, and Schema Modification: More complex SQL Queries. Insert, Delete and Update statements in SQL; Specifying constraints as Assertion and Trigger; Views (Virtual Tables) in SQL.

08 Hours

Module – III

Database Design Theory and Normalization: Informal Design Guidelines for Relation Schemas; Functional Dependencies; Normal Forms Based on Primary Keys; General Definitions of Second and Third Normal Forms; Boyce-Codd Normal Form

08 Hours

Module – IV

Disk Storage, Basic File Structures and Hashing: Introduction, Secondary Storage Devices, Buffering of Blocks, Hashing Techniques: Internal Hashing, External Hashing for Disk Files. **Indexing Structures for Files:** Types of Single-Level Ordered Indexes: Primary and Secondary Indexes, B+ tree: Examples on Construction, insert and searching

08 Hours

Module-V

Overview Of Transaction Management: The ACID Properties; Transactions and Schedules; Concurrent Execution of Transactions; Lock- Based Concurrency Control; Performance of locking; Transaction support in SQL; Introduction to crash recovery; **Concurrency Control**: 2PL, Serializability and Recoverability; Lock Management; **Crash Recovery**: The write-ahead log protocol; Check pointing; Recovering from a System Crash; Media Recovery; Other approaches and interaction with concurrency control.

08 Hours

Lab Programs

Part-A

1. PROBLEM STATEMENT:

 Choose an online application that you are familiar with that has a large user base. Examples: Twitter, Snapchat, Gmail, Facebook, Minecraft, Healthcare.gov, Dropbox, Flickr, LinkedIn, Instagram, eBay, Yelp, Trip Advisor. With reference to the site selected by you answer the following questions: Estimate the total number of users with accounts for the application. Explain your estimation process. Cite any sources you consulted.

List what you think is the main data for the application that is maintained on a per-user basis.

Estimate the average amount of data per user for this data. Explain the basis for your estimate.

Use the answers to Questions a - c to estimate the total amount of user data managed by the application provider.

- Assume that you have been asked to design the Library Management System at NMIT. List out the data that you would need to store with respect to books, patrons etc to create an efficient system.
 Note: Please analyse how a library works and then answer the above question
- 3. Visit an e-commerce website. Select two items of your choice. Identify the data that the web application would need to store with respect to this item. Which data is common to both items and which data is specific to each item?
- 4. Write down the names of 5 different database management systems. Note down the following details with respect to each
 - a) market share
 - b) type of DBMS
 - c) an application that uses this DBMS

2. PROBLEM STATEMENT:

Install MySQL, load sample database, execute basic mysql commands and complete the following tasks

- a) Open MySQL
- b) Create new user
- c) Load sample Database 1
- d) Load Sample Database 2
- e) Practice basic MySQL commands
- f) Answer the questionnaires provided in the lab.

3. PROBLEM STATEMENT

Design an ER Diagram for A pharmaceutical company manufactures database

Part-B

1. Database Schema for a Student Library scenario

Consider that a database named **Student Library** is developed by an application software NMIT Soft company. There are 4 tables in the database. Relationship scheme for the tables is as below:

Student (Stud_no : integer,Stud_name: string)

Membership (Mem_no: integer,Stud_no: integer)

Book (book_no: integer, book_name:string, author: string)

Iss_rec (iss_no:integer, iss_date: date, Mem_no: integer, book_no: integer)

For the above schema, perform the following:

- a) Create the tables with the appropriate integrity constraints
- b) Insert around 10 records in each of the tables
- c) List all the student names with their membership numbers
- d) List all the issues for the current date with student and Book names
- e) Give a count of how many books have been bought by each student
- f) Give a list of books taken by student with stud_no as 5
- g) Create a view which lists out the iss_no, iss _date, stud_name, book name

2. Create a relational database schema for a Project, described by the following relations.

STUDENT (Rollno: integer, Name: String, Sem: integer, Degree: String, Contact no:integer, Guide_No: integer)

GUIDE (Guide_name: String, Guide_No: integer, Guide_reserach_domain: String, Contat_No: integer, Email_Id: String)

PROJECT (Project_No: Integer, Project_title: String, Project_Area: String, Start_dt, date, Guide_No:integer)

GROUP (Group_Code:integer, Roll_No:integer)

PROJECT_GROUP (Group_Code:integer, Project_No: integer, no_of_students:integer)

For the above schema, perform the following.

- a) Create the tables with the appropriate integrity constraints
- b) Insert around 10 records in each of the tables
- c) Find the list of guides, who are guiding more than two student groups.
- d) Find the list of projects no, project name & name of guide, in domain of Database.
- e) Update guide details of a roll no "110011", new guide is "Ram Mohan" & id, 112200".
- f) Remove the Guide details, guide no is "112211" and assign guide no "133113" toall respective students' project group.
 - g) Create a view as student_project details that lists student name, project name and guide name

3. The following relations keep track of airline flight information:

Flights (flno: integer, from: string, to: string, distance: integer, departs: time, arrives: time, price: integer)

Aircraft (aid: integer, aname: string, cruisingrange: integer)

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.

For the above schema, perform the following.

- a) Create the above tables by specifying primary keys and foreign keys.
- b) Insert around 10 records in each of the tables.
- c) Find the names of aircraft such that all pilots certified to operate them earn more than 80,000.
- d) For each pilot who is certified for more than three aircraft, find the eid and the maximum cruising range of the aircraft that he (or she) is certified for.
- e) Find the names of pilots whose salary is less than the price of the cheapest route from Los Angeles to Honolulu.
- f) Find the second highest salary of an employee.
- g) Create a view which lists out the eid, ename, aid, aname

4. Consider a relational database schema for a Company database below.

Employee (F_name: string, L_name: string, Emp_id:integer, Bdate: date, Address:string, Gender:string, Salary: integer, Super_Emp_id: integer, D_no: integer)

Department (D_name:string, D_no:integer, D_Mgr_id:integer, Mgr_start_date: date)

- Dept_Location (D_no: integer, D_location:string)
- Project (P_name:string, P_number:integer, P_location:string, D_no:integer)

Works_on (Emp_id:integer, P_no:integer, Hours: int)

Dependent(Emp_id:integer,Dependent_name:string,Gender:string,Bdate:date,Relationship:String

For the above schema, perform the following

- a) Create the above tables by specifying primary keys and foreign keys.
- b) Insert around 10 records in each of the tables.
- c) Company decided to give a raise on salaries of every employee, working on the "ProductX" project by 10 percent.
- d) Find the names and address of all employees who work on same department.
- e) List the name and address of all employees who work for the "Research" department.

- f) Retrieve a list of employees and the projects they are working on, ordered by department and, within each department, ordered alphabetically by last name, then first name.
- g) Create a view Dept_info that gives details of department name, Number of employees and total salary of each employee.

5. Consider a relational database schema for a Sailors database below

Sailors (sid: integer, sname: string, rating: integer, age: real);

Boats (bid: integer, bname: string, color: string);

Reserves (sid: integer, bid: integer, day: date).

For each rating level that has at least two sailors.

- a) Create the above tables by specifying primary keys and foreign keys.
- b) Insert around 10 records in each of the tables.
- c) Find the names of sailors who have reserved a red boat, and list in the order of age.
- d) Find the names of sailors who have reserved boat 103
- e) Find the name and the age of the youngest sailor.
- f) Find the average age of sailors for each rating level that has at least two sailors.
- g) Find the names and ratings of sailor whose rating is better than some sailor called Horatio.

Course Outcomes

- **CO1:** Understand the essentials of DBMS and its architectures, Design and model a real time Scenario using ER-Modelling.
- CO2: Formulate, using relational algebra, SQL and SQL to solve queries.
- **CO3:**Demonstrate an understanding of normalization theory and apply such knowledge to the normalization of a database
- **CO4:** Familiarize the concept of storage management in DBMS and processing in Distributed and Parallel databases.

CO5: Illustrate the transaction management, database recovery and security issues.

Text Books:

- Fundamentals of Database Systems; RamezElmasri and Shamkant B. Navathe; Pearson; 6thEdition; ISBN: 978-0-136-08620-8 (Modules 1 to 4, Chapters- 2,3,4,5,7,13,15,17,18)
- Database management systems, Ramakrishnan, and Gehrke, 3rd Edition, 2014, McGraw Hill, ISBN-13: 978-0072465631, ISBN-10:0072465638

Reference Books:

 Silberschatz Korth and Sudharshan, Database System Concepts, 6th Edition, Mc- GrawHill, 2013, ISBN0-07-352332-1 (MODULE 5, Chapters-16,17,18)

E-Resources:

- 1) https://www.db-book.com/db6/_
- 2) <u>https://raw.githubusercontent.com/pforpallav/school/master/CPSC404/Ramakrishnan%20-%20Database%20Management%20Systems%203rd%20Edition.pdf</u>

OBJECT ORIENTED PROGRAMMING USING JAVA(IC)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CSI34	3:0:2:0	04	CIE:50 SEE:50	03 Hours	IC

Course Objectives:

This course will enable students to:

- > Learn the basic concepts of object-oriented programming.
- > Understand the basics of JAVA Programming using classes and objects.
- ➤ Gain the knowledge of Inheritance and packages.
- > Expose to the concepts of exceptions that occur while programming in JAVA.
- > Acquire the knowledge of multi-threaded programming in JAVA.

Module – I

Introduction to Object Oriented Concepts: Procedure–Oriented Programming system, Object Oriented Programming System, Comparison of Object-Oriented Language with C.

Introduction to Java: Java's magic, The Byte code, Java Development Kit (JDK), Java Buzzwords, Objectoriented programming, IO Streams, Data types, variables and arrays, reference variables, Operators, Control Statements. Simple Java programs.

08 Hours

Module – II

Classes: Classes fundamentals, Declaring objects, this keyword, garbage collection. **Methods**: Method Prototyping, Member functions and data members, Constructors, Objects and methods, Method Overloading, Objects and arrays, Access modifiers, Setters and getters, Nested classes, Console I/O.

08 Hours

Module – III

Inheritance: Inheritance basics, using super, creating multi-level hierarchy, method overriding, using Abstract classes, using final.

Packages: Packages: Access Protection, Importing Packages.

08 Hours

Module - IV

Interfaces, **Exceptions**, **Applets**: Interfaces, Exception handling fundamentals, exception types, uncaught exceptions, using try and catch, using multiple catch clauses, nested try statements, throw, throws, finally, Exception handling in Java, Applets, Types of Applets, Applet basics and class, Applet Architecture.

08 Hours

Module - V

Event Handling and Multi-Threaded Programming: Two event handling mechanisms, the delegation event model, Event classes, Sources of events, Event listener interfaces, Using the delegation event model, Adapter classes, Inner classes. Multi-Threaded Programming: What are threads? How to make the classes threadable, extending threads, implementing runnable, Synchronization, changing state of the thread, Bounded buffer problems, read-write problem.

08 Hours

Lab Programs

- 1) Write a Java program that prompts the user for an integer and then prints out all prime numbers up to that integer.
- 2) Write a Java program that prints the following pattern type
 - **** **** *** ** *
- 3) Write a java program to calculate gross salary & net salary taking the following data. Input: empno, empname, basic Process: DA=50% of basic HRA=25% of basic CCA=Rs240/- PF=10% of basic PT=Rs100/-
- 4) Write a Java program that displays area of different Figures (Rectangle,Square,Triangle) using the method overloading.
- 5) Write a Java program that displays the time in different formats in the form of HH:MM:SS using constructor Overloading.
- 6) Write a Java program that counts the number of objects created by using static variable.
- 7) Write a java program that implements educational hierarchy using inheritance.
- 8) Write a java program that implements Array Index out of bound Exception using built- in-Exception.
- 9) Write a java program that implements bank transactions using user defined exception.
- 10) Write a java program to identify the significance of finally block in handling exception.

Course Outcomes:

On completion of this course, the students will be able to:

- **CO1:** Explain the difference between Procedure and Object-Oriented Programming.
- CO2: Develop basic JAVA programs.
- **CO3:** Apply Inheritance properties and packages in solving real world problems.
- **CO4:** Use exception handling methods efficiently.
- **CO5:** Demonstrate the programs by using multithreaded concepts.

Text Books:

 Herbert Schildt, "Java The Complete Reference", 7th Edition, Tata McGraw Hill, 2013, ISBN-13: 978-0072263855, (Chapters 1-11).

Reference Books:

- Herbert Schildt, "The Complete Reference C++", 4th Edition, Tata McGraw Hill, 2013, ISBN- 13: 978-0072226805.
- 2) E Balagurusamy, "Programming with Java-A primer", 2nd Edition, Tata McGraw Hill companies,2009, *ISBN*-13: 978-9351343202.

E-Resources:

- 1) www.geeksforgeeks.org/java/
- 2) www.tutorialspoint.com/java/index.htm

OPERATING SYSTEMS

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CST35	2:2:0:0	03	CIE:50 SEE:50	03 Hours	PCC

Course Objectives:

This course will enable students to:

- > Learn the basic concepts of operating system, services and process handling.
- > Impart adequate knowledge on the need of parallel programming using multi-threading concepts.
- Identify and handling deadlocks.
- > Enable effective usage of the memory management techniques.
- ▶ Know about various file systems and understand the working of Linux platform.

Module-I

Introduction to Operating Systems, System Structures: What operating systems do; Computer System organization; Computer System architecture; Operating System structure; Operating System operations; Process management; Memory management; Storage management; Protection and Security; Distributed system; Special- purpose systems; Computing environments. **Operating System Services:** User - Operating System interface; System calls; Types of system calls; System programs; Operating system design and implementation; Operating System structure; Virtual machines; Operating System generation; System boot.

08 Hours

Module – II

Process Management: Process concept; Process scheduling; Operations on processes; Inter process communication. **Multi-threaded Programming:** Overview; Multithreading models; Thread Libraries; Threading issues. **Process Scheduling:** Basic concepts; Scheduling Criteria; Scheduling Algorithms; Multiple-processor scheduling; thread scheduling.

08 Hours

Module – III

Deadlocks: Deadlocks; System model; Deadlock characterization; Methods for handling deadlocks; Deadlock prevention; Deadlock avoidance; Deadlock detection and recovery from deadlock.

08 Hours

Module - IV

Memory Management: Memory management strategies: Background; Swapping; Contiguous memory allocation; Paging; Structure of page table; Segmentation.

Virtual Memory Management: Background; Demand paging; Copy-on-write; Page replacement; Allocation of frames; Thrashing.

08 Hours

Module – V

File System, Implementation of File System: File system: File concept; Access methods; Directory structure; File system mounting; File sharing; Protection: Implementing File system: File system structure; File system implementation; Directory implementation; Allocation methods; Free space management. **Case Study:** The Linux Operating System: Linux history; Design principles; Kernel modules; Process management; Scheduling; Memory Management; File systems, Input and output; Inter-process communication.

08 Hours

Course Outcomes:

On completion of this course, the students will be able to:

- CO1: Demonstrate functional architecture of an operating system.
- CO2: Describe process scheduling, multithreading and synchronization Concepts.
- CO3: Use suitable techniques for handling the deadlocks.
- CO4: Apply various memory management techniques.
- CO5: Realize the different concepts of OS in platform of usage through case studies

Text Books:

 Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, "Operating System Concepts" 9th edition, Wiley-India, 2016. ISBN-13: 978-8126554270.

Reference Books:

- Andrew S. Tanenbaum, Herbert Bos, "Modern Operating Systems", 4th edition, Pearson, India, 2014. ISBN-13: 978-0133591620.
- D.M Dhamdhere, "Operating Systems: A Concept Based Approach ", 3rd Ed, McGraw-Hill, 2013.ISBN: 9781259005589.

E-Resources:

- 1) https://www.tutorialspoint.com/operating_system/index.htm
- 2) https://www.studytonight.com/operating-system/

LOGIC DESIGN AND COMPUTER ORGANIZATION

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CST36	2:2:0:0	03	CIE:50 SEE:50	03 Hours	PCC

Course Objectives:

This course will enable students to:

- Design of Switching functions
- > Design a Combinational circuit design and simulation using gates
- > Explain the basic sub systems of a computer, their organization, structure and operation.
- > Illustrate the concept of programs as sequences of machine instructions.
- > Demonstrate different ways of communicating with I/O devices and standard I/O interfaces.

Module – I

Karnaugh maps: minimum forms of switching functions, two and three variable Karnaugh maps, four variable Karnaugh maps, determination of minimum expressions using essential prime implicants, Quine-McClusky Method: determination of prime implicants, simplification using map-entered variables

08Hours

Module – II

Combinational circuit design and simulation using gates: Review of Combinational circuit design, design of circuits with limited Gate Fan-in, Gate delays and Timing diagrams, Hazards in combinational Logic, simulation and testing of logic circuits Multiplexers, Decoders and Programmable Logic Devices: Multiplexers, three state buffers, decoders and encoders, Programmable Logic devices, Programmable Logic Arrays, Programmable Array Logic.

08Hours

Module – III

Basic Structure of Computers: Basic Operational Concepts, Bus Structures, Performance – Processor Clock, Basic Performance Equation, Clock Rate, Performance Measurement.

Machine Instructions and Programs: Memory Location and Addresses, Memory Operations, Instructions and Instruction Sequencing, Addressing Modes, Assembly Language, Basic Input and Output Operations, Stacks and Queues, Subroutines, Additional Instructions, Encoding of Machine Instructions

08Hours

Module – IV

Input/output Organization: Accessing I/O Devices, Interrupts – Interrupt Hardware, Direct Memory Access, Buses, Interface Circuits, Standard I/O Interfaces – PCI Bus, SCSI Bus, USB.

08Hours

Module-V

Memory System: Basic Concepts, Semiconductor RAM Memories, Read Only Memories, Speed, Size, and Cost, Cache Memories – Mapping Functions, Replacement Algorithms, and Performance Considerations.

08Hours

Course Outcomes:

On completion of this course, students will be able to:

- CO1: Identify and describe the six basic logic gates and simplification of Boolean Algebra.
- **CO2:** Design Combinational circuits in digital electronics. Realize and describe the operation of MUX, decoders, PLDs.
- CO3: Describe of the basic structure and operation of a digital computer system.
- CO4: Illustrate the different ways of communicating with I/O devices and standard I/O interfaces.
- CO5: Describe the hierarchical memory system, cache memories and Replacement algorithm.

Text Books:

- 1) Charles H Roth and Larry L Kinney, Analog and Digital Electronics, Cengage Learning, 2019
- Carl Hamacher, Zvonko Vranesic, Safwat Zaky, Computer Organization, 5th Edition, Tata McGraw Hill, 2002. (Listed topics only from Chapters 1, 2, 4, 5, 6, 7, 8, 9 and 12)

Reference Books:

- Donald P Leach, Albert Paul Malvino & Goutam Saha, Digital Principles and Applications, 8th Edition, Tata McGraw Hill, 2015.
- 2) M. Morris Mani, Digital Design, 4th Edition, Pearson Prentice Hall, 2008.
- 3) David A. Bell, Electronic Devices and Circuits, 5th Edition, Oxford University Press, 2008.
- 4) William Stallings: Computer Organization & Architecture, 9th Edition, Pearson, 2015.

BALEKE KANNADA/ SAMSKRUTHIKA KANNADA

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Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course					
20KBK38/20KSK38	02 Hours	S&H								
_{ಕನ್ನಡೆ} ಬಳಕೆ	ವಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಕ ವಿಶ್ವವಿದ್ಯಾಲಯ ಕನ್ನಡೇತರರಿಗೆ ಕನ್ನಡ ಕಲಿಸಲು ಗೊತ್ತುಪಡಿಸಿದ ಪಠ್ಯಪುಸ್ತಕ ಬಳಕೆ ಕನ್ನಡ - baLake Kannada (Kannada for Usage) (Common to B.Arch, B.Plan and B.E/B.Tech of all branches)									
[As per Outcome Based Education (OBE) and Choice Based Credit System (CBCS) scheme]										
Course Learning Objectives:										
The course will enable the non Kannadiga students to understand, speak, read and										
write Kannada language and communicate (converse) in Kannada language in their										
daily life with kannada speakers.										
Table of C	Table of Contents									
In	Introduction to the Book,									
N T	ecessity of learning	g a local langat	ige: v methods							
E	asy learning of a K	annada Langu	age: A few tips							
H	ints for correct and	polite conserv	ation							
In	structions to Teach	ers for Listeni	ng and Speaking Activit	ies						
L. In	ey to Transcription	arc								
Part – I L	essons to tea	ch and Le	arn Kannada Lai	iguage						
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Lesson – 5 ಚ	ತುರ್ಥಿ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯ	ಂದ ಬಳಕೆ ಮತ್ತು	ಸಂಖ್ಯಾವಾಚಕಗಳು – D:	ative Cases, and						
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Lesson – 6 🛪	ಖ್ಯಾಗುಣವಾಚಕಗಳು	ಮತ್ತು ಬಹುವಚ	ಕನ ನಾಮರೂಪಗಳು - Or	dinal numerals						
	nd Plural markers	i Andre wind winds								
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Lesson – 8 e	ಎ್ಟಡ / ಒಪ್ಪಿಗ, ನಿ ನದಗಳು ಮತ್ತು ವಾ	ರ್ಷಕನ, ಪೂ ಕ್ಯಗಳು - Perr	(ತನ್ನಥ ಮತು ಒತ್ತಾಯ nission, Commands,	ಅರ್ಧರೂಪ encouraging						

ಬಳಕ ಕನ್ನಡ

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	and Urging words (Imperative words and sentences)
Lesson – 9	ಸಾಮಾನ್ಯ ಸಂಭಾಷಣೆಗಳಲ್ಲಿ ದ್ವಿತೀಯ ವಿಭಕ್ತಿ ಪ್ರತ್ಯಯಗಳು ಮತ್ತು
	ಸಂಭವನೀಯ ಪ್ರಕಾರಗಳು
	Accusative Cases and Potential Forms used in General Communication
Lesson – 10	"ಇರು ಮತ್ತು ಇರಲ್ಲ." ಸಹಾಯಕ ಕ್ರಿಯಾಪದಗಳು, ಸಂಭಾವ್ಯಸೂಚಕ ಮತ್ತು
	ನಿಷೇಧಾರ್ಥಕ ಕ್ರಿಯಾ ಪದಗಳು
	Helping Verbs "iru and iralla", Corresponding Future and
	Negation Verbs
Lesson – 11	ಹೋಲಿಕೆ (ತರತಮ), ಸಂಬಂಧ ಸೂಚಕ ಮತ್ತು ವಸ್ತು ಸೂಚಕ
	ಪ್ರತ್ಯಯಗಳು ಮತ್ತು ನಿಷೇಧಾರ್ಥಕ ಪದಗಳ ಬಳಕೆ
	Comparitive, Relationship, Identification and Negation Words
Lesson – 12	ಕಾಲ ಮತ್ತು ಸಮಯದ ಹಾಗೂ ಕ್ರಿಯಾಪದಗಳ ವಿವಿಧ ಪ್ರಕಾರಗಳು
	Different types of forms of Tense, Time and Verbs
Lesson – 13	ದ್, -ತ್, - ತು, - ಇತು, - ಆಗಿ, - ಅಲ್ಲ, - ಗ್, -ಕ್, ಇದೆ, ಕ್ರಿಯಾ
	ಪ್ರತ್ಯಯಗಳೊಂದಿಗೆ ಭೂತ, ಭವಿಷ್ಯತ್ ಮತ್ತು ವರ್ತಮಾನ ಕಾಲ ವಾಕ್ಯ ರಚನೆ
	Formation of Past, Future and Present Tense Sentences with
	Verb Forms
Lesson – 14	ಕರ್ನಾಟಕ ರಾಜ್ಯ ಮತ್ತು ರಾಜ್ಯದ ಬಗ್ಗೆ ಕುರಿತಾದ ಇತರೆ ಮಾಹಿತಿಗಳು
	Karnataka State and General Information about the State
Lesson – 15	ಕನ್ನಡ ಭಾಷೆ ಮತ್ತು ಸಾಹಿತ್ಯ -
	Kannada Language and Literature
Lesson – 16	ಭಾಷೆ ಕಲಿಯಲು ಏನನ್ನು ಮಾಡಬೇಕು ಮತ್ತು ಮಾಡಬಾರದು
	Do's and Don'ts in Learning a Language
Lesson - 17	PART - II
	Kannada Language Script Part – 1
Lesson - 18	PART - III
	Kannada Vocabulary List : ಸಂಭಾಷಣೆಯಲ್ಲಿ ದಿನೋಪಯೋಗಿ ಕನ್ನಡ
	ಪದಗಳು - Kannada Words in Conversation

ಲೇಖಕರು

ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ

ಸಹಾಯಕ ಪ್ರಾಧ್ಯಾವಕರು ಮತ್ತು ಮುಖ್ಯಸ್ಕರು ಮಾನವಿಕ ಮತ್ತು ಸಾಮಾಜಿಕ ವಿಜ್ಞಾನಗಳ ವಿಭಾಗ ಸರ್ಕಾರಿ ಇಂಜಿನಿಯರಿಂಗ್ ಕಾಲೇಜು - ಹಾಸನ

ಪ್ರಕಟಣೆ

ಪ್ರಸಾರಾಂಗ, ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ.

2020

ಸಾಂಸ್ಪತಿಕ ಕನ್ನಡ/1

ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ ಪಠ್ಯಮಸ್ತಕ

(ಕನ್ನಡ ಮಾತೃಭಾಷೆಯ ವಿದ್ಯಾರ್ಥಿಗಳಿಗೆ)

(ಕನ್ನಡಿಗರಿಗಾಗಿ - for Kannadigas - Common to all branches)

[As per Outcome Based Education (OBE) and Choice Based Credit System (CBCS) scheme]

ಸಾಂಸ್ಥತಿಕ ಕನ್ನಡ ಕಲಿಕೆಯ ಉದ್ದೇಶಗಳು:

- ಪದವಿ ವಿದ್ಯಾರ್ಥಿಗಳಾಗಿರುವುದರಿಂದ ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡದ ಜೊತೆಗೆ ಕ್ರಿಯಾತ್ಮಕ ಕನ್ನಡವನ್ನು, ಕನ್ನಡ ಸಾಹಿತ್ಯ, ಸಂಸ್ಕೃತಿ ಮತ್ತು ನಾಡು ನುಡಿಯ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.
- ಕನ್ನಡದಲ್ಲಿ ತಾಂತ್ರಿಕ ವಿಜ್ಞಾನಗಳ ವಿಷಯಕ್ಕೆ ಸಂಬಂಧಿಸಿದ ಹಲವಾರು ವಿಷಯಗಳನ್ನು ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.
- ಕನ್ನಡ ಭಾಷಾಭ್ಯಾಸ, ಸಾಮಾನ್ಯ ಕನ್ನಡ ಹಾಗೂ ಅಡಳಿತ ಕನ್ನಡದ ಪದಗಳ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.

ಪರಿವಿಡಿ

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ಭಾಗ – ಒಂದು ಲೇಖನಗಳು
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ಕನ್ನಡ ನಾಡು, ನುಡಿ ಮತ್ತು ಸಂಸ್ಕೃತಿಗೆ ಸಂಬಂಧಿಸಿದ ಲೇಖನಗಳು

- ಕರ್ನಾಟಕ ಸಂಸ್ಕೃತಿ : ಹಂಪ ನಾಗರಾಜಯ್ಯ
- ಕರ್ನಾಟಕದ ವಿಕೇಕರಣ : ಒಂದು ಅಪೂರ್ವ ಚರಿತ್ರೆ ಜಿ. ವೆಂಕಟಸುಬ್ಬಯ್ಯ
- ಆಡಳಿತ ಭಾಷೆಯಾಗಿ ಕನ್ನಡ ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ ಮತ್ತು ಪ್ರೊ. ವಿ. ಕೇಶವಮೂರ್ತಿ.

ಭಾಗ – ಎರಡು

ಕಾವ್ಯ ಭಾಗ (ಅಧುನಿಕ ಪೂರ್ವ)

೪. ವಚನಗಳು : ಬಸವಣ್ಣ, ಆಕ್ರಮಹಾದೇವಿ, ಆಲ್ಬಮಪ್ರಭು, ಆಯ್ಯಕ್ಕಿ ಮಾರಯ್ಯ,

ಜೇಡರ ದಾಸಿಮಯ್ಯ, ಆಯ್ಕರ್, ಲಕ್ರಮ್ಮ.

೫. ಕೀರ್ತನೆಗಳು : ಅದರಿಂದೇನು ಫಲ ಇದರಿಂದೇನು ಫಲ – ಮರಂದರದಾಸ

ತಲ್ಲಣಿಸದಿರು ಕಂಡ್ಯ ತಾಳು ಮನವೆ – ಕನಕದಾಸ

- ೬ ತತ್ವವದಗಳು : ಸಾವಿರ ಕೊಡಗಳ ಸುಟ್ಟು ಶಿಶುನಾಳ ಷರೀಫ
 - ಶಿವಯೋಗಿ ಬಾಲಲೀಲಾ ಮಹಾಂತ ಶಿವಯೋಗಿ

ಜನವದ ಗೀತೆ : ಬೀಸುವ ಪದ, ಬಡವರಿಗೆ ಸಾವ ಕೊಡಬೇಡ

ಭಾಗ – ಮೂರು

ಕಾವ್ಯ ಭಾಗ (ಆಧುನಿಕ) ೮. ಮಂಕುತಿಮೃನ ಕಗ್ಗ : ಡಿ.ವಿ.ಜಿ.

ಸಾಂಸ್ಕೃತಿಕ ಕನ್ನಡ / 2

F. ಕುರುಡು ಕಾಂಜಾಣಾ : ದ.ರಾ. ಬೇಂದ್ರೆ ೧೦. ಹೊಸಬಾಳಿನ ಗೀತೆ : ಕುವೆಂಪ) ೧೧. ಹೆಂಡತಿಯ ಕಾಗದ : ಕೆ.ಎಸ್. ನರಸಿಂಹಸ್ವಾಮಿ ೧೨. ಮಬ್ಬಿನಿಂದ ಮಬ್ಬಿಗೆ : ಜಿ.ಎಸ್. ಶಿವರುದ್ರಪ್ಪ ೧೩. ಆ ಮರ ಈ ಮರ : ಚಂದ್ರಶೇಖರ ಕಂಬಾರ ೧೪. ಜೋಮನ ಮಕ್ಕಳ ಹಾಡು : ಸಿದ್ದಲಿಂಗಯ್ಯ ಭಾಗ – ನಾಲ್ರು ತಾಂತ್ರಿಕ ವ್ಯಕ್ತಿ ಪರಿಚಯ, ಕಥೆ ಮತ್ತು ಪ್ರವಾಸ ಕಥನ ೧೫. ಡಾ. ಸರ್ ಎಂ ವಿಶ್ವೇಶ್ವರಯ್ಯ – ವ್ಯಕ್ತಿ ಮತ್ತು ಐತಿಹ್ಯ : ಎ ಎನ್ ಮೂರ್ತಿರಾವ್ ೧೬. ಯುಗಾದಿ : ವಸುಧೇಂದ್ರ ೧೭. ಮೆಗಾನೆ ಎಂಬ ಗಿರಿಜನ ಪರ್ವತ : ಹಿ.ಜಿ. ಬೋರಲಿಂಗಯ್ಡ ಭಾಗ – ಐದು ವಿಜ್ಞಾನ ಮತ್ತು ತಂತ್ರಜ್ಞಾನ ೧೮. ಕರಕುಶಲ ಕಲೆಗಳು ಮತ್ತು ಪರಂಪರೆಯ ವಿಜ್ಞಾನ : ಕರೀಗೌಡ ಬೀಚನಹಳ್ಳಿ ೧೯. 'ಕ' ಮತ್ತು 'ಬ' ಬರಹ ತಂತ್ರಾಂಶಗಳು ಮತ್ತು ಕನ್ನಡದ ಟೈಪಿಂಗ್• 20. ಕನ್ನಡ - ಕಂಪ್ಯೂಟರ್ ಶಬ್ದಕೋಶ• 20. ತಾಂತ್ರಿಕ ಪದಕೋಶ : ತಾಂತ್ರಿಕ ಹಾಗೂ ವಾರಿಭಾಷಿಕ ಕನ್ನಡ ಪದಗಳು. • (ಅಧ್ಯಾಯ 3, 19, 20 ಮತ್ತು 21 ಇವುಗಳು ವಿತಾವಿ ಯುದಿಂದ ಪ್ರಕಟಿತ " ಅಡಳಿತ ಕನ್ನಡ "

ಮಸ್ತಕದಿಂದ ಆಯ್ದ ಲೇಖನಗಳು - ಡಾ. ಎಲ್. ತಿಮ್ಮೇಶ ಮತ್ತು ಪ್ರೊ. ವಿ. ಕೇಶವಮೂರ್ತಿ.

ಸಂಪಾದಕರು ಡಾ. ಹಿ. ಜಿ. ಜೋರಲಿಂಗಯ್ಯ ವಿಶ್ರಾಂತ ಕುಲಪತಿಗಳು, ಕನ್ನಡ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಹಂಷಿ.

ಡಾ. ಎಲ್. ತಿಮ್ಮೇತ ಸಹಾಯಕ ಪ್ರಾಧ್ಯಾಪಕರು ಮತ್ತು ಮುಖ್ಯಸ್ಥರು, ಮಾನವಿಕ ಮತ್ತು ಸಾಮಾಜಿಕ ವಿಜ್ಞಾನಗಳ ವಿಭಾಗ, ಸರ್ಕಾರಿ ಇಂಜಿನಿಯರಿಂಗ್ ಕಾಲೇಜು, ಹಾಸನ.

ಪ್ರಕಟಣೆ ಪ್ರಸಾರಾಂಗ, ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಬೆಳಗಾವಿ. 2020

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CONSTITUTION OF INDIA & PROFESSIONAL ETHICS AND HUMAN RIGHTS

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CPH38	0:2:0:0	01	CIE:50 SEE:50	02 Hours	S&H

Course Objective:

This course will enable students to:

- ▶ Learn about the preamble of the Indian constitution.
- ➢ Fundamental rights & duties of a citizen.
- > Special privileges of society and economically weaker section of the society.
- > Individual role & ethical responsibility towards society.

Module-I

Introduction to constitution: Introduction, making of constitution, Salient features of the constitution, preamble of the Indian constitution. Fundamental rights & limitations.

03 Hours

Module – II

DPSP, Union Executives: Directive principles of state policy, Fundamental duties, union executives- President, Prime minister, Parliament, supreme court of India.

03Hours

Module – III

State executives, Electoral process, Amendments: State executives- Governor, CM, state legislature, High courts, Electoral process. Amendment Procedures, Amendments -42nd, 44th, 74th, 76th, 86th and 91st.

02 Hours

Module – IV

Special provisions, Municipalities, co-operative society: Provisions for SC & ST, Women, Children & backward classes. Emergency provisions, Human rights. Municipalities, Panchayats and Co-operative societies.

03 Hours

Module – V

Scope & aim of Engineering ethics: Ethics, Responsibility of engineers, impediments to responsibility, Risks, Safety and Liability of engineers, Honesty, Integrity and reliability in engineering.

02 Hours

Course Outcomes:

On completion of this course, students will be able to:

- **CO1:** Familiarize with fundamental rights and duties.
- CO2: Recognize the electoral process.
- **CO3:** Get exposed to legislature and judiciary.
- **CO4:** Realize special provisions given for women, children and weaker section of the society.
- **CO5:** Exhibit engineering ethics and responsibilities of engineers.

Text Book:

- D. Srinivasan, "Constitution of India, professional ethics", Himalaya Publishing House, 2006, 1st Edition.
- Dr. Umapati K L, Ramesh L. Chakrasali, "Constitution of India, professional ethics", elite publishers, 2006, 2nd Edition.

Reference Books:

 M. Raja Ram, Constitution of India, professional ethics. New Age International (P) Limited, Publishers, 2015, 3rd Edition

ELEMENTS OF COMMUNICATION

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20PEC39	1:0:2:0	01	CIE:50 SEE:50	03 Hours	РТ

Course Objectives:

This course will enable students to:

- > Implement English vocabulary at command and ensure language proficiency.
- > Pronunciation skills to enhance with English vocabulary and language proficiency Language Lab.
- Augment LSRW and GV skills (Listening, Speaking, Reading, Writing and Grammar, Vocabulary) through tests, activities, exercises etc., comprehensive web-based learning and assessment systems can be referred
- Achieve better technical writing and Presentation skills Identify the common errors in speaking and writing English and acquire Employment and Workplace communication skills.
- Define non-verbal communication

Module-I

Introduction to Communication Skills: What is communication? The importance of communication skills in Engineering, Key concepts in communication, Kinds of communication, The communication process, Barriers & filters in communication, Feedback in communication, Traits of a good and poor communicator, The communication pie

04 Hours

Module-II

Listening Skills– Its importance, Difference between hearing & listening, Active Listening, Traits of good listeners, The Listening Cycle, Listening for Pronunciation Practice.

Speaking skills: Importance of Speaking, Purpose of Speaking, Secrets to Speaking, Importance of Pronunciation in speaking, Improving pronunciation through cluster, Sounds, Pronunciation clarity & Cluster sounds, JAM Sessions,Pick and Speak.

06 Hours

Module – III

Reading Skills: Importance of Reading Skills in Communication, Building confidence in reading, Countering common errors in reading, Reading rate & reading comprehension, Jigsaw reading.

Writing skills: Importance of Written Communication, The importance of good sentence and paragraph construction, Hallmarks of good writing, Accuracy, Ambiguity & Brevity in written communication, 7 C's of written communication, Activities on Written Communication.

Email etiquette: Before you start typing: what to send by Email, "What I'm trying to say": creating an **P a g e 36**
accurate subject line. It's still business writing: 12 common errors to avoid, Before clicking 'send': checking, proofing and copying, Damage control: Rx for bad email moments.

06 Hours

Module – IV

Body Language: Importance of Body Language, Body Language Do's & Don'ts, Body Language speaks volumes – the fine print, Body Language behavior & their Interpretation.

Presentation Skills: How to be an effective presenter, Establishing specific purpose and desired outcomes of apresentation, Organizing, writing and editing content in a presentation, Preparation of effective visuals to guide and support a presentation, Effective use of verbal and non-verbal presentation techniques.

Group presentations: Group presentations by the participants, Presentations would be followed by question & answer sessions, Extensive feedback would be given by the trainer on the strengths & areas of improvement, Action plan for improvement for each individual student.

06 Hours

Module - V

Team Building: Defining team and its important elements, Clarifying the advantages and challenges of team work, Understanding bargains in team building, Defining behavior to sync with team work, Team building activities.

04 Hours

Course Outcomes:

On completion of this course, the students will be able to:

- **CO1:** Identify common errors in spoken and written communication and get familiarized with English vocabulary and language proficiency. Improve nature and style of sensible writing and acquire employment and workplace communication skills.
- CO2: Improve their Technical Communication Skills through Technical Reading and Writing practices.
- **CO3:** Use grammatical English and essentials of language skills and identify the nuances of phonetics, intonation and flawless pronunciation and Implement English vocabulary at command and language proficiency..
- **CO4:** Understand and improve the non verbal communication and kinesics. Perform well in campus recruitment, engineering and all other general competitive examinations.
- **CO5:** able to communicate effectively orally and in writing.

Text Books:

1. S.L.N. Sharma, K. Shankaranarayana: "Basic Grammar", NavakarnatakaVinyasa Pvt. Limited.

- Technical Communication by Gajendra Singh Chauhan and Et al, Cengage learning India Pvt Limited [Latest Revised Edition] - 2018.
- Communication Skills by Sanjay Kumar and PushpLata, Oxford University Press 2018. Refer it's workbook for activities and exercises — "Communication Skills — If (A Workbook)" published by Oxford University Press— 2018.

Reference Books:

- 1. Technical Communication Principles and Practice, Third Edition by Meenakshi Raman and Sangeetha Sharma, Oxford University Press 2017.
- English Language Communication Skills (Lab Manual cum Workbook), Cengage learning India Pvt Limited [Latest Revised Edition]—2018. Reference Books.
- 3. English for Technical Communication by N.P.Sudharshana and C.Savitha, Cambridge University Press—2016.
- 4. Intermediate Grammar, Usage and Composition by M.L.Tichoo, A.L.Subramanian, P.R.Subramanian, Orient Black Swan-2016.

E-Resources:

- 1. https://www.habitsforwellbeing.com/9-effective-communication-skills/
- 2. https://www.selfgrowth.com/events/5-elements-of-effective-communication-2

IV Semester Course Syllabus

APPLIED CALCULUS AND PROBABILITY DISTRIBUTIONS

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20MAT41	4:0:0:0	04	CIE:50 SEE:50	03 Hours	BS

Course Objectives:

This course will enable students to:

- > Acquire the knowledge of calculus of complex functions.
- > Develop the proficiency in solving Numerical integral and Initial value problems.
- > Obtain the knowledge of probability distributions.
- Learn concept of the Joint distributions and Markov's chains. Known the importance of statistical inference in engineering.

Module-I

Complex Variables: Functions of a complex variable, derivative of complex functions. Analytic functions, (No problems by using limits). Cauchy's-Riemann equations in Cartesian and polar forms, Harmonic functions – problems (No problems by using limits). Construction of analytic functions by using Milne-Thomson method -problems.

Complex integration: Line integrals -problems. Cauchy Theorem (no problems on verification of the theorem) and Cauchy's integral formula -problems.

08 Hours

Module – II

Numerical Methods: Numerical Integration-Trapezoidal rule, Simpson's 1/3rd and 3/8th rule. Numerical solutions of ordinary differential equations of first order and first degree- Picard's method, Taylor's Series method, Modified Euler's Method, Runge- Kutta Method of 4th order and Milne's Predictor Corrector Method (without proof) – Problems.

08 Hours

Module – III

Random Variables and Probability Distribution: Discrete and continuous Random Variables, Probability density function and distributions. Binomial, Poisson, Exponential and Normal distributions.

08 Hours

Module-IV

Joint Probability and Markov's Chain: Joint Probability distribution of two discrete random variables. Expectations, correlation and co-variation. Probability vectors, stochastic matrices, fixed point matrices, regular stochastic matrices, Markov's Chains, higher transition probabilities, stationery distribution of regular Markov's Chains.

08 Hours

Module-V

Sampling and Inference: Sampling Distribution, Testing of hypothesis, level of significance, confidence limits, test of significance of large samples, sampling of variables, central limit theorem, confidence limits for unknown means, Students t-distribution and Chi-square test.

08 Hours

Course Outcomes:

On completion of this course, the students are able to:

- **CO1:** Use the concepts of analytical functions and complex integration in engineering application problems.
- **CO2:** Solve the Numerical integral and Initial value problems arising in engineering applications, using numerical methods.
- CO3: Apply probability distributions in analysing the probability models arising in engineering field.
- **CO4:** Apply Joint probability distributions and Markov's chains in analysing the probability models arising in engineering field.

CO5: Use the concept of sampling analysis in analysing the statistical models arising in engineering field

Text Books:

- Dr. B.S. Grewal: "Higher Engineering Mathematics", (Chapters 20,26,27,30,32), Khanna Publishers, New Delhi, 42nd Edition, 2012, ISBN: 9788174091955.
- N.P. Bali and Dr. Manish Goyal: "A Text Book of Engineering Mathematics", (Chapters: 19,21), Laxmi Publications (P) Ltd., New Delhi, 9th Edition, 2014, ISBN: 9788131808320.
- Seymour Lipschitz and Marc Lars Lipson: "Probability", (Chapters: 5 and 8), McGraw Hill Education (India) Private Limited, Chennai, Special Indian Edition, 2010,ISBN: 978-0-07-014622-8.

Reference Books:

 Erwin Kreyszig: "Advanced Engineering Mathematics", Wiley Pvt. Ltd., India, New Delhi, 9th Edition, 2011, ISBN 13: 9788126531356. B.V. Ramana: "Higher Engineering Mathematics", Tata McGraw – Hill Publishing Company Limited, New Delhi, 2nd Reprint, 2007, ISBN 13: 978-0-07063417-0.

E-Resources:

- 1) http://bookboon.com/en/essential-engineering-mathematics-ebook
- 2) https://www.free-ebooks.net/ebook/essential-engineering-mathematics
- 3) <u>https://archive.org/details/AdvancedEngineeringMathematics10thEdition</u>
- 4) <u>http://www.zums.ac.ir/ebooks/mathematics/essential-engineering-mathematic</u>

DESIGN AND ANALYSIS OF ALGORITHMS (IC)

Course Code	L : T : P : S	Credits	Exam Marks	Exam Duration	Course Type
20CSI42	3:0:2:0	04	CIE:50 SEE:50	03 Hours	IC

Course Objectives:

This course will enable a student to:

- > Acquire the knowledge of Algorithm and problem-solving technique.
- > Learn how to analyze the complexity of an algorithm in terms of time and space.
- Understand techniques like divide and conquer, decrease and conquer, transfer and conquer to solve problems.
- > Understand Space-Time Trade-offs and Dynamic programming technique.
- > Describe the limitations of algorithms.

Prerequisite: Data Structures, Discrete Mathematics, Graph Theory.

Module – I

Introduction: Definition of an algorithm, Fundamentals of algorithmic problem solving, Fundamentals of the analysis of algorithm efficiency, Asymptotic Notations and basic efficiency classes, Mathematical Analysis of Non-Recursive and Recursive Algorithms. **Brute Force Approaches:** Introduction, Selection Sort and Bubble Sort, Sequential Search and Brute Force String Matching.

08 Hours

Module-II

Divide and Conquer: General Method, Binary Search, Merge Sort, Quick Sort and its performance. **The Greedy method:** The General Method, Minimum-Cost Spanning Trees: Prim's Algorithm, Kruskal's Algorithm, Single Source Shortest Paths.

08 Hours

Module – III

Decrease and Conquer: Introduction, Insertion Sort, Depth First Search, Breadth First Search, Topological Sorting. **Transfer and Conquer:** Introduction, 2-3 trees, Heap (Top-down and Bottom-Up Heap construction) and Heap sort.

Module-IV

Space-Time Trade-offs: Introduction, Sorting by Counting, Input Enhancement in String Matching (Horspool algorithm) .Dynamic **programming:** The General Method, Warshall's Algorithm, Floyd's Algorithm for the All-Pairs Shortest Paths Problem, The Travelling Salesperson problem, Computing a Binomial co-efficient.

08 Hours

Module-V

Backtracking: n-Queens problem, Subset–Sum Problem. **Hashing:** Open Hashing, Closed Hashing. **Branch and Bound:** Assignment problem, Knapsack problem.

08 Hours

Lab Programs

Design, develop and implement the specified algorithms for the following problems using C/C++ Language in LINUX environment.

- Consider a list of 'n' files numbered using ID's. Write a C program to sort files based on its ID using Quick sort method.
- Consider a list of 'n' books numbered using Book_ ID's. Write a C program to sort files based on its Book_ ID using Merge sort method.
- 3. Suppose a travel agent is interested in finding shortest path from a single city to all the other cities in a network of 'n' cities. Write a C program to implement this using Djikstra's algorithm.
- 4. Implement 0/1 Knapsack problem using Dynamic Programming.
- 5. Consider a Electrical layout where 'n' houses are connected by electrical wires. Design a 'C' program using Prim's algorithm to output a connection with minimum cost.
- 6. Consider a network of 'n' systems represented as a Graph. Write a 'C' program to find the transitive closure of such a network using Warshall's algorithm.
- Suppose in a network of cities, you are interested in finding shortest paths between all cities. Design a 'C' program to implement this using Floyd's algorithm.
- 8. Print all the nodes reachable from a given starting node in a digraph using BFS method.
- 9. Consider a network having 'n' systems. Design a DFS based program in 'C' which outputs all systems reachable from a given system.

10. Consider 'N' patients and 'N XN' small rooms. Design a C program to allot the patients to these rooms using n-queen's method such that no two patients are allotted rooms in same row, column or diagonal.

Course Outcomes:

After studying this course, the students will be able to:

- CO1: Identify asymptotic notations and basic efficiency classes.
- **CO2:** Solve problems using various techniques like greedy and divide-and-conquer.
- CO3: Compute problems using various techniques like decrease-and-conquer and transfer-and-conquer.
- **CO4:** Use different algorithms like TSP, Floyd's etc. to solve real world problems.
- **CO5:** Develop solutions for n-Queens problem, Subset-sum problem, Assignment problem, Knapsack problem etc.

Text Books:

- 1) Anany Levitin: "Introduction to The Design and Analysis of Algorithms", (Chapters 1-,12), Pearson Education, Delhi, 3rd Edition, 2007, ISBN-13 : 9780132316811.
- 2) Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran: "Fundamentals of Computer Algorithms", (Chapters 1,3-8,10-12), Universities Press, Hyderabad, 2nd Edition, 2007, ISBN-10: 8173716129.

Reference Books:

- Thomas H. Cormen, Charles E. Leiserson, Ronal L. Rivest, Clifford Stein: "Introduction to Algorithms", PHI, London, England, 3rd Edition, 2010, ISBN-13: 9780262033848.
- 2) R.C.T. Lee, S.S. Tseng, R.C. Chang and Y.T. Tsai: "Introduction to the Design and Analysis of Algorithms A Strategic Approach", McGraw-Hill Higher Education,
- 3) USA, International Edition, 2005, ISBN-13: 978-0071243469.

E-Resources:

- 1) https://www.geeksforgeeks.org/fundamentals-of-algorithms/
- 2) http://www.citc.ui.ac.ir/zemoni/cls.pdf

WEB PROGRAMMING (IC)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CSI43	3:0:2:0	03	CIE:50 SEE:50	03 Hours	IC

Course Objectives:

This course will enable students to:

- Recollect the evolution of World Wide Web and its relevance to today's technological revolution and also, to comprehend HTML, CSS scripts to design web layouts.
- > Acquire Java Script skills for developing client-side web applications.
- Interpret the use of jQuery libraries to simplify complicated JavaScript applications and also, to perform DOM manipulation using jQuery constructs.
- > Cognize Bootstrap framework with a focus on creating interactive and responsive web pages.
- > Assimilate XML fundamentals for developing applications over web.

Prerequisite:

Basic programming and debugging skills, Java Programming, Database and SQL queries, connectivity of front end and back end

Module – I

HTML 5 and CSS: Introduction to Hyper Text Mark-up Language, HTML Elements and Attributes, Headers, Colors, Formatting Elements, Links, Images, Tables, Divs, Lists, Forms, Frames, iframes, HTML Media. **CSS**: Introduction to CSS, CSS selector, CSS formatting, positioning, layouts, debugging.

08 Hours

Module – II

JavaScript: Introduction, Scripts and HTML Document, JS Output Statements, Variables, Data Types and Conversions, Operators, Expressions, Control Structure, Decisions and Loops, Functions, Document Object Model, Forms and Form Handling Elements, Scripting, Event Handling, Regular Expressions, WEB SQL database.

08 Hours

Module – III

JQuery: Introduction, Selectors, Events, jQuery DOM Manipulation: jQuery HTML, jQuery CSS, jQuery Event Model, jQuery Effects and Animations, jQuery Plugins.

08 Hours

Module – IV

Bootstrap: Bootstrap Scaffolding, Bootstrap CSS, Bootstrap Layout Components, Bootstrap JavaScript Plugins, Using Bootstrap, Web services.

08 Hours

Module-V

XML: Introduction, Syntax, Document Type Definitions, Namespaces, XML Schemas, Displaying Raw XML Documents, Displaying XML Documents with CSS.

08 Hours

Lab Programs

I. HTML and CSS

1. Write and Implement HTML script to display employee details like name, address, mobile number, email id etc similar to a telephone directory.

2. Demonstrate a HTML program to display a nested list to list down all the elements serviced by an event management company. The list should be a nested list with main events and subevents.

3. Implement a HTML and CSS script to create a webpage with table structure containing alternative backgrounds using class selector functionalities.

4. Design a HTML and CSS program for the cover page which displays the events taking place in and around the state.

II. JavaScript

- 5. Construct a HTML and java script program to implement a simple banking application using SQL database. The application should provide features like withdraw, deposit, balance enquiry etc.
- 6. Implement a HTML and java script program to create a registration page having fields name, username, email Id, password & re-enter password and apply validation using match & equal functions.

III. jQuery

7. Create a webpage to fetch the details of the event and display the invitation using HTML and jQuery.

8. Design a webpage to accept event organizer name from the user and display it on the webpage using HTML and jQuery

IV. Bootstrap

9. Illustrate a HTML and bootstrap program to display glyph icons like envelop, print, search etc. Also, create buttons having glyph icons as links to carry out specific tasks.

V. XML

10. Develop a XML program to store book details like title, author, and publication year, price etc. using RSS.

Course Outcomes:

After studying this course, the students will be able to:

- **CO1:** Apply to Analyze the web layouts with style sheets and web screens in a presentable form.
- **CO2:** Create interactive web pages through form validations using Java Script and other methods.
- **CO3:** Use jQuery libraries to accelerate UI development.
- **CO4:** Design and develop responsive web pages using bootstrap framework.
- **CO5:** Create applications by using synchronous and asynchronous communication over web.

Text Books:

- Robert W. Sebesta: "Programming the World Wide Web", Pearson, 4th Edition, 2012, ISBN: 978-81-317-6458-9.
- Jon Duckett: "Web Design with HTML, CSS, JavaScript and jQuery Set", Wiley, 1st Edition, 2014, ISBN 13: 978-1118907443.
- Silvio Moreto, Matt Lambert, Benjamin Jakobus, Jason Marah:" Bootstrap 4 Responsive Web Design", Packt Publishing, 2016, ISBN 978-1-78839-731-5

Reference Books:

- Jake Spurlock: "Bootstrap, Shroff", O"Reilly Media, United States of America, 1st Edition, 2013, ISBN: 978 -1 -4493-4391-0.
- Bear Bibeault, Yehuda Katz and Aurelio De Rosa: "jQuery in Action", Dreamtech Press, New Delhi, India, 3rd Edition, 2015, ISBN: 978-1617292071

E-Resources:

- 1. http://www.w3schools.com/
- 2. https://www.tutorialspoint.com/
- 3. https://www.javascript.com/learn/

PYTHONPROGRAMMING (IC)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CSI44	2:0:2:0	03	CIE:50 SEE:50	03 Hours	IC

Course Objectives:

This course will enable students to

- > Learn the fundamentals of writing Python programming.
- Study the concepts of Iterations, Strings and Files in python.
- > Understand the concept of core data structures.
- > Acquire the knowledge of Object-Oriented Concepts in python.
- ➢ Gain the Knowledge about Python Libraries.

Prerequisite:

Students must have basic computer skills and knowledge of any programming language.

Module-I

Introduction: Why should you learn Python Programming, Introduction to Python, Python Interpreter and its working, Syntax and Semantics, Variables, Expressions and Statements, Operators, Conditional execution, User Input and Output.

08 Hours

Module – II

Iteration: Looping Statements, Break Statement, Continue Statement. **Manipulating Strings:** Creating String in Python, Traversal of Strings, String Slices, String Methods, Strings are Immutable, Parsing Strings.

Files: File Operations, Exception Handling, Working with Files Example Programs.

08 Hours

Module – III

Data Structure's: Lists, Dictionaries, Tuples. **Regular Expressions:** Finding Patterns of Text without Regular Expressions, Finding Patterns of Text with Regular Expressions, Matching Multiple Groups with the Pipe, Optional Matching with the Question Mark, Matching Zero or More with the Star, Character Classes.

Module – IV

OOP's Concepts in Python: Classes and objects, Classes and functions, Classes and methods, Types of methods, Inner class, Inheritance, Constructor, Method Overloading, Method Overriding.

08 Hours

Module-V

Python Libraries: Introduction to Numpy with Programming Examples. Working with Datasets using Pandas with Programming Examples. **Data Visualization:** Introduction to Matplotlib with Programming Examples. Introduction to Seaborn with Programming Examples.

08 Hours

Lab Programs

- 1.Implement a Python Program to find GCD of two numbers.
- 2.Implement a Python Program to find the square root of a number by Newton's Method.
- 3.Implement a Python program to find the exponentiation of a number.
- 4.Implement a Python Program to find the maximum from a list of numbers.
- 5.Implement a Python Program to perform Linear Search.
- 6.Implement a Python Program to perform Binary Search.
- 7.Implement a Python Program to perform Selection sort.
- 8.Implement a Python Program to perform Insertion sort.
- 9.Implement a Python Program to perform Merge sort.
- 10. Implement a Python Program to find first n Prime numbers.

Course Outcomes:

On completion of this course, the students will be able to

- CO1: Apply Python syntax and semantics and be fluent in the use of Python flow control and functions.
- CO2: Demonstrate proficiency in handling Strings and Files.
- **CO3:** Implement Python Programs using core data structures like Lists, Dictionaries and use Regular Expressions.
- **CO4:** Pertain the concepts of Object-Oriented Programming in Python.
- **CO5:** Develop exemplary applications using Python Libraries.

Text Books:

- Charles R. Severance, "Python for Everybody: Exploring Data Using Python 3", 1st Edition, Create Space Independent Publishing Platform, 2016, ISBN 13: 9781530051120, (Chapters 1 – 13, 15).
- Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2nd Edition, Green Tea Press, 2015, ISBN 13:9781491939369, (Chapters 15, 16, 17).
- Wes Mc Kinney, "Python for Data Analysis" 1st Edition, O'Reilly Media Inc., ISBN: 978-1-449-31979-3, (Chapters 4, 5).

Reference Books:

- Charles Dierbach, "Introduction to Computer Science Using Python", 1st Edition, Wiley India Pvt Ltd, 2013. ISBN-13: 978-8126556014.
- 2) Mark Lutz, "Programming Python", 4th Edition, O"Reilly Media, 2011.ISBN-13: 978- 9350232873.
- Wesley J Chun, "Core Python Applications Programming", 3rd Edition, Pearson Education India, 2015. ISBN-13: 978-9332555365.
- Roberto Tamassia, Michael H Goldwasser, Michael T Goodrich, "Data Structures and Algorithms in Python", 1st Edition, Wiley India Pvt Ltd, 2016. ISBN-13: 978-8126562176.

SOFTWARE ENGINEERING

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CST45	3:0:0:	03	CIE:50 SEE:50	03 Hours	РСС

Course Objectives:

This course will enable students to,

- Recollect Software process models and compare their applicability
- Acquire Software Requirement Analysis and Specification
- > Acquire Systematic software design procedure for Object Oriented and Real Time software
- > Interpret how to develop and test a software application/product
- Cognize software cost estimation techniques and to know project management

Pre-requisite: Basic knowledge of computer, softwares and programming

Module-I

Introduction to Software Engineering & Software Process Model: what is Software Engineering (SE), Difference between SE and System Engineering. The evolving role of software – the changing nature of software-Life cycle models. Software Process Model: Waterfall, Incremental, Spiral, Evolutionary, And Prototyping Concurrent development – Specialized Process Models: Component-Based Development, The Formal Methods Model, and Aspect-Oriented Software Development.

08 Hours

Module – II

Software Requirement Analysis and Specifications: Functional and Non-Functional, User, System – Requirement, Interface specification, software requirement documents. **Requirement Engineering Process**: Feasibility Studies, Requirements Elicitation and analysis, Requirement Validation and Requirement management. **System Model**: Context Model, Behavioral model, Data Model, Object Model, Structured Model.

08 Hours

Module – III

Software Design: Architectural design, Architectural Design Document, Client Server Architecture Distributed Object Architecture, **Object Oriented Design:** Object Oriented Design Process, Design Evolution. Real time Software Design: System Design, Real time Operating System, Monitoring and Control System and Data Acquisition System.

Module - IV

Software Development and Testing: Rapid Software Development-Agile Methods, Extreme Programming, Rapid Application Development, Software Reuse: Reuse landscape, Design Pattern, Application system Reuse, Verification and Validation; Planning Verification & Validation, Software Inspection, Verification and formal Methods .Software Testing: Approaches of Software Testing, Software Testing Strategies, Test Strategies for Object Oriented Software-Unit Testing, Integration Testing.

08 Hours

Module-V

Software Cost Estimation and Project Management: Software cost estimation - COCOMO model – Estimation Techniques, Project Duration and Staffing, Quality management: Quality Assurance and Standard, Quality Planning and Quality Control, Configuration Management: Configuration Management Planning, Change Management, Version and Release Management, Emerging Technology: Security Concepts, Security Risk Management.

08 Hours

Course Outcomes:

On completion of this course, the students will be able to,

- CO1: Identify and apply Software life cycle and process models to compare their applicability
- CO2: comprehend the types of requirements and summarize Requirement Engineering for various System models
- CO3: Design data, functional and behavioural model for any given software requirement
- CO4: Apply appropriate techniques and test the software application/product for a given problem
- CO5: Comprehend concepts of software quality assurance and software configuration management

Text Books:

- 1) Ian Somerville, "Software Engineering", 8th Edition, ISBN-10-9332582696, ISBN-13- 978- 9332582699, Pearson Education (24 May2017).
- Rogar Pressman, "Software Engineering and Application", 7th Edition, McGraw Hill Education Publication, 2009, ISBN-13:9789339212087.

References Books:

- 1) Pankaj Jalote, "Software Engineering, A Precise Approach", Wiley India, 2010, ISBN: 9788126523115
- 2) Pfleeger and Lawrance, "SoftwareEngineering:TheoryandPractice"PearsonEducation, 2ndEdition, 2001

- 3) Stephan Schach, "Software Engineering", Tata McGraw Hill, 2007.
- 4) Rajib Mall, "Fundamentals of Software Engineering", 3rdEdition, PHI Learning Private Limited, 2009, ISBN-10-9788120338197, ISBN-13-978-8120338197.
- 5) KelkarS.A., "Software Engineering", ISBN 10:8120332725, ISBN 13:9788120332720, Publisher: Prentice-Hall of India Pvt.Ltd, 2007.

E-Resources:

- 1) <u>https://www.pearson.com/us/higher-education/product/Sommerville-Software-Engineering-9th-</u> Edition/9780137035151.html
- 2) https://www.abebooks.com/9788120332720/Software-Engineering-Kelkar-S-A-8120332725/plp
- 3) https://www.wileyindia.com/pankaj-jalote-s-software-engineering-a-precise-approach.html

COMPUTER NETWORKS

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CST46	3:0:0:0	03	CIE:50 SEE:50	03 Hours	PCC

Course Objectives:

This course will enable students to:

- Understand the basics of data flow, network categories, models and different types of switched networks used in communication.
- Know different types of error detection and correction techniques and also, error control protocols applied in the data link layer.
- Compare the design, working and implementation of Internet protocols as well as routing protocols responsible for network layer communication.
- Gain Knowledge about TCP, UDP protocols and also, network security concepts.
- > Learn the use of various application layer protocols.

Module-I

Introduction, Network Models & Switching:

Data Communications, Networks, Network Types. Network Models: TCP/IP Protocol Suite, The OSI Model Switching: Circuit-Switched Networks, Packet Switching.

08 Hours

Module– II

Error Detection and Correction & Data Link Control (DLC):

Error Detection and Correction: Introduction, Block Coding, Cyclic Codes, Checksum, Forward Error Correction. Data Link Control: DLC Services, Data-Link Layer Protocols, HDLC, PPP (Framing, Transition phases only).

08 Hours

Module – III

Network Layer I – IP Protocols:

Network Layer Protocols: IPv4 addressing, Internet Protocol (IP), Mobile IP, Next Generation IP: IPv6 addressing, IPv6 protocol.

08 Hours

Module-IV

Network Layer II – Routing & Transport Layer Protocols:

Routing: Introduction, Routing Algorithms, Unicast Routing Protocols. Transport Layer Protocols: User Datagram Protocols (UDP), Transmission Control Protocol (TCP), TCP Congestion Control.

08 Hours

Module-V

Applications & Network Security:

Overview of the Application Layer, Domain Name System (DNS), Electronic Mail (E-Mail), World Wide Web (WWW), Remote Login Protocols, File Transfer and FTP. Overview of Network Security: Symmetric-Key Cryptography, Public-Key Cryptography.

08 Hours

Course Outcomes:

On completion of this course, the students will be able to:

- **CO1:** Establish appropriate switched networks based on the network models and use them for communication.
- CO2: Resolve errors that occur during communication and also, to analyze DLC protocols.
- **CO3:** Assign/map internet (logical) addresses to PDUs as well as, they can implement different routing algorithms
- **CO4:** Implement network applications choosing either TCP or UDP depending on the requirements and also, can integrate security measures for the applications

CO5: Use application-level protocols in the current technology trends.

Text Books:

- Behrouz A. Forouzan: Data Communication and Networking, 5th Edition, Tata McGraw-Hill, July 2013, ISBN: 978-0-07-131586-9 (Chapters 1, 2, 8, 10, 11,18,19, 20, 22, 24).ISBN-13: 978-1-25-906475-3, ISBN-10: 1-25-906475-1
- Nader F. Mir: Computer and Communication Networks, 2nd Edition, Pearson Education, 2015, ISBN: 0133814742 (Chapters 8, 9, 10).

Reference Books:

- William Stallings: Data and Computer Communication, 8th Edition, Pearson Education, 2007, ISBN- 13: 978-0133506488.
- Larry L. Peterson and Bruce S. Davie: Computer Networks A Systems Approach, 4th Edition, Elsevier, 2007, ISBN: 978-0-12-385059-1.

E-Resources:

- 1) https://archive.org/details/Data.Communications.and.Networking.5th.Edition
- https://doc.lagout.org/network/Data%20Communications%20and%20Networking%20By%20
 Behrouz%20A.Forouzan.pdf
- 3) http://ptgmedia.pearsoncmg.com/images/9780133814743/samplepages/9780133814743.pdf

UNIVERSAL HUMAN VALUES 2: UNDERSTANDING HARMONY

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20UHV47	3:0:0:0	03	CIE:50 SEE:50	03 Hours	S&H

Human Values Courses

This course also discusses their role in their family. It, very briefly, touches issues related to their role in the society and the nature, which needs to be discussed at length in one more semester for which the foundation course named as "H-102 Universal Human Values 2: Understanding Harmony" is designed which may be covered in their III or IV semester. During the Induction Program, students would get an initial exposure to human values through Universal Human Values – I. This exposure is to be augmented by this compulsory full semester foundation course.

Pre-requisites: Universal Human Values 1(desirable)

Course Objectives: The objective of the course is four fold:

- Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.
- Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence
- Strengthening of self-reflection.
- > Development of commitment and courage to act.

Module-I

Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

Purpose and motivation for the course, recapitulation from Universal Human Values-I Self-Exploration– what is it? - Its content and process; Natural Acceptance' and Experiential Validation- as the process for self-exploration Continuous Happiness and Prosperity- A look at basic Human Aspirations Right understanding, Relationship and Physical Facility- the basic requirements for fulfillment of aspirations of every human being with their correct priority Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario Method to fulfill the above human aspirations: understanding and living in harmony at various levels. Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co-existence) rather than as arbitrariness in choice based on liking- disliking.

Module - II

Understanding Harmony in the Human Being - Harmony in Myself!

Understanding human being as a co-existence of the sentient "Tand the material "Body'Understanding the needs of Self ("T) and "Body'-happiness and physical facility Understanding the Body as an instrument of '(I being the doer, seer and enjoyer)Understanding the characteristics and activities of "Tand harmony in "T. Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail Programs to ensure Sanyam and Health. Include practice sessions to discuss the role others have played in making material goods available to me. Identifying from one's own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health v/s dealing with disease

08 Hours

Module – III

Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship

Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfillment to ensure mutual happiness; Trust and Respect as the foundational values of relationship. Understanding the meaning of Trust; Difference between intention and competence Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship.Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals. Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family. Include practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationships. Discuss with scenarios. Elicit examples from students' lives.

08 Hours

Module - IV

Understanding Harmony in the Nature and Existence - Whole existence as Coexistence

Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature. Understanding Existence as Co-existence of mutually interacting units in all-pervasive space Holistic perception of harmony at all levels of existence. Include practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.

Module – V

Implications of the above Holistic Understanding of Harmony on Professional Ethics

Natural acceptance of human values Definitiveness of Ethical Human Conduct Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order Competence in professional ethics: a. Ability to utilize the professional competence for augmenting universal human order b. Ability to identify the scope and characteristics of people friendly and eco- friendly production systems, c. Ability to identify and develop appropriate technologies and management patterns for above production systems. Case studies of typical holistic technologies, management models and production systems Strategy for transition from the present state to Universal Human Order: a. At the level of individual: as socially and ecologically responsible engineers, technologists and managers b. At the level of society: as mutually enriching institutions and organizations Sum up. Include practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessions to discuss the conduct as an engineer or scientist etc.

08 Hours

Course Outcome:

On completion of the course students will be able to

- **CO1:** Understand the significance of value inputs in a classroom and start applying them in their life and profession.
- **CO2:** Distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual etc.
- CO3: Understand the value of harmonious relationship based on trust and respect in their life and profession.
- CO4: Understand the role of a human being in ensuring harmony in society and nature.
- **CO5:** Distinguish between ethical and unethical practices and start working out the strategy to actualize a harmonious environment wherever they work.

Text Books:

1) Human Values and Professional Ethics by RRGaur, RSangal, GPBagaria, ExcelBooks, NewDelhi,

Reference Books-3.2

- 1) Jeevan Vidya: Ek Parichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
- 2) Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
- 3) The Story of Stuff(Book). The Story of My Experiments with Truth-by Mohandas Karamchand.
- 4) Gandhi Small is Beautiful E. FSchumacher.
- 5) Slow is Beautiful CecileAndrews
- 6) Economy of Permanence J CKumarappa
- 7) Bharat Mein Angreji Raj -PanditSunderlal
- 8) Rediscovering India by Dharampal
- 9) Hind Swaraj or Indian Home Rule by Mohandas K.Gandhi

- 10) India Wins Freedom Maulana Abdul Kalam
- 11) Azad Vivekananda Romain Rolland (English)
- 12) Gandhi Romain Rolland (English)

Mode Of Conduct (L-T-P-C 2-1-0-3 or 2L:1T:0P 3 credits)

Lectures hours are to be used for interactive discussion, placing the proposals about the topics at hand and motivating students to reflect, explore and verify them. Tutorial hours are to be used for practices essions. While analyzing and discussing the topic, the faculty mentor's role is in pointing to essential elements to help in sorting them out from the surface elements. In other words, help the students explore the important or critical elements. In the discussions, particularly during practice sessions (tutorials), the mentor encourages the student to connect with one's own self and do self- observation, self- reflection and self-exploration. Scenarios may be used to initiate discussion. The student is encouraged to take up" ordinary situations rather than extra-ordinary situations. Such observations and their analyses are shared and discussed with other students and faculty mentor, in a group sitting. Tutorials (experiments or practical) are important for the course. The difference is that the laboratory is everyday life, and practical are how you behave and work in real life. Depending on the nature of topics, worksheets, home assignment and/or activity are included. The practice sessions (tutorials) would also provide support to a student in performing actions commensurate to his/her beliefs. It is intended that this would lead to development of commitment, namely behaving and working based on basic human values. It is recommended that this content be placed before the student as it is, in the form of a basic foundation course, without including anything else or excluding any part of this content. Additional content may be offered in separate, higher courses. This course is to be taught by faculty from every teaching department, including HSS faculty. Teacher preparation with a minimum exposure to at least one 8-day FDP on Universal Human Values is deemed essential.

Assessment: This is a compulsory credit course. The assessment is to provide a fair state of development of the student, so participation in classroom discussions, self-assessment, peer assessment etc. will be used in evaluation.

Example: Assessment by faculty mentor:10marks Self-assessment:10marks Assessment by peers: 10marks Socially relevant project/Group Activities/Assignments: 20 marks.

Semester End Examination: 50 marks

The overall pass percentage is 40%. In case the student fails, he/she must repeat the course.

PROFESSIONAL DEVELOPMENT OF ENGINEERS

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20PDE49	1:0:2:0	02	CIE:50 SEE:50	03 Hours	РТ

Course Objectives:

This course will enable students to:

- > Explain instances when sending email is necessary and appropriate.
- > Create an email subject line that accurately describes the content of the message.
- > Clarify and prioritize one's objectives and goals, by creating more planning time.
- Set and accomplish goals by self-reflection and self-monitoring
- ➤ Identify, prevent, and manage stress to improve academic success.
- Distinguishing between management and leadership and sharpening interpersonal and communication Skills.

Module-I

Team Building: Defining team and its important elements, Clarifying the advantages and challenges of team work, understanding bargains in team building, defining behavior to sync with team work, Team building activities. **Email etiquette:** Before you start typing: what to send by email, "What I'm trying to say": creating an accurate subject line It's still business writing: 12 common errors to avoid, before clicking send checking, proofing and copying, Damage control: Rx for bad email moments.

06 Hours

Module – II

Time Management: Assessing time management strengths and weaknesses, removing the barriers of productivity overcoming the procrastination habit Focusing and staying in the zone learning to be present: the power of now managing tasks, projects, goals and Ideas Determining and managing priorities.

06 Hours

Module-III

Stress Management: Achieving work-life balance by becoming better at stress management, approaching stress management in a scientific manner, enhancing personal effectiveness through managing stress, learning stress management techniques, responding resourcefully to stress situations.

Goal Setting: Developing a mission statement, creating goal, establishing specific, measurable, achievable, realistic and time-targeted (S.M.A.R.T) goals, constructing action Steps, Making

P a g e 62

06 Hours

Module – IV

Business Etiquettes: Importance of Business Etiquettes, Difference between Social and Business Etiquettes, Types of Business Etiquettes – Dining, Telephone, Office, Meeting, Dressing, Cubicle and Networking an action plan presentation. **Leadership Skills:** What is Leadership? Leaders V/s Followers, Managers V/s Leaders, Testing your Leadership Potential, Your Personality – Conduit of Leadership, Team Leadership, Leadership & Conflict Resolution, Assertiveness and Leadership.

06 Hours

Module-V

SWOT: Understanding SWOT, SWOT analysis, Understand the concept behind SWOT analysis, Understand the value of SWOT analysis on an individual, successfully perform a SWOT analysis. **Individual Presentations:** Individual presentations by the Participants, Presentations would be followed by question & answer sessions, Extensive feedback would be given by the trainer on the strengths & areas of improvement, Review of performance when compared with previous semesters, Action plan for improvement for each individual student.

06 Hours

Course Outcomes:

On completion of this course, the students will be able to:

- **CO1:** Master effective email structures to achieve clarity and successful communication. and address the importance of understanding readers.
- **CO2:** Demonstrate self-management by setting reasonable boundaries and Implement the steps of the self-regulation cycle using the SMART goals model
- **CO3:** Monitor effectiveness of stress management techniques and revise to meet current needs.
- CO4: Students will understand and be able to use a process for decision making
- **CO5:** Improve nature and style of sensible writing and acquire employment and workplace communication skills

V Semester Course Syllabus

CLOUD COMPUTING

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CST51	3:0:0:0	03	CIE:50 SEE:50	03 Hours	PCC

Prerequisite: Computer Networks, Database Management System, Operating system

Course Objectives:

This course will enable students to

- ➤ Identify the Cloud infrastructure components and service management processes
- > Explain the fundamentals of cloud computing
- ➤ Gain the knowledge about virtualization and its techniques.
- > Illustrate the cloud application programming and anekaplat form
- Differentiate Various cloud plat form used in industry

Module-I

Introduction: Cloud Computing at a Glance, The Vision of Cloud Computing, Defining Cloud, Closer Look, Cloud Computing Reference Model, Characteristics and Benefits, Challenges Ahead, Historical Developments, Distributed Systems, Virtualization, Web2.0, Service-Oriented Computing, Utility- Oriented Computing, Building Cloud Computing Environments, Application Development, Infrastructure and System Development, Computing Platforms and Technologies, Google, AppEngine, Microsoft Azure, Hadoop, Force.comand Salesforce.com, Manjrasoft Aneka. Virtualization: Introduction, Characteristics of Virtualized, Virtualization and Cloud Computing, Pros and Cons of Virtualization

08 Hours

Module-II

CloudComputingArchitecture:Introduction,CloudReferenceModel,Architecture,Infrastructure/ Hardware as a Service, Platform as a Service, Software as a Service, Types of Clouds, Public Clouds, Private Clouds, Hybrid Clouds, Community Clouds, Economics of the Cloud, Open Challenges, Cloud Definition, Cloud Interoperability and Standards Scalability and Fault Tolerance Security, Trust, and Privacy Organizational Aspects. Aneka: Cloud Application Platform, Framework Overview, Anatomy of the Aneka Container, From the Ground Up: Plat form Abstraction Layer, Fabric Services, foundation Services, Application Services, Building Aneka Clouds, Infrastructure Organization, Logical Organization, Private Cloud Deployment Mode, Public Cloud Deployment Mode, Hybrid Cloud Deployment Mode, Cloud Programming and Management, Aneka SDK, Management Tools.

Module-III

Concurrent Computing: Thread Programming, Introducing Parallelism for Single Machine Computation, Programming Applications with Threads, What is a Thread? ,Thread APIs, Multithreading with Aneka, Introducing the Thread Programming Model, Aneka Thread vs. Common Threads. High-Throughput Computing: Task Programming, Task Computing, Characterizing a Task, Computing Categories, Frame works for Task Computing, Task-based Application Models, Embarrassingly Parallel Applications, Parameter Sweep Applications, Workflow Applications with Task Dependencies.

08 Hours

Module-IV

Data Intensive Computing: Map-Reduce Programming, What is Data-Intensive Computing?, Characterizing Data-Intensive Computations, Challenges Ahead, Historical Perspective, Technologies for Data-Intensive Computing, Storage Systems, Programming Platforms.

08 Hours

Module-V

Cloud Platforms in Industry: Amazon Web Services, Compute Services, Storage Services, Communication Services, Additional Services, Google App Engine, Architecture and Core Concepts, Application Life-Cycle, Cost Model, Observations, Microsoft Azure, Azure Core Concepts, SQL Azure, Windows Azure Platform Appliance. Cloud Applications: Scientific Applications, Business and Consumer Applications, CRM and ERP, Productivity, Social Networking, Media Applications, Multiplayer Online Gaming.

08 Hours

Course Outcomes:

On completion of this course, the students will be able to:

- CO1: Explain cloud computing, classify services of cloud computing
- **CO2:** Illustrate architecture and programming in cloud

CO3: Demonstrate data intensive computing.

CO4: Apply cloud computing services to commercial systems for deploying cloud

CO5: Analyzing different Cloud plat form in industry and their applications

Text Books:

 Rajkumar Buyya, Christian Vecchiola, and Thamarai Selvi, "Mastering Cloud Computing", Mc Graw Hill Education, ISBN:9780124095397

Reference Books:

1) Dan C. Marinescu, "Cloud Computing Theory and Practice", Morgan Kaufmann, Elsevier2013.

E-Resources:

- 1) <u>http://index-of.co.uk/Cloud-Computing-Books/Mastering%20Cloud%20Computing%20-%20Rajkumar%20Buyya.pdf</u>
- 2) http://nptel.ac.in/courses/106105033/41
- 3) <u>http://video.mit.edu/watch/mitef-nyc-cloud-computing-8347/</u>

SYSTEM MODELLING AND SIMULATION

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CST52	3:0:0:0	03	CIE:50 SEE:50	03 Hours	PCC

Prerequisite:

- Probability distributions and random variables
- Computer Organization
- Object Oriented Modeling Concepts

Course Objectives:

This course will enable students to,

- > Define the basics of simulation modeling and replicating the practical situations in organizations.
- > Understand the techniques to model and to simulate various systems.
- > Generate random numbers and random variates using different techniques.
- Gain knowledge about the value of rapid prototyping for: requirements, potential design issues, modelling inputs.
- > Explain Verification and Validation of simulation model.

Module-I

Introduction: When simulation is the appropriate tool and when it is not appropriate; Advantages and disadvantages of Simulation; Areas of application; Systems and system environment; Components of a system; Discrete and continuous systems; Model of a system; Types of Models; Discrete-Event System Simulation; Steps in a Simulation Study. Simulation example: Simulation Of queuing systems, Simulation of Inventory Systems.

08 Hours

Module – II

General Principles, Simulation Software: Concepts in Discrete-Event Simulation: The Event-Scheduling / Time-Advance Algorithm, World Views, Manual simulation Using EventScheduling, List processing, Simulation in Java, Simulation in GPSS.

08 Hours

Module – III

Random-Number Generation: Properties of random numbers; Generation of pseudo-random numbers, Techniques for generating random numbers, Tests for Random Numbers, Random-Variate Generation: ,Inverse transform technique Acceptance-Rejection technique, Special properties.

Module – IV

Input Modelling: Data Collection; Identifying the distribution with data, Parameter estimation, Goodness of Fit Tests, Fitting a non-stationary Poisson process, Selecting input models without data, Multivariate and Time-Series input models.

08 Hours

Module-V

Verification and Validation of Simulation Models, Optimization: Model building, verification and validation; Verification of simulation models; Calibration and validation of models, Optimization via Simulation..

08 Hours

Course Outcomes:

The student will be able to:

- **CO1:** Describe the role of important elements of discrete event simulation and modelling paradigm
- CO2: Apply the behaviour of a dynamic system and create an analogous model for a dynamic system.
- **CO3:** Assess and select a model for an engineering system taking into consideration its suitability to facilitate engineering decision making and predicted advantages over alternative models.
- CO4: Develop skills to apply simulation software to construct and execute goal-driven system models.

CO5: Manage expectation level of different stakeholders.

Text Books:

 Jerry Banks, John S. Carson II, Barry L. Nelson, David M. Nicol: Discrete-Event System Simulation, 5 th Edition, Pearson Education, 2010.

Reference Books:

- Lawrence M. Leemis, Stephen K. Park: Discrete Event Simulation: A First Course, Pearson Education, 2006.
- 2) Averill M. Law: Simulation Modeling and Analysis, 4 th Edition, Tata McGraw-Hill, 2007

ADVANCED JAVA (IC)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CSI53	3:0:2:0	04	CIE: 50 SEE: 50	03 Hours	IC

Course Objectives:

This course will enable students to:

- > Learn String handling techniques of JAVA programming.
- > Acquire knowledge of JAVA Database Connectivity.
- > Learn the concepts of Collection Frameworks through Collection class and Collection interface.
- ➢ Gain knowledge of Collection algorithms and Legacy classes and interfaces.
- > Understand the file concepts and Streams in JAVA programming.

Module-I

String Handling and Wrapper classes: The String Constructors, String Length, Special String Operations, Character Extraction, String Comparison, Searching Strings, Modifying a String, Data Conversion Using value Of(), Changing the Case of Characters Within a String, Additional String Methods, String Buffer, String Builder, Primitive Type Wrappers.

08 Hours

Module – II

JDBC: The Concept of JDBC; JDBC Driver Types; JDBC Packages; A Brief Overview of the JDBC process; Database Connection; Associating the JDBC/ODBC Bridge with the Database; Statement Objects; Result Set; Transaction Processing; Metadata, Data types, Exceptions.

08 Hours

Module – III

Collections Framework-1: Collections Overview, Recent changes to Collections, The Collection Interfaces, The Collection Classes, Accessing a Collection via an Iterator, Storing User-Defined Classes in Collections, The Random Access Interface.

08 Hours

Module-IV

Collections Framework-2: Working with Maps, Comparators, the Collection Algorithms, Why Generic Collections, The Legacy Classes and Interfaces, Parting Thoughts on Collections.

08 Hours

Module – V

Files I/O: Files, The Close able and Flushable Interfaces, The Stream Classes, The Byte Streams, The CharacterStreams, The Console Class, Using Stream I/O.08 Hours

Lab Programs

Part-1

- 1) Write a Java program to use String/Wrapper class and its methods.
- 2) Write a Java program to execute select query using JDBC.
- 3) Write a Java program to update customer information.
- 4) Write a Java program to implement interface through Collection.
- 5) Write a Java program to access a collection through anterator.
- 6) Write a Java program to print word count of a file using Stream I/O.

Part-2

Project Work (30 Marks)

To create an application using the concepts of Java and JDBC.

Course Outcomes:

On completion of this course, the students will be able to:

CO1: Implement String handling techniques in JAVA programming effectively.

CO2: Implement the concepts of connectivity of Database through JDBC

CO3: Access Collection class and Collection interface for JAVA programming.

CO4: Interpret Collection algorithms and use Legacy classes and interfaces.

CO5: Interpret concepts of Input/ Output Streams in Files.

Text Books:

- Herbert Schildt, "JAVAtheCompleteReference",7th Edition, TataMcGrawHill,2011, ISBN-13: 9781259002465.
- Jim Keogh, "J2EE The Complete Reference", 1st Edition, McGraw Hill, 2017, ISBN-13: 9780070529120.

Reference Book:

 Y. Daniel Liang, "Introduction to JAVA Programming", 10th Edition, Pearson Education, 2013, ISBN-13: 978-0133761313

E-Resources:

https://www.udemy.com/course/advanced-java-programming/

MACHINE LEARNING (IC)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CSI54	3:0:2:0	04	CIE: 50 SEE: 50	03 Hours	IC

Description of the course: A machine learning (ML) is a form of Artificial intelligence that makes predictions from data. it is a new technological aspect which are used to automate processes like image classification, speech recognition, and market forecasting. A machine learning (ML) developer is an expert on using data to training models.

Prerequisite: Introduction to Machine learning, udemy, NPTEL

Course Objectives:

This course will enable students to:

- ▶ Understand the basic concepts and techniques of Machine Learning.
- ▶ Understand decision tree algorithms and classify supervised,
- ➤ Unsupervised and reinforcement learning algorithms.
- ➤ Learn Artificial Neural Networks with multilayer perceptions.
- ▶ Understand algorithms for Evaluating Hypothesis and learning Bayesian networks.
- ➤ Gain knowledge on probability learning theory.

Module - I

Introduction: Well-Posed Learning problems, Designing a learning system, Perspectives and issues in machine learning, Concept learning, Find-S Algorithm, Candidate elimination Algorithm

08 Hours

Module - II

Decision Tree Learning: Introduction, Decision Tree representation, appropriate problems for decision tree learning, The basic decision tree algorithm, Hypothesis space search in decision tree algorithms, Issues in decision tree learning.

08 Hours

Module-III

Artificial Neural Networks: Introduction, Neural network representation, Problems for neural network learning, Perceptions, Multiple layer networks and back propagation algorithm, Remarks on the Back propagation Algorithm
Module-IV

Evaluating Hypothesis and Bayesian Learning: Motivation, estimating hypothesis accuracy, Basics of sampling theorem, introduction to Bayesian learning, Features of Bayesian Learning methods, Practical difficulty in applying Bayesian methods, Bayes theorem and concept learning, Naïve Bayes classifier

08 Hours

Module-V

Reinforcement Learning: Introduction, Reinforcement learning problem, Reinforcement learning problem characteristics, The Learning task, Q Learning, An Algorithm for Q learning

08 Hours

Course Outcomes:

At the end of course Students will be able to

- **CO1:** Choose the learning techniques and investigate concept learning.
- **CO2:** Identify the characteristics of decision tree and solve problems associated with Machine Learning
 - Machine Learning.
- **CO3:** Apply effectively neural networks for appropriate applications.
- CO4: Apply Bayesian techniques and derive effectively learning rules.
- CO5: Investigate the Reinforcement learning and various types of learning

Text Books:

1) Tom M Mitchell, "Machine Learning", McGrraw-Hill

Reference Books:

- Aaron Courville, Ian Goodfellow, and Yoshua Bengio, Deep Learning, MIT Press, 2015, ISBN: 9780262035613
- Christopher Bishop, Pattern recognition and machine learning. Himalaya Publishing House. ISBN: 98345789
- Course material available on Swayam platform and NPTEL, for the course on Introduction to Machine Learning, conducted by Prof. Sudeshna Sarkar, IIT Kharagpur.
- 4) Ethem Alpaydın, Introduction to Machine Learning, MIT press 4th edition ISBN: 9780262043793.
- 5) C Agarwal, Machine Learning for Text, Pearson Education 2006 (2 & 4). ISBN 15:34519801.

THEROY OF COMPUTATION

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CST55	3:0:0:0	03	CIE:50 SEE:50	03 Hours	PCC

Prerequisites:

- 1. Discrete Mathematics
- 2. Principles of Programming Languages
- 3. Design and Analysis of Algorithms
- 4. Principles of Applied Mathematics

Course Objectives:

- > To Study abstract computing models
- Formalization of the notion of problems via formal languages
- > To learn Grammar and Turing Machine
- > To learn about the theory of computability and complexity
- Understanding a hierarchy of classes of problems or formal languages

Module - I

Formal Language Theory and Finite Automata: Introduction to Formal language, Structural representation, Automata and Complexity, Alphabets and languages. Finite Automata (FA): An Informal Picture of FA, Finite State Machine (FSM), Language accepted by FA, Definition of DFA, DFA problems, Definition of Nondeterministic, NFA problems, Equivalence of Deterministic and Non-deterministic Automata, epsilon-NFA with example problems.

08 Hours

Module – II

Regular Expressions (RE): Operators of RE, Building RE, Precedence of operators, DFA to RE Conversions, RE to DFA Conversions, Application of RE, Algebraic laws for RE,

Properties of Regular Languages: Pumping Lemma for Regular languages, Closure properties

08 Hours

Module – III

Context Free Grammars (CFG) and Languages: Introduction, Context Free Grammar-Definition, Derivation, Leftmost & amp; Rightmost Derivations, Language of grammar, Sentential

form, inference, derivation and Parse Tree, Ambiguity in grammar and Language- ambiguous Grammar Simplification of CFG: Eliminating useless symbols, unit and useless productions, and ε -productions, Chomsky normal form, Greibach normal form.

08 Hours

Module – IV

Turing Machines: Problems that Computers cannot solve, the turning machine, Programming techniques for Turning Machines, Extensions to the basic Turning Machines, Turing Machine and Computers.

08 Hours

Module-V

Undecidability: A Language that is not recursively enumerable, an un-decidable problem that is RE, Post Correspondence Problem, Undecidable problems for Context-Free languages, The classes of P and NP.

08 Hours

Course Outcomes:

On completion of the course, student will be able to:

- **CO1:** Acquire fundamental understanding of the core concepts in automata theory and Theory of Computation
- **CO2:** Learn how to translate between different models of Computation (e.g., Deterministic and Non-deterministic and Software models).
- **CO3:** Build Grammars and Automata (recognizers) for different language classes and become knowledgeable about restricted models of Computation (Regular, Context Free) and their relative powers.
- **CO4:** Develop skills in formal reasoning and reduction of a problem to a formal model, with an emphasis on semantic precision and conciseness.

CO5: Classify a problem with respect to different models of Computation

Text Books:

- John E Hopcroft, Rajeev Motwani, Jeffery D Ullman, Introduction to Automata Theory, Languages, and Computation, 3rd Edition, Pearson Education, 2013, ISBN- 13:978-8131720479.
- Peter Linz, An introduction to Formal Languages and Automata, 2nd Edition, Narosa Publishing House.

Reference Books:

- K L P Mishra, N Chandrasekaran, 3rd Edition, Theory of Computer Science, PHI Learning, 2013, ISBN-13:978-8120329683.
- 2) Elaine Rich, Automata, Computability and Complexity, 1st Edition, Pearson education, 2012/2013.

E-Resources:

- 1) https://plato.stanford.edu/entries/computational-complexity/#TecDev
- 2) https://www.cse.iitm.ac.in/~shwetaag/col705.html
- 3) https://www.cs.ucy.ac.cy/~mavronic/Classes/cs211/index.html
- 4) https://www.cse.csusb.edu/egomez/cs601.html
- 5) https://computer.ju.edu.jo/Lists/Courses/Disp_Course.aspx?ID=223&prog=MSc.%20of%20Computer %20Science&dept=Computer%20Science&deptName=Computer%20Science
- 6) https://www-e.openu.ac.il/courses/20585.html

Professional Elective - I

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CST561	3:0:0:0	03	CIE:50 SEE:50	03 Hours	PE-I

WIRELESS SENSOR NETWORKS

Course Objectives:

This course will enable students to

- > Describe the OSI Model for IoT/M2M Systems.
- > Understand the architecture and design principles for device supporting IoT.
- > Develop competence in programming for IoT Applications.
- Identify the uplink and downlink communication protocols which best suits the specific application of IoT / WSNs.

Module - I

Overview of Internet of Things: IoT Conceptual Framework, IoT Architectural View, Technology Behind IoT, Sources of IoT, M2M communication, Examples of IoT. Modified OSI Model for the IoT/MZM Systems, data enrichment, data consolidation and device management at IoT/M2M Gateway, web communication protocols used by connected IoT/M2M devices, Message communication protocols (CoAP-SMS, CoAP-MQ, MQTT, XMPP) for IoT/M2M devices. — Refer Chapter 1, 2 and 3 of Text 1. L1, L2

08 Hours

Module - II

Architecture and Design Principles for IoT: Internet connectivity, Internet- based communication, IPv4, IPv6,6LoWPAN protocol, IP Addressing in the IoT, Application layer protocols: HTTP, HTTPS, FTP, TELNET and ports. Data Collection, Storage and Computing using a Cloud Platform: Introduction, Cloud computing paradigm for data collection, storage and computing, Cloud service models, IoT Cloud- based data collection, storage and computing. - Refer Chapter 4 and 6 of Text 1. L1, L2

08 Hours

Module - III

Prototyping and Designing Software for IoT Applications: Introduction, Prototyping Embedded device software, Programming Embedded Device Arduino Platform using IDE, Reading data from sensors and devices, Devices, Gateways, Internet and Web/ Cloud services software development. Programming MQTT clients and MQTT server. Introduction to IoT privacy and security. Vulnerabilities, security requirements and threat analysis, IoT Security Tomography and layered attacker model. - Refer Chapter 9 and 10 of Text 1. L1, L2, L3

P a g e 78

08 Hours

Module - IV

Overview of Wireless Sensor Networks: Challenges for Wireless Sensor Networks, Enabling Technologies for Wireless Sensor Networks. Architectures: Single-Node Architecture - Hardware Components, Energy Consumption of Sensor Nodes, Operating Systems and Execution Environments, Network Architecture-Sensor Network Scenarios, Optimization Goals and Figures of Merit, Design principles for WSNs, Service interfaces of WSNs Gateway Concepts. – Refer

08 Hours

Module - V

Communication Protocols: Physical Layer and Transceiver Design Considerations, MAC Protocols for Wireless Sensor Networks, Low Duty Cycle Protocols And Wakeup Concepts-S-MAC, The Mediation Device Protocol, Wakeup Radio Concepts, Contention based protocols (CSMA,PAMAS),Schedule based protocols(LEACH, SMACS, TRAMA) Address and Name Management in WSNs, Assignment of MAC Addresses, Routing Protocols Energy-Deficient Routing, Geographic Routing, Hierarchical networks by clustering.

08 Hours

Course Outcomes:

At the end of the course, students will be able to:

CO1: Understand choice and application of IoT & M2M communication protocols.

CO2: Describe Cloud computing and design principles of TOT.

CO3: Relate to MQTT clients, MQTT server and its programming.

CO4: Describe the architectures and its communication protocols of WSNs.

CO5: Identify the uplink and downlink communication protocols associated with specific application of IOT / WSNs

Text Books:

- 1) Raj Kamal, "Internet of Things-Architecture and design principles", McGraw Hill Education.
- Holger Karl & Andreas Willi g, "Protocols And Architectures for Wireless Sensor Networks", John Wiley, 2005.

Reference Books:

- Feng Zhao & Leonidas J. Guibas, "Wireless Sensor Networks- An Information Processing Approach", ElseVier, 2007.
- 2) Kazem Sohraby, Daniel Minoli, & Taieb Znati, "Wireless Sensor
- 3) Networks- Technology, Protocols and Applications", John Wiley, 2007.
- 4) Anna Hac, "Wireless Sensor Network Designs", John Wiley, 2003.

INTRODUCTION TO DATA SCIENCE AND COMPUTING

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CST562	3:0:0:0	03	CIE:50 SEE:50	03 Hours	PE-II

Course Objective:

- > To understand the applications of Data Science.
- > To provide in-depth knowledge of Principles of Data Science, techniques and applications.
- > To gain a well-rounded introduction to the core concepts and technologies of Data Science.
- > An insight into data driven programming.

Module - I

Introduction to Data Science – Evolution of Data Science – Data Science Roles – Stages in a Data Science Project – Applications of Data Science in various fields – Data Security Issues.

08 Hours

Module - II

Data Collection and Data Pre-Processing Data Collection Strategies – Data Pre-Processing Overview – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization.

08 Hours

Module - III

Exploratory Data Analytics Descriptive Statistics – Mean, Standard Deviation, Skewness and Kurtosis – Box Plots – Pivot Table – Heat Map – Correlation Statistics – ANOVA.

08 Hours

Module - IV

Model Development Simple and Multiple Regression – Model Evaluation using Visualization – Residual Plot – Distribution Plot – Polynomial Regression and Pipelines – Measures for In-sample Evaluation Prediction and Decision Making.

08 Hours

Module - V

Model Evaluation Generalization Error – Out-of-Sample Evaluation Metrics – Cross Validation – Over fitting –Under Fitting and Model Selection – Prediction by using Ridge Regression – Testing Multiple Parameters by using Grid Search.

Course Outcome:

On completion of the course students will be able to

08 Hours

- **CO1:** Explore data science and data engineering
- **CO2:** Grasp the nuances of Data processing
- CO3: Apply Data-Driven Insights to Business and Industry
- CO4: Create Data Visualizations that Clearly Communicate Meaning
- CO5: Domain Expertise to Solve Real World Problems Using Data Science

Text Books:

 Davy Cielen, Arno D. B. Meysman, Mohamed Ali, "Introducing Data Science", manning publications 2016.

Reference Books:

- 1) Jojo Moolayil, "Smarter Decisions: The Intersection of IoT and Data Science", PACKT, 2016.
- 2) Cathy O'Neil and Rachel Schutt, "Doing Data Science", O'Reilly, 2015.
- 3) David Dietrich, Barry Heller, Beibei Yang, "Data Science and Big data Analytics", EMC 2013
- 4) Raj, Pethuru, "Handbook of Research on Cloud Infrastructures for Big Data Analytics", IGI Global.

UNIX AND SHELL PROGRAMMING

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CST563	3:0:0:0	03	CIE:50 SEE:50	03 Hours	PCC

Course Objectives:

This course will enable students to :

- > Learn basic commands to interact with UNIX System and VI editor.
- > Understand the history, origin, features and architecture of UNIX Operating System.
- > The usage of various commands in UNIX environment.
- > Develop the ability to evaluate regular expressions and use them for pattern matching.
- > Apply essential facets of SHELL programming in order to solve the SHELL script problems.

Module - I

INTRODUCTION: The UNIX operating system, Linux and GNU, The UNIX architecture, features of UNIX, POSIX and Single UNIX specification, Internal and External commands, Command structure, man browsing and manual pages on-line.

File System: The parent – child relationship, the HOME variable, pwd, cd, mkdir, absolute pathname, relative path name.

08 Hours

Module - II

Vi editor: Basics, input mode, saving text and quitting, searching for a pattern (| and ?), substitution- search and replace(:s).

Basic file attributes: ls: listing directory contents, the UNIX file system, ls –l, -d option, file ownership, file permissions, chmod, directory permissions, changing file ownership.

More file attributes: File systems and inodes, hard links, symbolic links and ln, the directory, umask, modification and access times, find.

08 Hours

Module - III

Process basics: ps process status, system processes (-e or -a), mechanism of process creation, process states and zombies, running jobs in background, nice: job execution, job control.

Simple filters: pr, head, tail, cut, paste, sort, uniq, tr. Filters using regular expressions – grep and sed: grep, Basic Regular Expressions (BRE), Extended Regular Expressions (ERE) and egrep.

08 Hours

Simple filters: sed: the stream editor, line addressing using multiple instructions (-E and -F) context addressing, writing selected lines to a file (w), text editing, substitution (s), basic regular expression revisited.

The shell : The shell's interpretive cycle, shell offerings, pattern matching, escaping and quoting, redirection, pipes, tee, command substitution, shell variables.

08 Hours

Module - V

Essential shell programming : Shell scripts, read using command line arguments, exit and exit status of command, the logical operators and ||, the if conditional, using test and {} to evaluate expression. The case conditional, expr, \$0, while, for, debugging.

08 Hours

Course Outcomes:

On completion of this course, the students are able to:

CO1: Describe history, origin, feature and architecture of UNIX operating system.

CO2: Interact with UNIX system easily.

CO3: Construct and edit files, search for any patterns using regular expressions.

CO4: Solve complex jobs using tools and utilities available in UNIX.

CO5: Design and develop various tasks by using Shell scripting.

Text Book:

 Sumitabha Das: "UNIX – Concepts and Applications", (Chapters 1,2,4,6-9,11-14,17,19), Tata McGraw Hill, Noida, 4th Edition, 15th Reprint, 2011, ISBN-13: 978-0-07-063546-3.

Reference Books:

- Behrouz A. Forouzan and Richard F. Gilberg: "UNIX and Shell programming", Cengage Learning, India, 1st Edition, 2005, ISBN: 81-35-0325-9.
- M G Venkatesh Murthy: "UNIX and Shell programming", Pearson Education, Delhi, 1st Edition, 2005, ISBN: 81-7758-745-5.

E-Resources:

- 1) http://www.mhhe.com/das/uca
- 2) http://www.tutorialspoint.com/unix/unix_tutorials.pdf.
- 3) http://www.perldoc.perl.org/

EMPLOYABILITY SKILLS AND APTITUDE TRAINING

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20PES58	1:0:2:0	02	CIE:50 SEE:50	03 Hours	P&T

Course Objectives:

This course will enable students to:

- > Understand different types of Numerical / Arithmetical problems.
- > Understand the different Data interpretation problems.
- > To enhance interpersonal and soft skills for professional development.
- > Enables students to develop their ability to reason by introducing them to elements of formal reasoning.
- > To develop Problem Solving, confidence building, organizational, team working skills.

Module - I

Quantitative Aptitude I: Number System, Ratio Proportion and Partnership, Average.

	06 Hours
Module - II	
Quantitative Aptitude II: Percentage, Profit and Loss, Time and Work	
	06 Hours
Module - III	
Logical Reasoning I: Number Series, Letter Series, Blood Relations,	
	04 Hours
Module - IV	
Logical Reasoning II: Analogy, Seating Arrangement, Data Arrangement	
	04 Hours
Module – V	
Verbal Ability: Comprehension, Sentence Correction, Sentence Completion.	
	05 Hours
Course Outcomes:	
On completion of this course, students should be able to:	
CO1: Solve and analyze different types of Numerical / Arithmetical problems.	
CO2: Identify logical relations among statements; and analyze logically complex statements into t	heir truth-
functional or quantificational components.	
CO3: Develop enhanced productivity, efficiency and effectiveness.	
CO4: Be equipped with a set of transferable team-building skills and general employability skills.	

CO5: Gain ease in switching jobs in the same or different sectors.

Text Books:

R.S.Agarwal: "QuantitativeAptitudeforcompetitiveexaminations", (Chapters 1-3, 6-8, 10-18, 20-22, 26-28, 30, 31, 35-39), S. Chand Publishing, New Delhi, 2014, ISBN-13: 978-81-219-2498-6.

Reference Books:

- 1) R.S. Aggarwal "A Modern Approach to Verbal & Non-Verbal Reasoning (Old Edition)" 2001.
- 2) R.S. Aggarwal "A Modern Approach to Logical Reasoning (Old Edition)" 1999.

E-Resources:

- 1) https://employabilityskills.org/development/
- 2) https://anivda.com/personal-development-for-employability/

VI Semester Course Syllabus

COMPILER DESIGN

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CST61	3-0-0-0	03	CIE:50 SEE:50	03 Hours	PCC

Course Description

The goal of the course is to provide an introduction to the system software like assemblers, compilers, and macros. It provides the complete description about inner working of a compiler. This course focuses mainly on the design of compilers and optimization techniques. It also includes the design of Compiler writing tools. This course also aims to convey the language specifications, use of regular expressions and context free grammars behind the design of compiler.

Course Objectives:

- ➤ This course will enable students to,
- > Understand the fundamentals of compiler design.
- > Learn about context-free grammars, parsing algorithms.
- Learn about different forms of intermediate code and techniques for generating efficient and optimized code.
- ➢ Gain the Knowledge on concepts of SDD and SDT.
- > Explore about code generation strategies, techniques for code optimization.

Module - I

Introduction: Language processors, the structure of a Compiler; The science of building a Compiler; Applications of compiler technology.

Lexical analysis: The Role of Lexical Analyser; Input Buffering; Specifications of Tokens; Recognition of Tokens.

08 Hours

Module - II

Syntax Analysis-1: Role of Parser; Syntax Error Handling, Error recovery strategies, Context-free Grammars; Writing a Grammar, Top-down Parsing.

08 Hours

Module - III

Syntax Analysis-2: Top-down Parsing, Bottom-up Parsing, Handle, Handle Pruning, Shift Reduce Parser, Conflicts during shift reduce parser.

08 Hours

Syntax-Directed Translation: Syntax-directed definitions; Evaluation orders for SDDs; Applications of syntax-directed translation; Syntax-directed translation schemes.

08 Hours

Module - V

Intermediate Code Generation, Code Optimization: Variants of syntax trees, Three-address code; Issues in the design of Code Generator; The Target Language; Addresses in the target code; Basic blocks and Flow graphs; Optimization of basic blocks; A Simple Code Generator.

08 Hours

Text Books:

 Alfred V Aho, Monica S.Lam, Ravi Sethi, Jeffrey D Ullman, "Compilers- Principles, Techniques and Tools", 2 nd Edition, Pearson Education India, 2013, ISBN 13:9781530051120. (Chapters 1, 3.1 to 3.4, 4 excluding 4.7.5 and 4.7.6, 5.1 to 5.4, 6.1, 6.2 6.4, 6.6, 6.7 to 6.9, 7.1 to 7.5, 8.1 to 8.6)

Reference Books:

 Kaushal Kishor Rastogi, "Compiler Design: Principles, Techniques and Tools", Raj Publications, 2014, ISBN 13: 9788182206267.

Course Outcomes:

At the end of course students will be able to:

- **CO1:** Acquire knowledge of different phases and passes of the compiler and also able to use the compiler tools like LEX, YACC, etc.
- CO2: Demonstrate to Write Context free grammar and solve the problems of parser.
- CO3: Design and implement LL and LR parsers using Top-down and Bottom-up approaches.
- **CO4:** Develop program to solve complex problems in syntax directed translations, syntax directed definitions and to generate intermediate code.
- **CO5:** Understand the target machine's run time environment, its instruction set for code generation and techniques used for code optimization.

E-Resources:

- 1) https://www.tutorialspoint.com/compiler_design/compiler_design_quick_guide.htm
- 2) <u>https://www3.nd.edu/~dthain/compilerbook/compilerbook.pdf</u>

ANDROID APPLICATION DEVELOPMENT(IC)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CSI62	2:0:2:0	03	CIE:50 SEE:50	03 Hours	IC

Course Objectives: This course will enable students to:

- > Outline the Android SDK features and the Development Framework and understanding Activities.
- > Learn adaptive, responsive user interfaces that work across a wide range of devices.
- > Identify background work and long-running tasks in Android applications
- > Describe the concepts of Storing, sharing and retrieving data in Android applications
- > Learn permissions, security and performance affects applications.

Prerequisite: JAVA Programming and XML (Extension Mark-up Language)

Module- I

Basics of Android

What Is Android? Android Versions, Features of Android, Architecture of Android, Android Devices in the Market, The Android Market, Obtaining the Required Tools, Eclipse, Android SDK, Android Development Tools (ADT), Creating Android Virtual Devices (AVDs), Creating Your First Android Application, Anatomy of an Android Application. Understanding Activities, Applying Styles and Themes to Activity, Hiding the Activity Title, Displaying a Dialog Window, Displaying a Progress Dialog, Linking Activities Using Intents, Resolving Intent Filter Collision, Returning Results from an Intent.

08 Hours

Module- II

Components of Screen, Views and Layouts

Understanding the Components of a Screen, Views and View Groups, Linear Layout, Absolute Layout, Table Layout, Relative Layout, Frame Layout, Scroll View, Adapting to Display Orientation, Anchoring Views, Resizing and Repositioning, Managing Changes to Screen Orientation, Persisting State Information during Changes in Configuration, Detecting Orientation Changes, Controlling the Orientation of the Activity, Creating the User Interface Programmatically, Basic Views

08 Hours

Module- III

Image Views, Preferences () and Storage

Using Image Views to Display Pictures - Gallery and Image View Views, Image Switcher, Grid View, Using Menus with Views - Creating the Helper Methods, Options Menu, Context Menu, Saving and Loading User Preferences - Using get Shared Preferences (), Using get Preferences (), Persisting Data to Files - Saving to

Internal Storage, Saving to External Storage (SD Card), Choosing the Best Storage Option, Using Static Resources, Creating and Using Databases.

08 Hours

Module- IV

Content Provider, SMS Messaging

Sharing Data in Android, Using a Content Provider - Predefined Query String Constants, Projections, Filtering, Sorting, Creating Your Own Content Providers - Using the Content Provider. SMS Messaging - Sending SMS Messages Programmatically, Getting Feedback after Sending the Message, Sending SMS Messages Using Intent, Receiving SMS Messages, Updating an Activity from a Broadcast Receiver, Invoking an Activity from a Broadcast Receiver.

08 Hours

Module- V

Services, Activities and Publishing APK Files.

Creating Your Own Services - Performing Long-Running Tasks in a Service, Performing Repeated Tasks in a Service, Executing Asynchronous Tasks on, Separate Threads Using Intent Service, Communicating between a Service and an Activity, Binding Activities to Services. Preparing for Publishing, Versioning, Digitally Signing Your Android Applications, Deploying APK Files - Using the adb.exe Tool, Using a Web Server, Publishing on the Android Market, Creating a Developer Profile, Submitting Your Apps.

08 Hours

Lab Programs

Programs supplementing the lecture concepts will be based on the latest version of Android SDK.

Part-A

- 1. Develop an android app which displays "Hello World" message
- 2. Using Android, Create a login Activity. It asks "username" and "password" from user. If username and password are valid, it displays Welcome message using new activity
- 3. Create Implicit Intents
- 4. "Happy Birth Day" App using TextView and ImageView
- 5. Set and retrieve shared preferences

Part-B

Develop an android app which displays a form to get following information from user. i) Username ii)
 Password iii) Email Address iv) Phone Number v) Country Form should be followed by a Button with label
 "Submit". When user clicks the button, a message should be displayed to user describing the information

entered. Utilize suitable UI controls (i.e. widgets). [When user enters country in Auto Complete Text View, list of states should be displayed in Spinner automatically

- 2. The Simple Calculator app has two edit texts and four buttons. When you enter two numbers and click a button, the app performs the calculation for that button and displays the result.
- 3. Develop an android app for Text to Speech.
- 4. Create the MP3 player like application with service

Course Outcomes:

On completion of this course, students will be able to:

- CO1: Comprehend the basic features of Android Platform and Create Activities in Android.
- CO2: Demonstrate the design concepts of user interface using components and views in Android.
- **CO3:** Create and use databases for Android Application.

CO4: Implement messaging services in Android.

CO5: Deploy mobile applications in various market place for distribution.

Text Books:

- Wei Meng Lee: "Beginning Android Application Development", Wiley publications, ISBN: 978-1-118-01711-1, (Chapters 1-8,10,11).
- Reto Meier: "Professional Android 4 Application Development", Wiley publications Publisher, 2012, ISBN-10: 812653608X

Reference Books:

- Mark Murphy: "Beginning Android 3", Apress Springer India Pvt. Ltd., 1st Edition, 2011, ISBN-13: 978-1-4302-3297-1
- Sayed Hashimi, Satya Komatineni, Dave MacLean; Pro Android 4; Apress Springer India Pvt Ltd; 1st Edition; 2012; ISBN: 978-1-4302-3930-7.
- Reto Meier: "Professional Android 2 Application Development", Wiley India Pvt. Ltd., 1st Edition, 2012, ISBN: 9788126525898.
- 4) James Steele: "The Android Developer's Cookbook: Building Applications with the Android SDK", Addison-Wesley Professional, 2010.

E-Resources:

- 1) https://developers.google.com/training/adf
- 2) <u>https://goo.gl/ADKvq8</u>
- 3) <u>https://innovator.samsungmobile.com</u>

BIG DATA ANALYTICS

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CST63	3:0:0:0	03	CIE: 50 SEE: 50	03 Hours	PCC

Description of the course:

Big Data has been described by some Data Management pundits (with a bit of a snicker) as "huge, overwhelming, and uncontrollable amounts of information." In 1663, John Graunt dealt with "overwhelming amounts of information". The Big Data course provides a unique approach to help students act on data for real business gain. The focus is not what a tool can do, but what you can do with the output from the tool. Gain the skills you need to store, manage, process, and analyze massive amounts of unstructured data to create an appropriate data lake. As big data analytics is gaining popularity with every passing day, it is essential for businesses to be aware of the big data analytics predictions and stay abreast with all the latest trends. The companies will require big data analytics to work on these data to provide insight for the companies so student able to get a better job in companies.

Prerequisite:

Good knowledge skill on database and data structures

Course Objectives:

This course will enable students to

- > Understand Big Data, Hadoop Distributed File system and Map Reduce.
- Explore Hadoop tools and manage Hadoop Administration.
- > Appraise the role of Business intelligence and its applications across industries.
- > Assess core data mining techniques for data analytics.
- Learn various Text Mining techniques.

Module - I

Introduction To Big Data: Big Data and its importance, Four Vs, Big data applications. Introduction To Hadoop: Hadoop Distributed File System Basics, Hadoop components, Hadoop Eco System, Hadoop Map Reduce Framework.

08 Hours

Module - II

Essential Hadoop Tools: Yarn, Hive, Oozie, Pig, Flume, Hadoop YARN Applications, Managing Hadoop with Apache Ambari, Basic Hadoop Administration Procedures.

08 Hours

Module-III

Business Intelligence Concepts and Application: BI – Tools, Skills, Applications, Data Warehousing – Approaches and Architecture, Data Mining – CRISP – DM, Techniques, Tools, Myths, Mistakes, Data Visualization – Types of charts.

08 Hours

Module - IV

Decision Trees: Pseudo code, Regression – Logistic, Advantages and Disadvantages, Artificial Neural Networks – Design principles, Steps in developing ANN, Advantages and Disadvantages, Cluster Analysis - K-means algorithm, Association Rule Mining - Apriori algorithm.

08 Hours

Module-V

Text Mining: Architecture, TDM, Applications, Naïve-Bayes Analysis - Model, Advantages and Disadvantages, Support Vector Machines - Model, Advantages and Disadvantages, Web Mining – Content, Structure, Usage, Social Network Analysis - Techniques and Algorithm, Page Rank, Practical Considerations.

08 Hours

Course Outcomes:

On completion of this course, the students are able to:

CO1: Master the concepts of Big Data, HDFS and Map Reduce framework

CO2: Investigate Hadoop related tools for Big Data Analytics and perform basic Hadoop Administration

CO3: Recognize the role of Business Intelligence, Data warehousing and Visualization in decision making

CO4: Demonstrate the importance of core data mining techniques for data analytics

CO5: Illustrate and analyze Text Mining Techniques

Text Books:

- Douglas Eadline, "Hadoop 2 Quick-Start Guide: Learn the Essentials of Big Data Computing in the Apache Hadoop 2 Ecosystem", 1stEdition, Pearson Education, 2016. ISBN-13: 978-9332570351
- Anil Maheshwari, "Data Analytics", 1st Edition, McGraw Hill Education, 2017. ISBN-13: 978-9352604180

Reference Books:

- 1) Tom White, —Hadoop: The Definitive Guidel, 4 Edition, O'Reilly Media,
- Boris Lublin sky, Kevin T. Smith, Alexey Yakubovich, —Professional Hadoop Solutions",1st Edition, Wrox Press, 2014ISBN-13: 978-8126551071
- Eric Sammer, —Hadoop Operations: A Guide for Developers and Administrators",1st Edition, O'Reilly Media, 2012.ISBN-13: 978-9350239261

E-Resources:

- 1) https://www.tutorialspoint.com/big_data_tutorials.htm
- 2) https://nptel.ac.in/courses/106/104/106104189/

ARTIFICIAL INTELLIGENCE

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CST64	3-0-0-0	03	CIE:50 SEE:50	03 Hours	PCC

Course Objectives:

This course will enable students to

- Understand AI technique to a given concrete problem
- Study non-trivial AI techniques to handle complex problem
- Understand uncertainty and Problem-solving techniques.
- Learn various symbolic knowledge representation to specify domains and reasoning tasks of a situated software agent.
- > Understand different logical systems for inference over formal domain

Module – I

Introduction: What is AI? Intelligent Agents: Agents and environment; Rationality; the nature of environment; the structure of agents. Problem solving: Problem-solving agents; Example problems; Searching for solution; uninformed search strategies.

08 Hours

Module – II

Informed Search, Exploration, Constraint Satisfaction, Adversial Search: Informed search strategies; Heuristic functions; On-line search agents and unknown environment. Constraint satisfaction problems; back tracking search for CSPs. Adversial search: Games; Optimal decisions in games; Alpha-Beta pruning.

08 Hours

Module –III

Inference in First-Order Logic-2: Forward chaining; Backward chaining; Resolution Logical Agents: Knowledge-based agents; The wumpus world as an example world; Logic; propositional logic Reasoning patterns in propositional logic; Effective propositional inference; Agents based on propositional logic.

08 Hours

Module-IV

First-Order Logic, Inference in First-OrderLogic-1: Representation revisited; Syntax and semantics of firstorder logic; using first-order logic; Knowledge engineering in first-order logic. Propositional versus firstorder inference; Unification and lifting.

Hours

Module-V

Inference in First-Order Logic-2: Forward chaining; backward chaining; Resolution.

08 Hours

08

Course Outcomes:

On completion of this course, students will be able to:

CO1: Design intelligent agents for solving simple gaming problem.

CO2: Apply non-trivial AI techniques to handle complex problems.

CO3: Apply various symbolic knowledge representation to Specific problems.

CO4: Design Knowledge-based agents.

Textbook:

Stuart Russel, Peter Norvig: —Artificial Intelligence A Modern Approachl, 2nd Edition, Pearson Education, 2003, (Chapters 1.1, 2, 3.1 - 3.4, 4.1, 4.2, 4.5, 5.1, 5.2, 6.1-6.3, 7, 8, 9, 10, 11.1, 11.2, 11.4, 11.5, 13.1, 13.4, 13.5, 13.6,) ISBN:0-13-103805-2.

Reference Books:

- 1. Elaine Rich, Kevin Knight: —Artificial Intelligencel, 3rd Edition, Tata McGraw Hill, 2009, ISBN-10: 0070087709
- 2. Nils J. Nilsson: —Principles of Artificial Intelligencell, Elsevier, 1980, ISBN:978-3-540-11340-9.

E-Resources:

1) <u>http://stpk.cs.rtu.lv/sites/all/files/stpk/materiali/MI/Artificial%20Intelligence</u>

% 20A% 20 Modern% 20 Approach.pdf.

2) <u>http://www.getfreeebooks.com/16-sites-with-free-artificial-intelligence-ebooks/</u>

FULL STACKDEVELOPMENT (IC	5
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Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CSI65	3:0:2:0	04	CIE:50 SEE:50	03 Hours	IC

Course Objectives:

This course will enable students to,

- ➤ Use HTML, CSS and JavaScript in web page design.
- > Access the DOM objects, filters, forms in Java Script's query.
- > Write programs using Hooks, components and Events in React JS.
- Design interactive web pages.
- > Understand with the database connectivity and reactive forms using JavaScript

Module- I

Java script: Basics: Variables, Operator, DOM, Arrays, Functions, Arrow Functions, Classes, Objects, Event Handling, Map, Babbel JS React Introduction ,React Installation. Simple React program and CSS styling.

08 Hours

Module– II

React: Functional Component, Class Component, Event Based Component, Props, States, Set state, Event Handling, Binding Event Handler, Life Cycle Methods, Lists& Keys, Forms and user inputs, Rendering: Conditional Rendering, List Rendering.

08 Hours

Module– III

Hooks: use State, use Menu, use Effect, Axios Package, use Ref, use Context, use Reducer, use Callback use Input, React Router, APIs, Practical React: icons, video player, credit card, model, chart, count up.

08 Hours

Module- IV

IntroductiontoNode.js: WhatisNode.js? Features of Node.js, Setup Development Environment-Installing, Node.js, Working with REPL, Node.js Console, Node.js Module, Node Package Manager, Node.js Basics, File System, HTTP and HTTPs, Creating Web Server- Handling http request, Node.js Callbacks, Node. Js Events.

08 Hours

Module– V

Database Connectivity and Reactive Forms: Promises, Express.js, Database Connectivity Connecting to RDBMS and No SQL database, Performing CRUD operations, What is Reactive Forms, Syncing of HTML and Form, Form Control Arrays, Relative Forms, Value changes and Reacting to status, Create Reactive form through code, Adding Validation, Adding Validation, Grouping, Custom Valuators.

08 Hours

Lab Programs

- 1. Write a react JS Program using use State hook .
- 2.Write a react Js Program to style a webpage using CSS
- 3. Write a react JS Program to fetch details from spotify API.
- 4. Write a react Js Program to implementing routing using react-router-dom package.
- 5.Write a react JS Program to implement digital clock using hook
- 6.Write a react Js program create login form
- 7.Write a react Js program create a simple greeting website

Course Outcomes:

On completion of this course, the students will be able to,

- CO1: Develop programs in HTML, Java Script.
- **CO2:** Test and deploy web pages containing Java Script.
- **CO3:** Design programs using React JS components and Hooks.
- **CO4:** Manipulate page content using DOM and utilize even than dlerstores pond to user events.

CO5: Design programs using React JS with data base connectivity.

Text Book:

 Brad Dayley, "Node.js, MongoDB, and Angular JS Web Development,2018,\ISBN-13:9789352865505.

Reference Book:

- 1) Adam Freeman, "Pro Angular JS", A press Publications, 2nd Edition, 2017, ISBN-13:9781484223062.
- Learning React Functional Web Development with React and Redux By Alex Banks, Eve Porcello-2017

E-Resources:

1) https://reactjs.org/docs/getting-started.html

- 2) https://www.mongodb.com/resources
- 3) https://youtube.com/playlist?list=PLC3y8-rFHvwgg3vaYJgHGnModB54rxOk

Professional Elective-II

ADVANCED ALGORITHMS

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course
					Туре
20CST661	3:0:0:0	03	CIE:50 SEE:50	03 Hours	PEC-II

Course Objectives:

This course will enable students to:

- ➤ Learn the different amortized analysis.
- > Know the modular arithmetic for solving problems.
- > Explore the knowledge of different graph algorithms.
- > Understand familiarity with major algorithms and data structures.
- > Synthesize efficient algorithms in common engineering design situations.

Module– I

Analysis Techniques: Growth functions, Recurrences and solution of recurrence equations; Amortized analysis: Aggregate, Accounting, and Potential methods, String Matching Algorithms: Naïve Algorithm; Robin-Karp Algorithm, String matching with Finite Automata, Knuth-Morris- Pratt and Boyer-Moore Algorithms.

08 Hours

Module– II

Number Theoretic Algorithms: Elementary notions, GCD, Modular arithmetic, solving modular linear equations, The Chinese remainder theorem, Powers of an element RSA Cryptosystem, primarily testing, Integer factorization, - Huffman Codes, Polynomials. FFT-Huffman codes: Concepts, construction, Proof correctness of Huffman's algorithm; Representation of polynomials.

08 Hours

Module- III

DFT and FFT efficient implementation of FFT, Graph Algorithms, Bellman-Ford Algorithm Shortest paths in a DAG, Johnson's Algorithm for sparse graphs, Flow networks and the Ford- Fulkerson Algorithm, Maximum bipartite matching.

08 Hours

Module– IV

Computational Geometry-I: Geometric data structures using, C, Vectors, Points, Polygons, Edges Geometric objects in space; Finding the intersection of a line and a triangle, Finding star shaped polygons using incremental insertion.

08 Hours

Module-V

Computational Geometry-II: Clipping: Cyrus-Beck and Sutherland-Hodman Algorithms; Triangulating, monotonic polygons; Convex hulls, Gift wrapping and Graham Scan; Removing hidden surfaces.

08 Hours

Course Outcomes:

After studying this course, students will be able to

CO1: Explain the principles of algorithms analysis approaches.

CO2: Apply different theoretic based strategies to solve problems.

CO3: Illustrate the complex signals and data flow in networks with usage of tools.

CO4: Compare between different data structures algorithms.

CO5: Describe the computational geometry criteria.

Text Books:

- Thomas H. Cormen et al: Introduction to Algorithms, third edition Prentice Hall India, 1990ISBN-10: 9780262033848
- Michael J. Laszlo: Computational Geometry and Computer Graphics in C' Prentice HallIndia,1996 ISBN-13: 978-0132908429.

Reference Books:

- E. Horowitz, S. Sahni and S. Rajasekaran, Fundamentals of Computer Algorithms, University Press, Second edition, 2007 ISBN: 9788173716126
- Kenneth A Berman & Jerome L Paul, Algorithms, Cengage Learning, First Indian reprint, 2008 ISBN-13: 978-8131505212.

E-resources:

- 1) https://www.coursera.org/learn/advanced-algorithms-and-complexity
- 2) <u>https://www.freecodecamp.org/news/these-are-the-best-free-courses-to-learn-datastructuresand-algorithms-in-depth-4d52f0d6b35a/</u>

USER INTERFACE DESIGN

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CST662	3:0:0:0	03	100	03 Hours	PEC-II

Course Objectives:

- > To study the concept of menus, windows, interfaces
- To study about business functions
- > To study the characteristics and components of windows and the various controls for the windows.
- To study about various problems in windows design with color, text, graphics and To study the testing methods.

Module– I

The User Interface-Introduction, Overview, The importance of user interface – Defining the user interface, The importance of Good design, Characteristics of graphical and web user interfaces, Principles of user interface design

08 Hours

Module- II

The User Interface Design process- Obstacles, Usability, Human characteristics in Design, Human Interaction speeds, Business functions-Business definition and requirement analysis, Basic business functions, Design standards.

08 Hours

Module-III

System menus and navigation schemes- Structures of menus, Functions of menus, Contents of menus, Formatting of menus, Phrasing the menu, Selecting menu choices, Navigating menus, Kinds of graphical menus.

08 Hours

Module– IV

Windows - Characteristics, Components of window, Window presentation styles, Types of window, Window management, Organizing window functions, Window operations, Web systems, Characteristics of device based controls.

08 Hours

Module-V

Screen based controls- Operable control, Text control, Selection control, Custom control, Presentation control, Windows Tests-prototypes, kinds of tests.

08 Hours

Course Outcomes:

After the completion of this course, student will be able to

CO1: Explains the important role of the User Interface design,

CO2: Illustrate the menu creation

CO3: Demonstrate windows creation

CO4: Apply connection between menus and windows

CO5: Analyzing different user interface design

Textbooks:

 Wilbert O. Galitz, "The Essential Guide to User Interface Design", John Wiley & Sons, Second Edition 2002.

Reference Books:

- 1) Ben Sheiderman, "Design the User Interface", Pearson Education, 1998.
- 2) Alan Cooper, "The Essential of User Interface Design", Wiley- Dream Tech Ltd., 2002

BLOCK CHAIN & CRYPTO CURRENCIES

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CST663	3:0:0:0	03	100	03 Hours	PEC-II

Course Objectives:

- Be Able to explain what is block chain and why we need block chain? What are the real world problems that block chain is trying to solve?
- Understand and describe how block chain works and explain the underlying technology of transactions, blocks, proof-of-work, and consensus building.
- > To study the Impact of Block chain Technology On Crypto-currency
- ➢ How bit coin crypto currency work.
- > Why people value a 'digital' currency, how it can be stored, exchange and do transactions.

Module– I

Introduction to Block chain: Back story of Block chain, what is Block chain? Centralized vs. Decentralized Systems, Layers of Block chain, why is Block chain Important? Limitations of Centralized Systems, Block chain Adoption So Far, Block chain Uses and Use Cases How Block chain Works-1: Laying the Block chain Foundation, Cryptography, Symmetric Key Cryptography.

08 Hours

Module– II

How Block chain Works-2: Asymmetric Key Cryptography, Diffie-Hellman Key Exchange, Symmetric vs. Asymmetric Key Cryptography, Nash Equilibrium, Prisoner's Dilemma, Byzantine Generals' Problem, Zero-Sum Games, Why to Study Game Theory, Computer Science Engineering, The Block chain, Merkle Trees, Putting It All Together, Properties of Block chain Solutions, Block chain Transactions, Distributed Consensus Mechanisms, Block chain Applications, Scaling Block chain, Off-Chain Computation, Sharding Block chain State

08 Hours

How Bit coin Works: The History of Money, Dawn of Bit coin, What Is Bit coin? Working with Bit coins, TheBit coin Block chain, Block Structure, The Genesis Block, The Bit coin Network, Network Discovery for a New Node, Bit coin Transactions, Consensus and Block Mining, Block Propagation, Bit coin Scripts, Bitcoin Transactions Revisited, Scripts, Full Nodes vs. SPVs, Full Nodes, SPVs, Bit coin Wallets.
08 Hours

Module-IV

Introduction to Cryptography & Crypto currencies: Cryptographic Hash Functions, Hash Pointers and Data Structures, Digital Signatures, Public Keys as Identities, A Simple Crypto currency

08 Hours

Module-V

How to Store and Use Bit coins: Simple Local Storage, Hot and Cold Storage, Splitting and Sharing Keys, Online Wallets and Exchanges, Payment Services, Transaction Fees, Currency Exchange Markets.

08 Hours

Course Outcomes:

After the completion of this course, student will be able to

CO1: Understand and explore the working of Block chain technology

CO2: Understand and analyze the working of game theory.

CO3: Analyze the working of bit coin scripts and transactions

CO4: Analyze the Impact of Block chain Technology on Crypto-currency.

CO5: Understand and explore online wallets, exchanges and payment services.

Text Books:

- Beginning Block chain: A Beginner's Guide to Building Block chain Solutions by Bikramaditya Singhal, Gautam Dhameja and Priyansu Sekhar Panda
- Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, Bit coin and Crypto-currency Technologies: A Comprehensive Introduction, Princeton University Press (July 19, 2016).

References Books:

- 1) Mastering Bit coin by Andreas M. Antonopoulos
- Block chain Technology: Crypto-currency and Applications by S. Shukla, M. Dhawan, S. Sharma, S. Venkatesan, Oxford University Press 2019.

E-Resources:

- 1) NPTEL online course : https://nptel.ac.in/courses/106/104/106104220/#
- 2) Udemy: https://www.udemy.com/course/build-your-blockchain-az/
- EDUXLABS Online training :https://eduxlabs.com/courses/blockchain technologytraining/?tab=tab-curriculum

Professional Elective-III

CRYPTOGRAPHY, NETWORK SECURITY AND CYBERLAW

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CST681	3:0:0:0	03	100	03 Hours	PEC-III

Course Objectives:

- Explain the concepts of Network security
- > Illustrate key management issues and solutions.
- > Familiarize with Cryptography and very essential algorithms
- > Introduce cyber Law and ethics to be followed.

Module-I

Introduction: Cyber Attacks, Defence Strategies and Techniques, Guiding Principles, Mathematical Background for Cryptography - Modulo Arithmetic's, The Greatest Comma Divisor, Useful Algebraic Structures, Chinese Remainder Theorem, Basics of Cryptography - Preliminaries, Elementary Substitution Ciphers, Elementary Transport Ciphers, Other Cipher Properties, Secret Key Cryptography – Product Ciphers, DES Construction.

08 Hours

Module– II

Public Key Cryptography and RSA – RSA Operations, Why Does RSA Work?, Performance, Applications, Practical Issues, Public Key Cryptography Standard (PKCS), Cryptographic Hash - Introduction, Properties, Construction, Applications and Performance, The Birthday Attack, Discrete Logarithm and its Applications - Introduction, Diffie-Hellman Key Exchange, Other Applications.

08 Hours

Module- III

Key Management - Introduction, Digital Certificates, Public Key Infrastructure, Identity–based Encryption, Authentication–I - One way Authentication, Mutual Authentication, Dictionary Attacks, Authentication – II – Centralised Authentication, The Needham-Schroeder Protocol, Kerberos, Biometrics, IPSec- Security at the Network Layer – Security at Different layers: Pros and Cons, IPSec in Action, Internet Key Exchange (IKE)

P a g e 108
Protocol, Security Policy and IPSEC, Virtual Private Networks, Security at the Transport Layer - Introduction, SSL Handshake Protocol, SSL Record Layer Protocol, Open SSL.

08 Hours

Module-IV

IEEE 802.11 Wireless LAN Security - Background, Authentication, Confidentiality and Integrity, Viruses, Worms, and Other Malware, Firewalls – Basics, Practical Issues, Intrusion Prevention and Detection - Introduction, Prevention Versus Detection, Types of Instruction Detection Systems, DDoS Attacks Prevention/Detection, Web Service Security – Motivation, Technologies for Web Services, WS- Security, SAML, Other Standards.

08 Hours

Module-V

IT act aim and objectives, Scope of the act, Major Concepts, Important provisions, Attribution, acknowledgement, and dispatch of electronic records, Secure electronic records and secure digital signatures, Regulation of certifying authorities: Appointment of Controller and Other officers, Digital Signature certificates, Duties of Subscribers, Penalties and adjudication, The cyber regulations appellate tribunal, Offences, Network service providers not to be liable in certain cases, Miscellaneous Provisions.

08 Hours

Course Outcomes:

The students should be able to:

- CO1: Understand Cryptography basics, algorithms and Mathematical background for Cryptography.
- **CO2:** Analyse the important Cryptographic algorithms and understand the key management issues of the algorithms
- CO3: Understand security issues in Wireless LAN and Web.
- CO4: Interpret the methods for authentication, access control, intrusion detection and prevention.
- CO5: Understand the cyber security and need cyberLaw
- **Text Books:**
- 1) Cryptography, Network Security and Cyber Laws Bernard Menezes, Cengage Learning, 2010 edition (Chapters-1,3,4,5,6,7,8,9,10,11,12,13,14,15,19(19.1-19.5), 21(21.1-21.2), 22(22.1-22.4),25

Reference Books:

- Cryptography and Network Security- Behrouz A Forouzan, Debdeep Mukhopadhyay, Mc-GrawHill, 3rd Edition, 2015
- 2) Cryptography and Network Security- William Stallings, Pearson Education, 7th Edition
- 3) Cyber Law simplified- VivekSood, Mc-GrawHill, 11th reprint, 2013
- Cyber security and Cyber Laws, Alfred Basta, Nadine Basta, Mary brown, ravindra kumar, Cengage learning

PATTERN RECOGNITION

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CST682	3:0:0:0	03	100	03 Hours	PEC -III

Course Objectives:

- Be able to explain what PR is, the different paradigms for PR, and the estimation of minimum risk estimators.
- Understand data structures for PR and representation of clusters, different feature extractions, and selection methods.
- To study the different classifier algorithms and compare a variety of Naïve Bayes classification algorithms
- Understand the DT for PR, the construction of the DT, and Markov models for Classification.
- > To study different clustering algorithms and handwritten digital recognition

Module- I

Introduction: Definition of PR, Applications, Datasets for PR, Different paradigms for PR, Introduction to probability, events, random variables, Joint distributions and densities, moments. Estimation minimum risk estimators, problems

08 Hours

Module– II

Representation: Data structures for PR, Representation of clusters, proximity measures, size of patterns, Abstraction of Data set, Feature extraction, Feature selection, Evaluation

08 Hours

Module-III

Nearest Neighbor based classifiers & Bayes classifier: Nearest neighbour algorithm, variants of NN algorithms, use of NN for transaction databases, efficient algorithms, Data reduction, prototype selection, Bayes theorem, minimum error rate classifier, estimation of probabilities, estimation of probabilities, comparison with NNC, Naive Bayes classifier, Bayesians belief network

08 Hours

Module- IV

Naive Bayes classifier, Bayesians belief network, Decision Trees: Introduction, DT for PR, Construction of DT, splitting at the nodes, Over fitting & Pruning, Examples, Hidden Markov models: Markov models for classification, Hidden Markov models and classification using HMM

08 Hours

Module-V

Clustering: Hierarchical (Agglomerative, single/complete/average linkage, wards, Partitional (Forgy's, k-means, Isodata), clustering large data sets, examples, An application: Handwritten Digit recognition

08 Hours

Course Outcomes:

At the end of the course the student will be able to:

- **CO1:** Explain pattern recognition principals.
- **CO2:** Develop algorithms for Pattern Recognition.
- CO3: Develop and analyze decision tress.
- **CO4:** Design the nearest neighbor classifier.
- CO5: Apply Decision tree and clustering techniques to various applications

Text Books:

- 1) Pattern Recognition (AnIntroduction), V Susheela Devi, M Narsimha Murthy Universities Press 2011
- 2) Pattern Recognition & Image Analysis, Earl Gose, Richard Johnson baugh, Steve Jost PH 1996.

References Books:

1) Pattern Classification Duda R. O., P.E.Hart, D.G. Stork John Wiley and sons 2000.

DEEP LEARNING

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CST683	3:0:0:0	03	100	03 Hours	PEC-III

Course Objectives:

By the end of the course, students will be able to

- > Understand complexity of Deep Learning algorithms and their limitations
- > Understand modern notions in data analysis-oriented computing;
- Capable of confidently applying common Deep Learning algorithms in practice and implementing their own;
- > Capable of performing distributed computations;
- > Capable of performing experiments in Deep Learning using real-world data.

Module- I

Introduction to Tensor Flow: Computational Graph, Key highlights, creating a Graph,Regression example, Gradient Descent, Tensor Board, Modularity, Sharing Variables, Keras

Perceptrons : What is a Perceptron, XOR Gate.

08 Hours

Module– II

Activation Functions: Sigmoid, ReLU, Hyperbolic Fns, Softmax

Artificial Neural Networks: Introduction, Perception Training Rule, Gradient Descent Rule

08 Hours

Module- III

Gradient Descent and Back propagation: Gradient Descent, Stochastic Gradient Descent, Back propagation, some problems in ANN

Optimization and Regularization: Over fitting and Capacity, Cross Validation, Feature Selection, Regularization, Hyper parameters

08 Hours

Module-IV

Introduction to Convolutional Neural Networks: Introduction to CNNs, Kernel filter, Principles behind CNNs, Multiple Filters, CNN applications

Introduction to Recurrent Neural Networks: Introduction to RNNs, Unfolded RNNs,Seq2Seq RNNs, LSTM, RNN applications

08 Hours

Module– V

Deep Learning applications: Image Processing, Natural Language Processing, Speech Recognition, Video Analytics

08 Hours

Course Outcomes:

- CO1: Apply the concepts of Tensor Flow, its main functions, operations and the execution pipeline
- **CO2:** Implement deep learning algorithms, understand neural networks and traverse the layers of data abstraction which will empower the student to understand data more precisely.
- **CO3:** Illustrate convolutional neural networks, recurrent neural networks, training deep networks and high-level interfaces
- CO4: Build deep learning models in Tensor Flow and interpret the results
- **CO5:** Determining the language and fundamental concepts of artificial neural networks Differentiate between machine learning, deep learning and artificial intelligent

Text Books:

1) Goodfellow, I., Bengio, Y., and Courville, A., Deep Learning, MIT Press, 2016.

References.

ENVIRONMENTAL STUDIES

Course Code	L : T : P : S	Credits	Exam Marks	Exam Duration	Course Type
20ENV67	1:0:0:0	01	CIE:50 SEE:50	03 Hours	HSMC

Course Objectives: To recognize major concepts in environmental sciences and demonstrate in-depth understanding of the environment. The industrial revolution and development have led to the stress on environment in the form of pollution. Checking of the pollution in all fronts at local and global level encompassing the issues of carbon credit, ozone level depletion, global warming, desertification and polar ice cap melting. The main objectives of the course is to expose to students to the problems and mitigation measures concerned to the environmental components like resources, air, water and land.

Module-I

Ecosystems (Structure and Function): Forest, Desert, Wetlands, Riverine, Oceanic and Lake. **Biodiversity:** Types, Value; Hot-spots; Threats and Conservation of biodiversity, Forest Wealth, and Deforestation.

03 Hours

Module-II

Advances in Energy Systems (Merits, Demerits, Global Status and Applications): Hydrogen, Solar, OTEC, Tidal and Wind.

Natural Resource Management (Concept and case-studies): Disaster Management, SustainableMining, Cloud Seeding, and Carbon Trading.

03 Hours

Module-III

Environmental Pollution (Sources, Impacts, Corrective and Preventive measures, Relevant Environmental Acts, Case-studies): Surface and Ground Water Pollution; Noise pollution; Soil Pollution and Air Pollution.

Waste Management & Public Health Aspects: Bio-medical Wastes; Solid waste; Hazardous wastes; Ewastes; Industrial and Municipal Sludge.

03 Hours

Module-IV

Global Environmental Concerns (Concept, policies and case-studies): Ground water depletion/recharging, Climate Change; Acid Rain; Ozone Depletion; Radon and Fluoride problem in drinkingwater; Resettlement and rehabilitation of people, Environmental Toxicology.

03 Hours

Module-V

Latest Developments in Environmental Pollution Mitigation Tools (Concept and Applications):

G.I.S. & Remote Sensing, Environment Impact Assessment, Environmental Management Systems, ISO14001; Environmental Stewardship- NGOs.

Field work: Visit to an Environmental Engineering Laboratory or Green Building; Visit to a local area to document environment assets river / forest / grassland / hill / mountain. Visit to a local polluted siteurban/rural/industrial/agricultural/Water Treatment Plant/ Waste water treatment Plant. Study of common plants, insects, birds. Study of simple ecosystems-pond, river, hills lopes; etc (field workequal to 2 lecture works) ought to be Followed by understanding of process and its brief documentation.

03 Hours

Course Outcomes:

At the end of the course, students will be able to: .

- **CO1:** Understand 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 and describe the realities that managers face when dealing with complex issues.

Text Books:

- 1) Benny Joseph: "Environmental Studies". Tata Mc Graw Hill, 2nd Edition, 2012.
- 2) S M Prakash: "Environmental Studies", Pristine PublishingHouse, Mangalore, 3rd Edition, 2018.
- 3) R Rajagopalan: "Environmental Studies From Crisis to Cure: Oxford Publisher, 2005.
- R. Geetha Balakrishna, and K. G. LakshminarayanaBhatta: "Environmental Studies", SM Publications, 2016.

Reference Books:

1) Raman Sivakumar: "Principals of Environmental Science and Engineering", Cengage learning,

Singapur, 2nd Edition, 2005.

- 2) M.Ayi Reddy Textbook of environmental science and Technology, BS publications 2007.
- 3) Dr. B.S Chauhan, Environmental studies, university of science press 1st edition.

E-Resources:

1) <u>https://youtu.be/tqgo6PYfJLk?si=dd82TkdFKTu8D-zB</u>

VII Semester Course Syllabus

INTERNET OF THINGS (IC)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CSI71	3:0:2:0	04	CIE:50 SEE:50	03 Hours	IC

Course Objectives:

This course will enable the students to:

- ➢ Gain the knowledge about IOT concepts.
- > Know different Application protocols for IOT.
- > Understand methods of deploying smart objects and connect them to network.
- > Know the diverse methods of deploying smart objects and connect them to network.
- ▶ Learn about Cloud based IoT services and AWS IOT.

Module– I

Introduction to Internet of Things: Definition and Characteristics of IOT, Physical Design of IOT – IOT Protocols, IOT communication models, IOT Communication APIs IOT enabled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IOT Levels and Templates.

08 Hours

Module- II

Prototyping IoT Objects: Introduction to Sensors and actuators, Workflow of sensors, types of sensors, Workflow of Actuators, classifications of actuators, interfacing concepts to Embedded Systems, Wireless sensing networks and its technologies- architecture- topologies, issue and challenges, security, Participating Wireless sensing technologies and Case study - Bluetooth, Wi-Fi, Zigbee, RFID.

08 Hours

Module– III

IOT Architecture and Protocols: Architecture Reference Model- Introduction, Reference Model and architecture, IOT reference Model. Protocols- 6LowPAN, RPL, CoAP, MQTT.

08 Hours

Module- IV

Smart Objects: The "Things" in IOT, Sensors, Actuators, and Smart Objects, Sensor Networks, Connecting Smart Objects, Communications Criteria.

08 Hours

Module-V

Cloud Services for IOT: What is Cloud IoT?, Few key ways for Cloud IoT is different from traditional or noncloud-based IoT, How does cloud IoT work?, Cloud Services for IoT, Amazon Web services for IOT, What is AWS IoT?, AWS IoT core, AWS IoT analytics .

08 Hours

Lab Programs

Part – A

- 1. Familiarize the concept of Arduino, Raspberry Pi. Write an application to blink the light in a loop.
- 2. Develop an LED Knight rider application to display in the loop.
- 3. Construct a simulator to display whole numbers in a loop using 7 segment cathode in Arduino.
- 4. Display 3 LED to turn on and reset then using button for smart home appliances.

Part –B

1. Make a report to measure the distance of the obstacles in units using raspberry pi board

Course Outcomes:

After studying this course, students will be able to

- CO1: Explain IOT architectural components.
- **CO2:** Analyze the interface of the sensor and actuator with the Arduino development board and Raspberry Pi board.
- CO3: Implement different protocols used for communication in IoT devices.
- CO4: Design smart applications in different domain and analyze their performance.
- CO5: Analyze the use of cloud based IoT services in different applications.

Text Books:

- "Internet of Things (A Hands-on-Approach)" by Vijay Madisetti and Arshdeep Bahga, 1st Edition, VPT, 2014. ISBN 13: 9780996025515
- 2) Srinivasa K G, "Internet of Things", CENGAGE Leaning India, 2017 ISBN: 9789386858955
- 3) David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry, "IOT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things", 1st Edition, Pearson Education (Cisco Press Indian Reprint). (ISBN: 978- 9386873743)

Reference Books:

- 1) Vijay Madisetti and ArshdeepBahga, "Internet of Things (A Hands-on-Approach)", 1st
- 2) Edition, VPT, 2014. (ISBN: 978-8173719547)
- Raj Kamal, "Internet of Things: Architecture and Design Principles", 1st Edition, McGraw Hill Education, 2017. (ISBN: 978-9352605224)
- "The Internet of Things Key applications and Protocols" by Olivier Hersent, David Boswarthick, Omar Elloumi, , Wiley, 2012 ISBN: 978-1-119-99435-0

E-resources:

- 1) www.coursera.org/specializations/IOT
- 2) www.futurelearn.com/courses/internet-of-things
- 3) https://dgtlinfra.com/amazon-web-services-aws-iot/

CYBER SECURITY AND FORENSIC (IC)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CSI72	3:0:2:0	04	CIE:50 SEE:50	03 Hours	IC

Course Objectives:

This course will enable students to,

- > Realize the fundamental concepts of cyber security and get the awareness of cyber-attack.
- > Create insight into cybercrime and offenses in the digital world.
- > Get knowledge of Cyber forensic techniques and procedures.
- > Learn Cyber Defense and Analysis Techniques.
- >Gain the Knowledge in threat detection, incident response, and cybersecurity for career growth.

Module-I

Cyber Crime: Introduction, Cybercrime: Definition and Origins of the Word, who are Cybercriminals? Classification of Cybercrimes, Indian ITA 2000. Cyber offenses: How Criminals Plan them? Introduction, Categories of Cyber-crime, How Criminals Plan the Attacks, Social Engineering.

08 Hours

Module-II

Cyber Security: Network and Security Concepts, Information Assurance Fundamentals, Basic Cryptography, Symmetric Encryption, Public Key Encryption, RSA, the Domain Name System (DNS).

08 Hours

Module-III

Cyber Attack: Attacker Techniques and Motivations, different Types of attacks, Anti-forensics, Fraud Techniques, Threat Infrastructure. Malicious Code: Self-Replicating Malicious Code.

08 Hours

Module-IV

Cyber Forensic: Understanding Computer Forensics, Historical background of Cyber forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber forensics and Digital Evidence, Forensics analysis of E-mail, Digital Forensics Life Cycle.

08 Hours

Module-V

Cyber Defense and Analysis: Defence and Analysis Techniques, Memory Forensics, Honeypots, Malicious Code Naming, Automated Malicious Code Analysis Systems, Intrusion Detection Systems, Case studies, Demonstration of forensic software and tool.

08 Hours

Course Outcomes:

On completion of this course, the students will be able to,

CO1: Analyze and resolve security issues in networks and computer systems to secure an IT infrastructure.

- CO2: Analyze the cyber vulnerabilities and techniques used by hackers to create frauds.
- CO3: Diagnose and investigate cyber-attacks related to computer systems and the digital world
- **CO4:** Analyze and compare various types of cybercrime to Interpret and forensically investigate security incidents.

CO5: To deploy cyber defense techniques and can analyze the system for better forensic solutions

Lab Programs

- 1. Case Study on Cyber Security and Forensics
- 2. Demonstration of Forensic Tools
- 3. Experiment on Disk Forensics and Data Recovery
- 4. Experiment on Steganography
- 5. Experiment on Key loggers

Text Books:

- James Graham, Richard Howard, RyanOlson Cyber Security Essentials CRC Press, ISBN9780815351429, Published December 14, 2010, by Auerbach Publications.
- Sunit Belapure and Nina Godbole, "Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives", Wiley India Pvt Ltd, ISBN: 978-81-265-21791, Publish Date2013.

References Books:

- 1) MarjieT.Britz-Computer Forensics and CyberCrime :An Introduction–Pearson.
- Kimberly Graves "Official Certified Ethical Hacker Review Guide", ISBN-13:978-0-7821-4437-6, Wiley Publishing, Inc. 2015.
- Chwan-Hwa (John) Wu,J. David Irwin Introduction to Computer Networks and Cybersecurity CRC Press.

E-Resources:

- 1) https://www.hacker101.com/
- 2) https://blog.elearnsecurity.com/free-resources-to-legally-practice-ethical-hacking.html
- 3) <u>https://www.routledge.com/Cyber-Security-Essentials/Graham-Olson-</u> Howard/p/book/9781439851234
- 4) <u>https://doc.lagout.org/security/ceh-official-certified-ethical-hacker-review-guide-exam-312-50.9780782144376.27422.pdf</u>
- 5) https://www.pdfdrive.com/ethical-hacking-and-penetration-testing-guide-e18776556.html
- 6) <u>https://heimdalsecurity.com/pdf/cyber_security_for_beginners_ebook.pdf</u>

Professional Elective-IV

ADVANCED CLOUD COMPUTING (AMAZON WEB SERVICES)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CSI731	3:0:0:0	03	CIE:50 SEE:50	03 Hours	PEC-IV

Course Objectives:

This course will enable students to:

- > Identify the security and compliance benefits of by using the AWS Cloud.
- > Understand the access control and management features of AWS.
- > Learn about data encryption methods to secure all types of sensitive data.
- > Get knowledge about the important steps for managing various AWS resources.
- > Study the AWS services to protect network security.

Module-I

Introduction to AWS: AWS history, features, AWS Global infrastructure, Comparing AWS to other cloud computing providers. An overview of the AWS API, AWS API security. Understanding the role of the AWS Management Console, creating an AWS account, Loading Data into S3 Buckets, S3 URL naming conventions.

08 Hours

Module-II

AWS Storage services: AWS S3, AWS EBS, AWS S3 concepts, creating S3 bucket, AWS storage classes, AWS versioning, storage gateway, AWS snowball.

AWS Identity Services: AWS IAM, features, IAM identities, IAM roles.

08 Hours

Module-III

AWS computing and marketplace: AWS EC2, EC2 pricing options, AWS EBS, EC2 auto scaling, creating an EC2 instances, EBS volume types, AWS AMI, AWS load balancing, AWS Lambda, Cloud Watch EC2, AWS Route53..

08 Hours

Module-IV

AWS Networking and database services: AWS VPC, architecture of VPC, VPC peering, direct connect, Architecture of direct connect, features of direct connect, Relational Database, Non-relational Database, AWS elastic cache, Aws Dynamo DB, AWS Aurora, AWS redshift.

08 Hours

Module-V

AWS Application Services: AWS SQS, AWS SWF, AWS SNS, Elastic Transcoder, API Gateway, AWS kinesis.

AWS Monitoring and Analytics: AWS Cloud Watch, Cloud trail, AWS trusted Adviser.

AWS pricing and support: AWS pricing models, Billing dashboard, consolidation billing, AWS budgets, AWS cost Explorer, AWS support plans.

08 Hours

Course Outcomes:

On completion of this course, the students will be able to:

- **CO1:** Discuss system virtualization and outline its role in enabling the cloud computing system model.
- CO2: Illustrate the fundamental concepts of cloud storage and demonstrate their use instorage systems

such as Amazon S3 and HDFS.

- CO3: Design various management and other distinguish services of AWS.
- CO4: Develop security and compliances for AWS.

CO5: Analyze the billing of resources and other paradigm: how to deal with disasters.

Text Books:

- Barrie Sosinsky. John Wiley & Sons. Cloud Computing Bible..First Edition January 2011. ISBN-13: 978-0470903568.
- Bernard Golden Amazon Web Services For Dummies. For Dummies publication; 1edition (9 August 2013) ISBN-13: 978- 1118571835
- Rajkumar Buyya, Cloud Computing: Principles and Paradigms, John Wiley & Sons, First Edition (3 January 2011). ISBN: 9780470887998

Reference Books:

- Amazon.com Mashups by Francis Shanahan, Wrox, Wiley Publishing Inc., ISBN-13: 978-0470097779, ISBN-10: 0470097779
- Amazon Web Services in Action by Michael Wittig and Andreas Wittig, Dreamtech Press, ISBN: 9789351198758
- Building Applications in the Cloud: Concepts, Patterns and Projects by Christopher M. Moyer, Pearson Addison-Wesley Professional, ISBN-10: 0321720202, ISBN-13: 978- 0321720207
- Cloud Computing Design Patterns by Thomas Erl, Prentice Hall, ISBN-10: 0133858561, ISBN-13: 978-0133858563

E-Resources:

- 1) Amazon Security overview whitepaper- https://aws.amazon.com/whitepapers
- 2) IAM Getting started Guide http://docs.aws.amazon.com/IAM/latest/UserGuide/getting-started html

ADVANCED MACHINE LEARNING TECHNIQUES

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CST732	3:0:0:0	03	CIE:50 SEE:50	03 Hours	PEC-IV

Course Objectives:

- > To understand the need for machine learning for various problem solving.
- > To study the various supervised, semi-supervised and unsupervised learning algorithms in machine learning.
- > To learn the new approaches in machine learning.
- > To design appropriate machine learning algorithms for problem solving.

Module-I

INTRODUCTION: Learning Problems – Perspectives and Issues – Concept Learning – Version Spaces and Candidate Eliminations – Inductive bias – Decision Tree learning – Representation – Algorithm – Heuristic Space Search.

08 Hours

Module-II

NEURAL NETWORKS AND GENETIC ALGORITHMS: Neural Network Representation – Problems – Perceptrons – Multilayer Networks and Back Propagation Algorithms – Advanced Topics – Genetic Algorithms – Hypothesis Space Search – Genetic Programming – Models of Evaluation and Learning.

08 Hours

Module-III

BAYESIAN AND COMPUTATIONAL LEARNING: Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – Bayesian Belief Network – EM Algorithm – Probability Learning – Sample Complexity – Finite and Infinite Hypothesis Spaces–Mistake Bound Model.

08 Hours

Module-IV

INSTANT BASED LEARNING: K- Nearest Neighbour Learning – Locally weighted Regression–Radial Bases Functions–Case Based Learning.

08 Hours

Module-V

ADVANCED LEARNING: Learning Sets of Rules – Sequential Covering Algorithm – Learning Rule Set – First Order Rules – Sets of First Order Rules – Induction on Inverted Deduction – Inverting Resolution – Analytical Learning – Perfect Domain Theories – Explanation Base Learning – FOCL Algorithm – Reinforcement Learning – Task – Q-Learning – Temporal Difference Learning.

08 Hours

Course Outcomes:

On completion of the course, students will be able to:

- CO1: Differentiate between supervised, unsupervised, semi-supervised machine learning approaches
- CO2: Apply specific supervised or unsupervised machine learning algorithm for a particular problem
- CO3: Analyze and suggest the appropriate machine learning approach for the various types of problem
- **CO4:** Design and make modifications to existing machine learning algorithms to suit an individual application
- **CO5:** Provide useful case studies on the advanced machine learning algorithms

Text Books:

1) Tom M. Mitchell, —Machine Learningl, McGraw-Hill Education (India) Private Limited, 2013.

Reference Books:

 Ethem Alpaydin, —Introduction to Machine Learning (Adaptive Computation and Machine Learning) , The MIT Press 2004. Stephen Marsland, —Machine Learning: An Algorithmic Perspective, CRC Press, 2009.

DATA WAREHOUSING & DATA MINING

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CST733	3:0:0:0	03	CIE:50 SEE:50	03 Hours	PEC-IV

Course Objectives:

- Study data warehouse principles and its working
- > Learn Data mining concepts and understand Association Rule Mining
- Study Classification Algorithms
- ➢ Gain knowledge of how data is grouped using clustering techniques

Module-I

Data warehouse: Introduction to Data warehouse, Difference between operational database systems and data warehouses, Data warehouse Characteristics, Data warehouse Architecture and its Components, Extraction-Transformation-Loading, Logical(Multi-Dimensional), Data Modeling, Schema Design, Star and Snow-Flake Schema, Fact Constellation, Fact Table, Fully Addictive, Semi-Addictive, Non Addictive Measures; Fact-Less-Facts, Dimension Table Characteristics; OLAP Cube, OLAP Operations, OLAP Server Architecture-ROLAP, MOLAP and HOLAP.

08 Hours

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Data Mining Task Primitives, Integration of a Data Mining System with a Database or Data Warehouse System, Major issues in Data Mining.

Data Preprocessing: Need for Preprocessing the Data, Data Cleaning, Data Integration & Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

08 Hours

Module-III

Association Rules: Problem Definition, Frequent Item Set Generation, The APRIORI Principle, Support and Confidence Measures, Association Rule Generation; APRIOIRI Algorithm, The Partition Algorithms, FP-Growth Algorithms, Compact Representation of Frequent Item Set-Maximal Frequent Item Set, Closed Frequent Item Set.

08 Hours

Module-IV

Classification: Problem Definition, General Approaches to solving a classification problem, Evaluation of Classifiers, Classification techniques, Decision Trees-Decision tree Construction, Methods for Expressing attribute test conditions, Measures for Selecting the Best Split, Algorithm for Decision tree Induction ; Naive-Bayes Classifier, Bayesian Belief Networks; K- Nearest neighbor classification-Algorithm and Characteristics. Prediction: Accuracy and Error measures, evaluating the accuracy of classifier or a predictor, Ensemble methods.

08 Hours

Module-V

Clustering: Clustering Overview, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, , Partitioning Clustering-K-Means Algorithm, PAM Algorithm; Hierarchical Clustering-Agglomerative Methods and divisive methods, Basic Agglomerative Hierarchical Clustering Algorithm, Key Issues in Hierarchical Clustering, Strengths and Weakness, Outlier Detection.

08 Hours

Course Outcomes:

On completion of the course, students will be able to:

CO1: Comparison of functional differences between data warehouse and database systems.

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CO2: Ability to perform the pre-processing of data and apply mining techniques on it.

CO3: Capability to identify the association rules, classification and clusters in large data sets.

CO4: Skills to solve real world problems in business and scientific information using data mining.

Text Books:

- 1. Data Mining- Concepts and -1.chniques- Jiawei Han, Micheline Kamber, Morgan Kaufmann Publishers, Elsevier, 2 Edition, 2006.
- 2. Introduction to Data Mining, Psng-Ning Tan, Vipin Kumar, Michael Steinbanch, Pearson Educatior.

Reference Books:

- 1. Data Mining Techniques, Arun KPujari, 3rd Edition, Universities Press.
- 2. Data Warehousing Fundament's, Pualraj Ponnaiah, Wiley Student Edition.
- 3. The Data Warehouse Life CycleToolkit Ralph Kimball, Wiley Student Edition.
- 4. Data Mining, Vikaram Pudi, P Rddha Krishna, Oxford University Press

Professional Elective-V

UML & AGILE PRACTICES

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CST741	3:0:0:0	03	CIE:50 SEE:50	03 Hours	PEC-V

Course Objectives:

This course will enable students to:

- > Understand the basic concepts of Object Orientation and UML.
- ▶ Get a clear understanding of how to use UML and design diagrams.
- ▶ Know iterative, incremental and development process.
- > Study the principles and practices of extreme programming.
- Understand the essence of agile development methods and develop prototyping in the Software process.

Module-I

Introduction, Modeling Concepts, Class Modeling : What is Object Orientation? What is OO development? OO themes; Evidence for usefulness of OO development; OO modelling history. UML diagrams – Use Case –

Class Diagrams–Interaction Diagrams – State Diagrams – Activity Diagrams – Package, component and Deployment Diagrams.

08 Hours

Module-II

Advanced Modelling and Design: State Modelling, elements of state diagram, State Diagrams, Nested state Diagram

Interaction models, use case Diagrams, Sequence models, Activity Diagrams and Examples.

08 Hours

Module-III

Process Overview, System Conception, Domain analysis: Process overview Development Stages, Development life cycle, System Conception, devising a system concept, preparing a problem statement, The ATM case study, Domain analysis, Domain class model, Domain state model, System Design activities.

08 Hours

Module-IV

The Agile Methodologies: A Five Minute Primer What is Agile Development? The Agile Methodologies Agile Values, Agile Practices, Agile Principles. Agile Characteristics-The Characteristics of an Agile Project, The Development Team Project Management, The Customer, Processes and Tools, The Contract, What Projects Can Benefit from Agile Development.

08 Hours

Module-V

Agile Practices and Testing: Common Themes, Methodology Descriptions, Extreme Programming, Scrum, Feature Driven Development, The Crystal Methodologies, Adaptive Software Development, Dynamic Systems Development Method, Lean Software Development, Starting Monday: Investigate Further. Selecting an Approach that Fits: Choosing between an Agile or Traditional Approach.

08 Hours

Course Outcomes:

On completion of this course, the students will be able to:

CO1: Use the basic concepts of object orientation and.UML diagrams.

CO2: Analyze the relationship between sequence diagram and use case diagrams.

- **CO3:** Apply object Oriented Concepts for domain analysis.
- **CO4:** Determine the common characteristics of an agile development process.
- **CO5:** Analyze agile software development process and plan driven process models.

Text Books:

- Craig Larman, "Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development", Third Edition, Pearson Education, 2005.(module 1 and 2), ISBN-13: 9781584509876
- Michael Blaha, James Rumbaugh: Object-Oriented Modeling and Design with UML, 2nd Edition, Pearson Education, 2005. (module 1 and 2), ISBN-13:9781584509876
- Ken Schwaber And Mike Beedle, Agile Software Development With Scrum, Pearson Education, 2015. ISBN-13: 9780132074896
- Peter Schuh, Integrating Agile Development In The Real World (Charles River Media Programming), 2004 Cengage Learning, ISBN-13: 97815845036

Reference Books:

- 1. Simon Bennett, Steve Mc Robb and Ray Farmer, "Object Oriented Systems Analysis and Design
- 2. Using UML", Fourth Edition, Mc-Graw Hill Education, 2010.
- Alistair Cockburn, Agile Software Development: The Cooperative Game, Pearson Education, 2015. ISBN-13: 9780321482754
- Mike Cohn, Succeeding With Agile : Software Development Using Scrum, Pearson Education Limited, 2016, ISBN-13: 9789332547964

E Resources:

- 1. <u>https://www.gurock.com/testrail/agile-testing?</u>
- 2. https://cucumber.io/tools/cucumberstudio/?utm_source

DEVOPS

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CST742	3:0:0:0	03	CIE:50 SEE:50	03 Hours	PEC-V

Course objectives:

This course will enable students to:

> Understand the DevOps Concepts and DevOps Tool.

- Expose to the evolving Applications and advance features of Jenkins and Docker.
- Get Familiarize with Docker and Chef work stations.
- Understand the importance of testing using Jenkins, AWS EC2.
- > Identify and understand security in Jenkins and monitor the azure Applications.

Module-I

Introduction to DevOps Concepts: Understanding DevOps movement, DevOps with changing times, The waterfall model, Agile Model, Why DevOps?, DevOps lifecycle, Benefits of DevOps.

08Hours

Module-II

Continuous Integration with Jenkins 2: Introduction, Installing Jenkins, Jenkins dashboard, Configuration Java, Maven/Ant in Jenkins, Creating and Configuring build job for Java Application with Maven, Managing Nodes, Email notifications based on build status.

08 Hours

Module-III

Containers: Overview of Docker containers, Understanding the difference between virtual machines and containers, Installing and configuring Docker, Creating a Tomcat container. Cloud Computing and Configuration Management: An overview of the Chef configuration management tool, Installing and configuring a Chef workstation, Installing knife plugins for Amazon Web Services and Microsoft Azure.

08 Hours

Module-IV

Automated Testing (Functional and Load Testing): Functional testing using Selenium, Functional test execution in Jenkins, Load test execution using Jenkins. Orchestration - End-to- End Automation: End-to-end automation of application life cycle management using Jenkins, End-to-end automation using Jenkins, Chef, and AWS EC2, End-to-end automation using Jenkins and AWS Elastic Beanstalk, End-to end automation using Jenkins and Microsoft Azure app services, End-to-end automation orchestration of application life cycle Management using VSTS.

08 Hours

Module-V

Security and Monitoring: Security in Jenkins and VSTS, Security in Jenkins and VSTS, Monitoring Jenkins and Microsoft Azure, Monitoring Jenkins, Azure Web Apps troubleshooting and monitoring, Azure App

Services - CPU and memory consumption, Azure App Services – Activity log, Azure Application Insights for application monitoring, Azure web application monitoring, Diagnostics logs.

08 Hours

Lab Programs

- 1. Download and install Jenkins CI on GCP.
- 2. Configuration. Change language interface and Create the first Jenkins job
- 3. Build Triggers, corn syntax, Artifacts.
- 4. Create and run Jenkins pipeline.
- 5. Create parameterized jobs in Jenkins.
- 6. Install and configure Docker.

Course outcomes:

On completion of this course, the students are able to:

- **CO1:** Understand the fundamentals of DevOps engineering and be fully proficient with DevOps terminologies, concepts, benefits, and deployment options to meet your business requirements
- **CO2:** Build jobs and configurations in Jenkins and Master in docker, Continuous Delivery and chef Configuration Management.
- **CO3:** Create tomcat container and work on Dockers and chef workstation.
- CO4: Analyse, design and evaluate automation scripts & systems.
- CO5: Use Azure application services and monitors the security issues in Jenkins and Microsoft Azure.

Text Books:

- Mitesh Soni: DevOps for Web Development, Packet Publishing, ISBN:9781786465702, Released October 2016
- Mitesh Soni: DevOps Bootcamp-A fast-paced guide to implement DevOps with ease, May2017 (Chapters: 3,4,6,7,8),ISBN 978-1-78728-596-5.

Reference Books:

- Len Bass, Ingo Weber, Liming Zhu, Devops Software Architect's perspective, first edition, ISBN 978-0-13-404984-7,2015 Pearson Education, Inc.
- Trevor Roberts, Jr.Josh Atwell, Egle Sigler, Yvo van Doorn, Devops for VMware Administrator, First Printing: April 2015, ISBN-10: 0-13-384647-4, ISBN-13: 978-0-13-384647-8, Pearson Education, Inc.

 Sanjeev Sharma "The DevOps Adoption Playbook: A Guide to Adopting DevOps in a Multi- Speed IT Enterprise "Published by John Wiley & Sons, Inc. ISBN: 978-1-119-30874-4,ISBN:978-1-119-31052-5 (eBook),ISBN: 978-1-119-31076-1 (eBook)

E-Recourses:

- 1) <u>https://resources.collab.net/devops-101/what-is-devops.</u>
- 2) <u>https://www.ibm.com/cloud/learn/devops-a-complete-guide.</u>
- 3) <u>https://newrelic.com/devops/what-is-devops</u>
- 4) https://www.oreilly.com/library/view/devops-for-web/9781786465702/

MANAGEMENT AND ENTREPRENEURSHIP

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CST743	3:0:0:0	03	CIE:50 SEE:50	03 Hours	PEC-V

Course Objectives:

This course will enable students to:

- > Explain the principles of management, organization and entrepreneur.
- Discuss on planning, staffing, ERP and their importance
- > Infer the importance of intellectual property rights and relate the institutional support

Module-I

Introduction - Meaning, nature and characteristics of management, scope and Functional areas of management, goals of management, levels of management, brief overview of evolution of management theories,. Planning- Nature, importance, types of plans, steps in planning, Organizing- nature and purpose, types of Organization, Staffing- meaning, process of recruitment and selection

08 Hours

Module-II

Directing and controlling- meaning and nature of directing, leadership styles, motivation Theories, Communication- Meaning and importance, Coordination- meaning and importance, Controlling- meaning, steps in controlling, methods of establishing control.

08 Hours

Module-III

Entrepreneur – meaning of entrepreneur, characteristics of entrepreneurs, classification and types of entrepreneurs, various stages in entrepreneurial process, role of entrepreneurs economic development, entrepreneurship in India and barriers to entrepreneurship. Identification of business opportunities, market feasibility study, technical feasibility study, financial feasibility study and social feasibility study.

08 Hours

Module-IV

Preparation of project and ERP - meaning of project, project identification, projectselection, project report, need and significance of project report, contents, formulation, guidelines by planning commission for project report, **Enterprise Resource Planning: Meaning and Importance- ERP** and Functional areas of Management – Marketing / Sales- Supply Chain Management – Finance and Accounting – Human Resources – Types of reports and methods of report generation

08 Hours

Module-V

Micro and Small Enterprises: Definition of micro and small enterprises, characteristics and advantages of micro and small enterprises, steps in establishing micro and small enterprises, Government of India indusial policy 2007 on micro and small enterprises, case study (Microsoft), Case study (Captain G R Gopinath),case P a g e 139

study (N R Narayana Murthy & Infosys), **Institutional support:** MSME-DI, NSIC, SIDBI, KIADB, KSSIDC, TECSOK,KSFC, DIC and District level single window agency, **Introduction to IPR.**

08 Hours

Course outcomes:

The students should be able to:

- **CO1:** Define management, organization, entrepreneur, planning, staffing, ERP and outline their importance in entrepreneurship
- CO2: Utilize the resources available effectively through ERP
- CO3: Make use of IPRs and institutional support in entrepreneurship

Text Books:

- Principles of Management -P. C. Tripathi, P. N. Reddy; Tata McGraw Hill, 4th 6thEdition, 2010.
- Dynamics of Entrepreneurial Development & Management -Vasant Desai Himalaya Publishing House.
- Entrepreneurship Development -Small Business Enterprises -Poornima M Charantimath Pearson Education – 2006.
- 4) Management and Entrepreneurship Kanishka Bedi- Oxford University Press-2017

Reference Books:

- 1) Management Fundamentals -Concepts, Application, Skill Development Robert Lusier Thomson.
- 2) Entrepreneurship Development -S S Khanka -S Chand & Co.
- 3) Management -Stephen Robbins -Pearson Education /PHI -17th Edition, 2003

Industrial Elective-I

MODERN TOOLS & DEVELOPMENT

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CST751	3:0:0	03	CIE:50 SEE:50	03 hours	IE-I

Course Objectives:

This course will enable students to:

- Understand the new Concepts and Modern Tool.
- Expose to the evolving Applications and advance features of modern tools.
- > Understand the importance of testing using sales force and security sharing.

Module-I

Introduction to Cloud Computing and Salesforce.com

What is cloud, what is cloud Computing, Types of Clouds, Services of Cloud: IaaS (Infrastructure as a Service, PaaS (Platform as a Service), SaaS (Software as a Service), Advantages of Cloud, Service Providers:Salesforce.com, Microsoft – Dynamics, Amazon S3, Googl-Azure etc. Advantages of salesforce.com over. What is Salesforce.com, Difference between Salesforce, Different Enviroment, Types of Editions: Enterprise, professional Unlimited and group. Comparison of editions. Salesforce Releases, designing your data model. Understanding the sales process. Analyzing a real time functional requirement. Converting functional requirement to technical specifications. Building your data model.

08 Hours

Module-II

CMR, Creation of Account and Operators, Formulas Rules and Functions: what is CRM : how CRM can help, Evolution of CRM. Different objects in CRM: Campaign, Lead, Account, and Opportunity. Overview of CRM Functionality. Creation of Account: SFDC Application, Creation of Salesforce Account, PROD VS TEST, Components of Salesforce: App, Objects, Tabs, Fields. Different Relationships: Lookup, Master-Detail, Roll-up Summary, Many to many. Creation of Custom Apps, Console App, Custom Application. Custom Object: Custom Field, Custom Fields with different field types, Field Dependencies, Field History Tracking. Operators, Formulas Rules and Functions: Different Logical Operators, Formula Fields and Cross Object Formula. Validation Rules. Date and String Functions.

08 Hours

Module-III

Salesforce View Setup, Lead Cycle and Service & Support Management : Setting up User Interface, Home Page Layouts and Home Page Components. List Views, Adding Snapshot to Home Page Layout, Working With ChattersLead Cycle: Creation of Campaign. Creation and Conversion of Lead. Web to LeadService & Support Management: Cases: Email to Case, Web to Mail. Queue. Groups. Assignment Rules. Escalation Rules. Auto Response Rules. Work Flows and its Actions: Field Update, Email Alert, Assign a new task to User, Outbound Messages. Approvals Process: One Level, Multi-Level. Audit Trail. Setting up Search Layouts

08 Hours

Module-IV

Security & Sharing, Tools &Data Migration Tools and Reports & Dashboards: Creation of Profiles and Permission Set, Role Hierarchy, Users. Delegated Administrator Setup. Organization Wide Default: Different Level of Security, Object – Level Security, Field – Level Security, Record – Level Security, Page – Level Security. Profile & Role Level Security. Difference between Profile & Role. Sharing Rules. Record Types and Assigning Page Layouts toRecord Types. Single Sign-On. Public Groups.

Data Loader: Insert, Update, Upset, Export, Export All. DataLoader.io. Force.com IDE. Working With Work bench. Working With Import Wizard. Working With Process Builder

Introducing Reports: Build a Report, Run and Then Read a Report, Share a Report, Report Limits etc. Working with Different Types of Report. Summary Report, Tabular Report, Joined Report and MatrixReport. Introducing Dashboards Component Types: Chart, Metric. Table. Introducing Custom Report Types

08 Hours

Module-V

APEX Programming Language, Visual Force and Advanced Development: Introduction to Apex. Access Modifiers and OOP's concepts. Data Types. Collections: List, Set, Map. Creating Apex Classes, Sample Apex Classes. Apex Data Manipulation Operations(DML): Insert Statement, Update Statement, Upset Statement, Delete Statement, Undelete Statement, Merge Statement. Sales force Object Query Language (SOQL). Sales force Object Search Language (SOSL). Relationship Queries. Nested Queries. Date Functions. String Functions. Introduction of Triggers. Trigger types. Introduction of Test Classes. Sample Test Class examples. Understanding the Testing Apex and Code Coverage

Visual Force: Introduction of Visual force. Standard Components with Examples. Standard Controller. Standard List Controller. Custom Controllers and Controller Extensions. Order of Execution in Visual force Page. Overriding Buttons, Links and Tabs with Visual force Page. Create Static Resources and Using in Visual force page. Introduction of Custom Components. Dynamic Visual force Binding. Integrating Email with Visual force. Email Templates. Using JavaScript in Visual force Pages

Advanced Development: Apex Scheduling Batch Apex. Email Services with examples. Deployment Process.Use of Workbench. Use of Developer Console and Debug Logs08 Hours

Course outcomes:

The students should be able to

CO1: Define modern tools, sales force, security sharing and outline their importance in tools

- **CO2:** Utilize the resources available effectively through Modern tools
- CO3: Make use of new tools and development.

Textbooks:

- 1) Srinivasan Desikan, Gopalaswamy Ramesh, "Modern tools", Pearson
- 2) Stephen Kan,"Metrics and Models in Software Quality", Addison Wesley, Second Edition

SOFTWARE TESTING & QUALITY ASSURANCE

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CST752	3:0:0	03	CIE:50 SEE:50	03 Hours	IE-I

Course Objectives:

- > Differentiate the various testing techniques.
- > Analyze the problem and derive suitable test cases.
- > Apply suitable technique for designing of flow graph.
- > Explain the need for planning and monitoring a process.
- > Learn the techniques for quality assurance and applying for applications.

Module-I

Basics of Software Testing: Basic definitions, Software Quality, Requirements, Behaviour and Correctness, Correctness versus Reliability, Testing and Debugging, Test cases, Insights from a Venn diagram, Identifying test cases, Test-generation Strategies, Test Metrics, Error and fault taxonomies, Levels of testing, Testing and Verification, Static Testing.

08 Hours

Module-II

Problem Statements: Generalized pseudo code, the triangle problem, the Next Date function, the commission problem, the SATM (Simple Automatic Teller Machine) problem, the currency converter, Saturn windshield wiper.

Functional Testing: Boundary value analysis, Robustness testing, Worst-case testing, Robust Worst testing for triangle problem, Next Date problem and commission problem, Equivalence classes, Equivalence test cases for the triangle problem.

08 Hours

Module-III

Fault Based Testing: Overview, Assumptions in fault based testing, Mutation analysis, Fault-based adequacy criteria, Variations on mutation analysis.

Structural Testing: Overview, Statement testing, Branch testing, Condition testing, Path testing: DD paths, Test coverage metrics, Basis path testing, guidelines and observations, Data –Flow testing: Definition-Use testing, Slice based testing, Guidelines and observations.

08 Hours

Module-IV

Test Execution: Overview of test execution, from test case specification to test cases, Scaffolding, Generic versus specific scaffolding, Test oracles, Self-checks as oracles, Capture and replay.

Process Framework : Basic principles: Sensitivity, redundancy, restriction, partition, visibility, Feedback, the quality process, Planning and monitoring, Quality goals, Dependability properties ,Analysis Testing, Improving the process, Organizational factors.

08 Hours

Module-V

Software Quality: Software quality - People's Quality Expectations, Frameworks and ISO-9126, McCall's Quality Factors and Criteria – Relationship.

Software Quality Assurance: Quality Assurance - Root Cause Analysis, modeling, technologies, standards and methodologies for defect prevention. Fault Tolerance and Failure Containment.

08 Hours

Course Outcomes:

CO1: Develop test plans, test cases, and test scripts for various types of software applications.

- **CO2:** Compare the different testing techniques.
- **CO3:** Classify the problem into suitable testing model
- **CO4:** Apply the appropriate technique for the design of flow graph.
- CO5: Apply quality assurance practices to prevent defects and ensure the reliability of software

Text Books:

- Paul C. Jorgensen, <u>Byron DeVries</u>, "Software Testing, A Craftsman's Approach", 5th Edition, Auerbach Publications, 2015, **ISBN 9781032186474**. (Chapters 1, 2, 5, 6, 7, 9, 10, 12, 13)
- Mauro Pezze, Michal Young, "Software Testing and Analysis Process, Principles and Techniques", Wiley India, 2009, ISBN 9788126517732. (Chapters 3, 4, 16, 17, 20, 21, 22, 24).
- 3) Aditya P Mathur, "Foundations of Software Testing", Pearson Education, 1st Edition, 2011, ISBN 13: 978-8131759080. (Chapters 1, 6.2)
- 4) JEFF TIAN, "Software Quality Engineering: Testing, Quality Assurance, and Quantifiable Improvement", Wiley-IEEE Computer Society, 2005, ISBN: 978-0-471-71345-6. (Chapters 2, 13)

References Books:

Software testing Principles and Practices – Gopalaswamy Ramesh, Srinivasan Desikan, 2nd Edition, Pearson, 2007, **ISBN 13: 9788177581218**.

INDUSTRY 4.0

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type	
20CST753	3:0:0:0	03	CIE:50 SEE:50	03 Hours	PEC-IV	
Course Objectives						

Course Objectives:

- > To impart basic idea in Industry 4.0.
- To provide students with good depth of knowledge of designing Industrial 4.0 Systems for various application.

> Learn the design and analysis of Industry 4.0 systems for approach problems that exist in real life.

Module-I

Introduction 4.0 Industry: Introduction to Sensing & Actuation, Industry 4.0: Globalization and Emerging Issues, The Fourth Revolution, LEAN Production Systems, Smart and Connected business perspective. Industry 4.0: Cyber Physical Systems and Next Generation Sensors, Collaborative Platform and Product Lifecycle Management, Artificial Intelligence, Big Data and Advanced Analysis, Introduction to FDM machine, 3D printing demonstration

Module-II

Cloud Computing Technologies: Introduction to Cloud Technologies, Study of top cloud services providers platforms and their real life use cases exploration (AWS, Azure, GCP), Hands-on using platforms. Augmented Reality and Virtual Reality: Introduction to AR and VR, Hands-on using UNITY, Industry use cases of AR and VR.

Module-III

Design Thinking as a Problem-Solving Process: Describe the principles of Design Thinking. - Describe the Design Thinking process for problem solution

Module–IV Basics of Industrial Internet of Things (IIOT): Introduction, Industrial Internet system, Industrial process, Key enablers of IIOT, Cyber Security

Module-V

Case Studies: Real time use cases from different Industries like OIL, Chemical and Pharma and Uses of UAV in industries. .

Course Outcomes:

On completion of the course, students will be able to:

CO1: Know about Industry 4.0 and its scope.

CO2: Explain Design thinking principles and its usage for problem solution

CO3: Use various tools and technologies.

CO4: Apply learned skills to approach problems that exist in real life.

Text Books:

08Hours

08 Hours

08Hours

08 Hours

08Hours

- The Concept Industry 4.0: An Empirical Analysis of Technologies and Applications in Production Logistics By Christoph Jan Bartodziej
- 2) Industry 4.0: Entrepreneurship and Structural Change in the New Digital Landscape, By Springer.

References Books:

- Virtual and Rapid Manufacturing: Advanced Research in Virtual and Rapid Prototyping, By Bartolo, P J, Taylor and Francis.
- Rapid Manufacturing: An Industrial Revolution for a Digital Age By Hopkinson, N, Haque, R., and Dickens, P., Wiley
- 3) Make: 3D Printing By Anna Kaziunas France

PROJECT PHASE – I

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CSP76	0:0:6:0	03	CIE:50 SEE:50	03 Hours	Project

Activity of Phase – I

Batch formation, project identification, literature survey, Guide allocation, finalization of problem statement with objectives and outcomes, Synopsis submission, Preliminary seminar for the approval of the selected topic

and objectives.

Course Outcomes:

- **CO1:** Review the current state of Art and trends in their area of interest in current technologies and identify a suitable problem in their chosen subject domain with justification.
- CO2: Survey the available research literature/documents for the tools and techniques to be used.
- CO3: Examine the functional, non-functional, and performance requirements of their chosen problem definition.
- **CO4:** Design system architecture for different components and develop all the system components using appropriate tools and techniques.
- CO5: Work effectively in a team and use good project management practices and defend the project work as a team.

VIII Semester Course Syllabus

TECHNICAL SEMINAR

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CSP81	0:0:2:0	01	CIE:50 SEE:50	03 Hours	Seminar

Activity of Technical Seminar

Students need to select one technical topic on latest trends in Information Technology and has to present seminar on the topic selected. The technical seminar report to be submitted.

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CSP82	0:0:6:0	03	CIE:50 SEE:50	03 Hours	Internship

INTERNSHIP

Activity of Internship

Students need to complete Internship at Industry and should submit the certificate along with the report.

PROJECT PHASE – II

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
20CSP83	0:0:18:8	11	CIE:100 SEE:100	09 Hours	Project

Activity of Phase – II

- 1. Design, Theoretical/experimental investigation and Midterm seminar to review the progress of the work and documentation (Mid-term report).
- **2.** Completion of the project work, participation in the project exhibition, Submission of project report Final Internal seminar and demonstration, Publications.