GEETHANJALI INSTITUTE OF SCIENCE & TECHNOLOGY
Unit of USHODAYA EDUCATIONAL SOCIETY
An ISO 9001:2015 certified Institution: Recognized under Sec. 2(f)& 12(B) of UGC Act, 1956
3rd Mile, Bombay Highway, Gangavaram (V), Kovur(M), SPSR Nellore (Dt), Andhra Pradesh, India- 524137
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COURSES OFFERED BY CSE to OTHER DEPARTMENTS

OPEN ELECTIVES

S.NO	COURSE CODE	COURSE NAME
1	22A0512T	DATABASE MANAGEMENT SYSTEMS
2	22A0528T	MACHINE LEARNING
3	22A0529T	CLOUD COMPUTING
4	22A0534b	CYBER SECURITY

SKILL COURSES

S.NO	COURSE CODE	COURSE NAME
1	22A0511	HTML and JavaScript
2	22A3205	PYTHON PROGRAMMING
3	22A0539	JAVA PROGRAMMING

MANDATORY COURSES

S.NO	COURSE CODE	COURSE NAME
4	22A0526	DESIGN THINKING FOR INNOVATION

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DATABASE MANAGEMENT SYSTEMS

(Common to CE,EEE,ME and ECE)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0512T	3:0:0:0	3	CIE: 30 SEE:70	3 Hours	OEC

Course Objectives:

This course will enable students to:

- To teach the role of database management system in an organization.
- To design databases using data modeling and Logical database design techniques.
- To construct database queries using relational algebra and calculus and SQL.
- To explore implementation issues in database transaction.
- To familiarize database security mechanisms.

Course Outcomes (CO):

On completion of this course, student will be able to

- Understand the Basic Concepts of Database languages, Relational model, SQL.
- Choose the specific Data models for large enterprise database design.
- Analyze the data efficiently through SQL instructions.
- Apply Normal forms on database for eliminating the redundancy.
- Demonstrate the Basic Concepts of transaction management techniques.
- Apply concurrency control techniques for Database recovery.

Syllabus		Total Hours:48
Module-I	**Introduction to Database concepts and Modeling**	**10Hrs**

Conceptual Modeling Introduction: Introduction to Data bases, Purpose of Database Systems, View of Data, Data Models, Database Languages, Database Users, Database Systems architecture.

The Entity-Relationship Model: Overview of Database Design, Beyond ER Design, Entities, Attributes and Entity sets, Relationships and Relationship sets, Conceptual Design with the ER Model.

Module-II	Relational Model, Relational Algebra	9Hrs

Relational Model: Introduction to the Relational Model – Integrity Constraints over Relations, Enforcing Integrity constraints, querying relational data, Logical data base Design, Views.

Relational Algebra: Introduction to Relational algebra, selection and projection, set operations, renaming, joins, division.

Module-III	SQL	10Hrs

SQL: Basic form of SQL Query, DDL, DML queries, Views in SQL, Joins, Nested & Correlated queries, Operators, predefined functions, Aggregate Functions.

PL/SQL: Introduction, Functions & Procedures, Triggers, Cursors.

Module-IV	Normalization	9Hrs

Relational database design: Introduction, Functional Dependencies (FDs), Normalization for relational databases: 1NF, 2NF, 3NF and BCNF, Basic definitions of Multi Valued Dependencies, 4NF and 5NF.

Module-V	Transaction Management &Concurrency Control and Recovery	10Hrs

Transaction Management: Transaction processing, Transaction Concept, Transaction States, Implementation of Atomicity and Durability, Concurrent Executions.

Concurrency Control: Lock-Based Protocols, Timestamp- Based Protocols, Validation-Based Protocols, Multiple Granularity.

Recovery: Failure Classification, Recovery and Atomicity, Log-Based Recovery.

Text Books:

1. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, Database System Concepts, 6th Edition, Tata McGraw-Hill Publishing Company,2017.
2. Raghu Ramakrishnan, Database Management System, 3rd Edition, Tata McGraw-Hill Publishing Company, 2014.

Reference Books:

1. Peter Rob, A.Ananda Rao, Corlos Coronel, Database Management Systems (for JNTU), Cengage Learning, 2011.
2. Hector Garcia Molina, Jeffrey D. Ullman, Jennifer Widom, Database System Implementation, 1st Edition, Pearson Education, United States, 2000.
3. E. Ramez and Navathe, Fundamental of Database Systems, 7th Edition, Pearson Education
4. R.P. Mahapatra & Govind Verma, Database Management Systems, Khanna Publishing House, 2016.
5. Carlos Coronel and Steven Morris, Database Systems: Design, Implementation, and Management, 12th edition, Cengage Learning,2016.
6. John V. ,Absolute beginner's guide to databases, Petersen, QUE

Web Resources:

1. https://www.coursera.org/learn/database-management
2. https://www.coursera.org/learn/sql-data-science
3. https://www.w3schools.com/sql/
4. https://www.youtube.com/watch?v=fHAfc7Hjq28&list=PLWPirh4EWFpGrpcMfZ6UcdI786QdtSxV8
5. https://www.youtube.com/watch?v=HwmEcudlv44&list=PL4OCRJojkV1jN-Ed6RkQpWfBvqe0utRd6
6. http://www.w3schools.in/dbms/
7. https://www.geeksforgeeks.org/dbms/
8. https://www.javatpoint.com/dbms-tutorial
9. https://www.edureka.co/blog/dbms-tutorial/

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MACHINE LEARNING
(Common to CE,EEE,ME and ECE)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0528T	3:0:0:0	3	CIE: 30 SEE:70	3 Hours	OEC

Course Objectives:

This course will enable students to:

- Understand basic concepts of Machine Learning
- Study different learning algorithms
- Illustrate evaluation of learning algorithms

Course Outcomes(CO):

On completion of this course, student will be able to

- Identify machine learning techniques suitable for a given problem
- Solve the problems using various machine learning techniques
- Design application using machine learning techniques

Syllabus		Total Hours:48
Module-I	**Introduction – Human Learning & Machine Learning**	**10Hrs**

Human Learning, Types of Human Learning, Machine Learning, Types of Machine Learning, Applications of Machine Learning, Issues in Machine Learning.

Basic types of Data in Machine Learning, Data Preprocessing : Data Cleaning, Data transformation and Data Reduction

Module-II	Modeling and Evaluation	9Hrs

Introduction, selecting a Model, training a Model, Model Representation and Interpretability, Evaluating Performance of a Model, Improving Performance of a Model

Module-III	Supervised Learning :Classification	10Hrs

Classification – Methods of Classification : Classification model, Classification Learning Steps, Classification by Decision tree Induction, Classification by Back propagation, K-Nearest Neighbor Classification, Random Forest Algorithm, Naïve Baye's Classification

Module-IV	Supervised Learning : Regression	10Hrs

Regression – Assumptions in Regression Analysis, Types of Regression: Simple Linear Regression, Multiple Linear Regression, Polynomial Regression, Logistic Regression, Curve Fitting- Method of Least Squares.

Module-V	Unsupervised Learning : Clustering	9Hrs

Clustering- Different types of clustering techniques, Partitioning Methods: K-Means Algorithm, K-Medoid's algorithm, Hierarchical Clustering Methods, Density based Clustering Methods- DBSCAN, DENCLUE, OPTICS

Text Books:

1. Machine Learning, SaikatDutt, Subramanian Chandramouli, Amit Kumar Das, Pearson, 2019..

Reference Books:

1. EthernAlpaydin, “Introduction to Machine Learning”, MIT Press, 2004.
2. Stephen Marsland, “Machine Learning -An Algorithmic Perspective”, Second Edition, Chapman and Hall/CRC Machine Learning and Pattern Recognition Series,2014.
3. Andreas C. Müller and Sarah Guido “Introduction to Machine Learning with Python: A Guide for Data Scientists”, Oreilly.

Web Resources:

1. Andrew Ng, “Machine Learning Yearning”
2. https://www.deeplearning.ai/machine-learning-
3. https://www.cse.huji.ac.il/~shais/UnderstandingMachineLearning/index.html

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CLOUD COMPUTING
(Common to CE,EEE,ME and ECE)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0529T	3:0:0:0	3	CIE: 30 SEE:70	3 Hours	OEC

Course Objectives:

This course will enable students to:

- To introduce the broad perceptive of cloud architecture and model
- To understand the concept of Virtualization and familiar with the lead players in cloud.
- To understand the features of cloud simulator and apply different cloud programming model
- To design of cloud Services and explore the trusted cloud Computing system

Course Outcomes(CO):

On completion of this course, student will be able to

CO1: To Understand the basic concepts about cloud computing vision and its developments and gain the **Knowledge** of virtualization technology.
CO2: Analyze the concepts of cloud services and the deployment models.
CO3: Choose among various cloud technologies for implementing applications(GAE, Openstack,etc)
CO4: Construct the virtual machines by using VMware simulator.
CO5: Build scientific applications by using Cloud environment.
CO6: Develop Business and Consumer Applications.

Syllabus		Total Hours:48
Module-I	**Basics of Cloud Computing**	**10Hrs**

Introduction to Cloud: Introduction to Cloud, Cloud Computing Reference Model, Characteristics and Benefits, Challenges Ahead, Elasticity in Cloud, On-demand Provisioning.

Virtualization: Introduction, Characteristics of Virtualized Environment, Taxonomy of Virtualization Techniques, Virtualization, and Cloud computing.

Module-II	Cloud Architecture, Models and Security	9Hrs

Cloud Computing Architecture: Introduction, Cloud Reference Model, Architecture, Infrastructure / Hardware as a Service, Platform as a Service, Software as a Service, Types of Clouds.

Cloud Deployment Model: Public Clouds, Private Clouds, Hybrid Clouds, Community Clouds, Economics of the Cloud.

Module-III	Cloud Technologies and Advancements	10Hrs

Apache Hadoop, MapReduce,Hadoop Cluster setup, Virtual Box, Google App Engine, Programming Environment for Google App Engine – Open Stack

Module-IV	VMware Simulator	9Hrs

VMWare: Basics of VMWare, Advantages of VMware virtualization, create a new virtual machine on local host, cloning virtual machines, virtualize a physical machine, starting and stopping a virtual machine.

Module-V	Cloud Applications	10Hrs

Cloud Applications: Scientific Applications – Health Care, Geoscience.

Business And Consumer Applications - CRM and ERP, Social Networking, Media Applications, and Multiplayer Online Gaming.

Text Books:

1. Mastering Cloud Computing by RajkumarBuyya, Christian Vecchiola, S.Thamarai Selvi from TMH 2013.
2. George Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud" O'Reilly
3. Cloud computing a practical approach - Anthony T.Velte , Toby J. Velte Robert Elsenpeter, TATA McGraw- Hill , New Delhi – 2010.

Reference Books:

1. Cloud computing for dummies- Judith Hurwitz , Robin Bloor , Marcia Kaufman ,Fern Halper, Wiley Publishing, Inc, 2010
2. Cloud Computing (Principles and Paradigms), Edited by Rajkumar Buyya, James Broberg, Andrzej Goscinski, John Wiley & Sons, Inc. 2011
3. Enterprise Cloud Computing, Gautam Shroff, Cambridge University Press, 2010.
4. Cloud Application Architectures: Building Applications and Infrastructure in the Cloud, George Reese, O 'Reilly, SPD, rp2011.
5. Essentials of Cloud Computing by K. Chandrasekaran. CRC Press. Cloud computing A Hands-On Approach by ArshdeepBahga and Vijay Madisetti.

Web Resources:

1. https://nptel.ac.in/courses
2. https://freevideolectures.com/university/iitm

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CYBER SECURITY
(Common to CE,EEE,ME and ECE)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0534b	3:0:0:0	3	CIE: 30 SEE:70	3 Hours	OEC

Course Objectives:

This course will enable students to:

1. The Cyber security Course will provide the students with foundational Cyber Security principles, Security architecture, risk management, attacks, incidents, and emerging IT and IS technologies.
2. Students will gain insight into the importance of Cyber Security and the integral role of Cyber Security professionals.
3. Evaluate the trends and patterns that will determine the future state of cyber security.

Course Outcomes(CO):

On completion of this course, student will be able to

- Cyber Security architecture principles
- Identifying System and application security threats and vulnerabilities
- Identifying different classes of attacks
- Cyber Security incidents to apply appropriate response
- Describing risk management processes and practices

Syllabus		Total Hours:48
Module-I	**Introduction to Cybercrime**	**9 Hrs**

Introduction to Cybercrime: Definition and Origins of the Word, Cybercrime and Information Security, Who are Cybercriminals, Classifications of Cybercrimes, Cybercrime: The Legal Perspectives, Cybercrimes: An Indian Perspective, Cybercrime and the Indian ITA 2000, A Global Perspective on Cybercrimes, Cybercrime Era: Survival Mantra for the Netizens

Module-II	**Cyber Offenses**	**10 Hrs**

How Criminals Plan Them –Introduction, How Criminals Plan the Attacks, Social Engineering, Cyber stalking, Cyber Cafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Attack Vector Backdoors-Steganography-SQL Injection.

Module-III	**Cybercrime Mobile and Wireless Devices**	**9 Hrs**

Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile and Wireless Computing Era, Security Challenges Posed by Mobile Devices, Registry Settings for Mobile Devices, Authentication Service Security, Attacks on Mobile/Cell Phones, Mobile Devices: Security Implications for Organizations, Organizational Measures for Handling Mobile.

Module-IV	**Tools and Methods Used in Cybercrime**	**10Hrs**

Introduction, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, DoS and DDoS Attacks, Buffer Overflow, Attacks on Wireless Networks, Phishing and Identity Theft: Introduction, Phishing, Identity Theft (ID Theft).

Module-V	Cyber Crimes andsecurity	10Hrs
Cyber Security –Organizational implications-cost of cybercrimes and IPR issues Web threats for organizations: the evils and Perils-Social media marketing Security and privacy Implications-Protecting people privacy in the organizations Forensic best practices for organizations. Cases.		

Text Books:

1. Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Nina Godbole, SunitBelapure, Wiley.
2. Principles of Information Security, MichealE.Whitman and Herbert J.Mattord, Cengage Learning

Reference Books:

1. Information Security, Mark Rhodes, Ousley, MGH.

E-resources:

1. https://www.tutorialspoint.com/fundamentals_of_science_and_technology/cyber_crime_and_cyber_security.htm
2. https://www.javatpoint.com/cyber-security-tutorial
3. https://www.youtube.com/watch?v=lpa8uy4DyMo&list=PL9ooVrP1hQOGPQVeapGsJCktzIO4DtI4_

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HTML and JavaScript (SKILL)
(Common to CSE, AIML, CS, DS and EEE)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0511	1:0:2:0	2	CIE: 30 SEE:70	3 Hours	SC

Course Objectives:

This course will enable students to:

- Learn website development using HTML, CSS, and JavaScript.
- Understand the concepts of responsive web development using the bootstrap framework
- Learn the frame concepts to the websites and interactive websites.
- Discover how development process to use Google Charts to provide a better way to visualize data on a website
- Learn Content Management Systems to speed the development process

Course Outcomes(CO):

On completion of this course, student will be able to

CO1: Construct websites with valid HTML,CSS.
CO2: Create responsive monitors.
CO3: Develop websites using jQuery and bootstrap to provide interactivity and engaging user experiences
CO4: Design and Develop JavaScript applications.
CO5: Embed Google chart tools in a website for better visualization of data.
CO6: Design and develop web applications using Content Management Systems like Word Press

Syllabus | **Total Hours:48**

List of Experiments

Module -1:

HTML: What is a browser, Internet concepts, Introduction to HTML, Basic structure of HTML document, Creating an HTML document, Mark up Tags, Heading-Paragraphs, and Line Breaks HTML Tags.

Task: Design HTML page to display different heading tags and scroll college name as a message.

Module-2:

Introduction to elements of HTML, Working with Text, Lists, Hyperlinks, Images, Multimedia.

Task: Design HTML page to display the list of departments in college by using ordered and unordered list.

Module-3:

HTML(continued):HTML Tables

Task: Design HTML page to display Class Timetable

Module-4:
HTML Frames and Frameset.

Task: Design college website.

Module-5:
HTML Form Elements.

Task: Design a Student Registration web page using forms.

Module-6:
Cascading Style Sheets(CSS):CSS Properties, Types of CSS, Selectors, box model ,Pseudo-elements, z-index

Task: Apply CSS on student registration form.

Module - 7:
Bootstrap - CSS Framework: Layouts (Containers, Grid system), Forms, Other Components

Task: Style the student registration Form designed in Module-5still more beautiful using Bootstrap CSS (Re-size browser and check how the webpage displays in mobile resolution).

Module - 8:
HTTP & Browser Developer Tools: Understand HTTP Headers (Request & Response Headers), URL & its Anatomy, Developer Tools: Elements/Inspector, Console, Network, Sources, performance, Application Storage.

Task: Analyze various HTTP requests (initiators, timing diagrams, responses) and identify problems

Module-9:
JavaScript: Variables, Data Types, Operators.
Task: Design a simple JavaScript program to perform arithmetic operations.

Module-10:
JavaScript objects, conditions, loops and functions.

Task: Write JavaScript to find the factorial of a given number and generate the Fibonacci series (Recursive and non-Recursive).

Module-11:
JavaScript arrays and pop-up box.

Task: Validate all Fields and Submit the student registration Form designed in Module-5

Reference Books:

1. Deitel and Deitel and Nieto, ―Internet and World Wide Web-How to Program, Prentice Hall, 5th Edition,2011.
2. Web Technologies, Uttam K.Roy, Oxford Higher Education., 1st edition, 10th impression, 2015.
3. Stephen Wynkoop and John Burke―Running a Perfect Website‖,QUE,2nd Edition,1999.
4. Jeffrey C and Jackson, ―Web Technologies A Computer Science Perspective Pearson Education, 2011.
5. Gopalan N.P. and Akilandeswari J.,―WebTechnology,PrenticeHallofIndia,2011.

Web Reference:

1. HTML:https://html.spec.whatwg.org/multipage/
2. HTML:https://developer.mozilla.org/en-US/docs/Glossary/HTML5
3. CSS:https://www.w3.org/Style/CSS/
4. Bootstrap-CSSFramework:https://getbootstrap.com/
5. Browser Developer Tools:https://developer.mozilla.org/enUS/docs/Learn/Common_questions/What_are_browser_developer_tools
6. Javascript:https://developer.mozilla.org/en-US/docs/Web/JavaScript
7. JQuery:https://jquery.com
8. GoogleCharts:https://developers.google.com/chart
9. Wordpress:https://wordpress.com

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PYTHON PROGRAMMING (SKILL)
(Common to CS, DS, EEE,ME and ECE)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A3205	1:0:2:0	2	CIE: 30 SEE:70	3 Hours	SC

Course Objectives:

This course will enable students to:

- Acquire programming skills in core Python
- To understand the importance of Object-oriented Programming
- Develop the skill of designing graphical-user interfaces (GUI) in Python.
- Develop the ability to write database applications in Python.

Course Outcomes (CO):

On completion of this course, student will be able to

- Understand various data types like lists, tuples, strings etc.
- Able to create practical and contemporary applications using Functions
- Explore the use of Object-oriented concepts to solve Real-life problems
- Utilize Python packages in developing software applications
- Solve mathematical problems using Python programming language

Syllabus | **Total Hours:48**

Introduction to Python: Features of Python, Data types, Operators, Input and output, Control Statements, Looping statements

Python Data Structures: Lists, Dictionaries, Tuples.

Strings: Creating strings and basic operations on strings, string testing methods.

Functions: Defining a function- Calling a function- Types of functions-Function Arguments- Anonymous functions- Global and local variables

OOPS Concepts; Classes and objects- Attributes- Inheritance- Overloading- Overriding- Data hiding

Modules and Packages: Standard modules-Importing own module as well as external modules Understanding Packages Powerful Lamda function in python Programming using functions, modules and external packages

Working with Data in Python: Printing on screen- Reading data from keyboard- Opening and closing file- Reading and writing files- Functions-Loading Data with Pandas-Numpy

Tasks:

1:OPERATORS

a. Read a list of numbers and write a program to check whether a particular element is present or notusing membership operators.
b. Read your name and age and write a program to display the year in which you will turn 100 yearsold.
c. Read radius and height of a cone and write a program to find the volume of a cone.
d. Write a program to compute distance between two points taking input from the user (Hint: usePythagorean theorem)

2:CONTROL STRUCTURES

a. Read your email id and write a program to display the no of vowels, consonants, digits and white spaces in it using if…elif…else statement.
b. Write a program to create and display a dictionary by storing the antonyms of words. Find the antonym of a particular word given by the user from the dictionary using while loop.
c. Write a Program to find the sum of a Series 1/1! + 2/2! + 3/3! + 4/4! +…….+ n/n!. (Input : n = 5, Output : 2.70833)
d. In number theory, an abundant number or excessive number is a number for which the sum of its proper divisors is greater than the number itself. Write a program to find out, if the given number is abundant. (Input: 12, Sum of divisors of 12 = 1 + 2 + 3 + 4 + 6 = 16, sum of divisors 16 > original number 12)

3: LIST

a. Read a list of numbers and print the numbers divisible by x but not by y (Assume x = 4 and y = 5).
b. Read a list of numbers and print the sum of odd integers and even integers from the list.(Ex: [23, 10,15, 14, 63], odd numbers sum = 101, even numbers sum = 24)
c. Read a list of numbers and print numbers present in odd index position. (Ex: [10, 25, 30, 47, 56, 84,96], The numbers in odd index position: 25 47 84).
d. Read a list of numbers and remove the duplicate numbers from it. (Ex: Enter a list with duplicateelements: 10 20 40 10 50 30 20 10 80, The unique list is: [10, 20, 30, 40, 50, 80])

4: TUPLE

a. Given a list of tuples. Write a program to find tuples which have all elements divisible by K from alist of tuples. test_list = [(6, 24, 12), (60, 12, 6), (12, 18, 21)], K = 6, Output : [(6, 24, 12), (60, 12, 6)]
b. Given a list of tuples. Write a program to filter all uppercase characters tuples from given list of tuples. (Input: test_list = [(“GFG”, “IS”, “BEST”), (“GFg”, “AVERAGE”), (“GfG”,), (“Gfg”, “CS”)],Output : [(„GFG“, „IS“, „BEST“)]).
c. Given a tuple and a list as input, write a program to count the occurrences of all items of the list inthe tuple. (Input : tuple = ('a', 'a', 'c', 'b', 'd'), list = ['a', 'b'], Output : 3)

5: SET

a. Write a program to generate and print a dictionary that contains a number (between 1 and n) in theform (x, x*x).
b. Write a program to perform union, intersection and difference using Set A and Set B.
c. Write a program to count number of vowels using sets in given string (Input : “Hello World”, Output:No. of vowels : 3)
d. Write a program to form concatenated string by taking uncommon characters from two strings usingset concept (Input : S1 = "aacdb", S2 = "gafd", Output : "cbgf").

6: DICTIONARY

a. Write a program to do the following operations:
    i. Create a empty dictionary with dict() method
    ii. Add elements one at a time
    iii. Update existing key“s value
    iv. Access an element using a key and also get() method
    v. Deleting a key value using del() method

b. Write a program to create a dictionary and apply the following methods:
   i. pop() method
   ii. popitem() method
   iii. clear() method
c. Given a dictionary, write a program to find the sum of all items in the dictionary.
d. Write a program to merge two dictionaries using update() method.

7: STRINGS

a. Given a string, write a program to check if the string is symmetrical and palindrome or not. A stringis said to be symmetrical if both the halves of the string are the same and a string is said to be a palindrome string if one half of the string is the reverse of the other half or if a string appears same when read forward or backward.
b. Write a program to read a string and count the number of vowel letters and print all letters except 'e'and 's'.
c. Write a program to read a line of text and remove the initial word from given text. (Hint: Use split()method, Input : India is my country. Output : is my country)
d. Write a program to read a string and count how many times each letter appears. (Histogram).

8: USER DEFINED FUNCTIONS

a. A generator is a function that produces a sequence of results instead of a single value. Write agenerator function for Fibonacci numbers up to n.
b. Write a function merge_dict(dict1, dict2) to merge two Python dictionaries.
c. Write a fact() function to compute the factorial of a given positive number.
d. Given a list of n elements, write a linear_search() function to search a given element x in a list.

9: BUILT-IN FUNCTIONS

a. Write a program to demonstrate the working of built-in statistical functions mean(), mode(),median() by importing statistics library.
b. Write a program to demonstrate the working of built-in trignometric functions sin(), cos(), tan(),hypot(), degrees(), radians() by importing math module.
c. Write a program to demonstrate the working of built-in Logarithmic and Power functions exp(),log(), log2(), log10(), pow() by importing math module.
d. Write a program to demonstrate the working of built-in numeric functions ceil(), floor(), fabs(),factorial(), gcd() by importing math module.

10. CLASS AND OBJECTS

a. Write a program to create a BankAccount class. Your class should support the following methodsfor
   i) Deposit
   ii) Withdraw
   iii) GetBalanace
   iv) PinChange
b. Create a SavingsAccount class that behaves just like a BankAccount, but also has an interest rateand a method that increases the balance by the appropriate amount of interest (Hint:use Inheritance).
c. Write a program to create an employee class and store the employee name, id, age, and salary usingthe constructor. Display the employee details by invoking employee_info() method and also using dictionary (_dict_).
d. Access modifiers in Python are used to modify the default scope of variables. Write a program to demonstrate the 3 types of access modifiers: public, private and protected.

11. FILE HANDLING

a. Write a program to read a filename from the user, open the file (say firstFile.txt) and then performthe following operations:
   i. Count the sentences in the file.
   ii. Count the words in the file.
   iii. Count the characters in the file.

b. Create a new file (Hello.txt) and copy the text to another file called target.txt. The target.txt file shouldstore only lower-case alphabets and display the number of lines copied.

c. Write a Python program to store N student's records containing name, roll number and branch. Printthe given branch student's details only.

Reference Books:

1. Reema Thareja, "Python Programming - Using Problem Solving Approach", Oxford Press, 1st Edition, 2017.
2. Michael H Goldwasser, David Letscher, "Object Oriented Programming in Python", Prentice Hall, 1st Edition, 2007.
3. Yashavant Kanetkar, Aditya Kanetkar, "Let us Python", BPB publication, 1st Edition, 2019.
4. Ashok Kamthane, Amit Kamthane, "Programming and Problem Solving with Python", McGraw Hill Education (India) Private Limited, 2018.
5. Taneja Sheetal, Kumar Naveen, "Python Programming – A modular approach", Pearson, 2017

Web Reference:

1. https://realpython.com/python3-object-oriented-programming/
2. https://python.swaroopch.com/oop.html
3. https://python-textbok.readthedocs.io/en/1.0/Object_Oriented_Programming.html
4. https://www.programiz.com/python-programming/
5. https://www.geeksforgeeks.org/python-programming-language/

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JAVA PROGRAMMING (SKILL)
(Common to EEE,ME and ECE)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0539	1:0:2:0	2	CIE: 30 SEE:70	3 Hours	SC

Course Objectives:

This course will enable students to:

- To introduce the fundamental concepts of object-oriented programming to design & implement object oriented programming concepts in Java.
- To obtain knowledge about the principles of inheritance and polymorphism
- Learn the usage of Control structures in java
- To implement the concept of Array, interfaces, exception handling
- To understand the usage of Threads in java

Course Outcomes (CO):

On completion of this course, student will be able to

- Understand the basic concepts of OOP
- Compare & Contrast basic constructs of C++ & Java
- Develop a program on operators in Java
- Apply Control statements to solve real time problems
- Analyze the concepts of constructers, overloading, Inheritance and Interfaces in java
- Implementing different types of Threads to solve real time problems

Syllabus | **Total Hours:48**

Module : 1

Fundamentals of Object Oriented Programming: Introduction, Object Oriented Paradigm, Basic concepts of OOP : Class, Object, Inheritance, Polymorphism, Abstraction, Encapsulation..

Task: introduction to Object Oriented Programming and its basic concepts.

Module : 2

Overview of Java Language: Introduction, Java features, Java program structure, parts of Java, Java Virtual Machine-Java versus C++, How to Compile & Executing a basic java program.

Task: Differences between Java and C++, Execute “Hello welcome to java” program

Module : 3

Variables-Identifiers-Literals- Data types: Integer literals-character literals-Floating point literals-String Literals, Variables, Keywords, Data types.

Task: implementing data types with variables, find valid/invalid variables, Identifiers

Module : 4

Operators: Arithmetic operators, Relational operators, Assignment operators, Conditional operators, Type casting/Type Conversion in java.

Task: Perform all arithmetic operators using a single program, program using typecast/type conversion

Module : 5

Java Statements: Input and Output Statements, Accepting Input from the Keyboard, Displaying output with System.out.printf( ) , Displaying Formatted output with String.format( )

Task: Write a program using I/O statements in java.

Module : 6

Control Structures: Conditional control statements :- if ..statement, if… else statement- if-else-if ladder, Switch statement

Task: Write a program to find a person is eligible for vote >18?, Largest number among 3 numbers?

Module : 7

Looping/Repetitive/Iterative statements: While statement- Do ..While statement-For Statement, Continue statement-Break statement.

Task: print N natural numbers, sum of N natural numbers, Armstrong number, Strong number using for statement.

Module:8

Arrays: Arrays, One-dimensional arrays, Creating an array, Find The Length Of An Array, Types of Arrays:-Two-dimensional arrays, Creating a two-dimensional array.

Task: Find the N^{th} Largest value in an array, Insert and Addition of values using array

Module : 9

Strings: Introduction to strings, Built in strings, Creating Strings, String reverse, String Concatenation, String comparison, Immutability of Strings

Task: write a program to Perform all string operations as single output

Module : 10

Classes , Objects& Methods: Introduction, Defining a class, Adding Variables, Object Creation, Initializing the Instance variables, Access Specifiers, Methods, Constructors, Method Overloading

Task: To implement Class and Object concept, Method Overloading program

Module :11

Interfaces: Interface, Multiple Inheritance using Interfaces.

Exception Handling: Errors in Java Program, Exceptions, throws clause, throw clause, Types of Exceptions,

Task: Implement a program using exception handling, write a program Multiple Inheritance using Interfaces.

Module : 12

Threads: Introduction, Creating Threads, Extending the Threads, Stopping and Blocking a Thread, Life Cycle of a Thread. single Tasking Using a Thread, Multi tasking Using Threads

Task: Implement a program using Threads.

Reference Books:

1. Programming with Java by E.Balagurusamy.
2. Programming in Java by Sachin Malhotra, OXFORD University Press.
3. Java Complete Reference by Herbert Schildt.
4. John R.Hubbard, Programming with Java, Second Edition, Schaum's outline series, TATA McGraw-Hill Company.

Web Reference:

1. https://www.javatpoint.com/java-tutorial
2. https://www.learnjavaonline.org/
3. https://www.tutorialspoint.com/java/index.htm
4. https://www.w3schools.com/java/
5. https://www.geeksforgeeks.org/java/

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DESIGN THINKING AND INNOVATION

(Common to CSE, AIML, CS, DS, CE, EEE, ME and ECE)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0526	2:0:0:0	2	CIE:30	-	MC

Course Objectives:

The objective of this course is to familiarize students with design thinking process as a tool for breakthrough innovation. It aims to equip students with design thinking skills and ignite the minds to create innovative ideas, develop solutions for real-time problems.

Course Outcomes(CO):

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

- Define the concepts related to design thinking.
- Explain the fundamentals of Design Thinking and innovation
- Apply the design thinking techniques for solving problems in various sectors.
- Analyse to work in a multidisciplinary environment
- Evaluate the value of creativity
- Formulate specific problem statements of real time issues

Syllabus		Total Hours:48
Module-I	**Introduction to Design Thinking**	**9Hrs**

Introduction to elements and principles of Design, basics of design-dot, line, shape, form as fundamental design components. Principles of design. Introduction to design thinking, history of Design Thinking, New materials in Industry.

Module -II	Design Thinking Process	9Hrs

Design thinking process (empathize, analyze, idea & prototype), implementing the process in driving inventions, design thinking in social innovations. Tools of design thinking - person, costumer, journey map, brain storming, product development Activity: Every student presents their idea in three minutes, Every student can present design process in the form of flow diagram or flow chart etc. Every student should explain about product development.

Module -III	Innovation	10Hrs

Art of innovation, Difference between innovation and creativity, role of creativity and innovation in organizations. Creativity to Innovation. Teams for innovation, Measuring the impact and value of creativity. Activity: Debate on innovation and creativity, Flow and planning from idea to innovation, Debate on value-based innovation.

Module -IV	Product Design	10Hrs

Problem formation, introduction to product design, Product strategies, Product value, Product planning, product specifications. Innovation towards product design Case studies. Activity: Importance of modelling, how to set specifications, Explaining their own product design.

Module -V	Design Thinking in Business Processes	10Hrs

Design Thinking applied in Business & Strategic Innovation, Design Thinking principles that redefine business – Business challenges: Growth, Predictability, Change, Maintaining Relevance, Extreme competition, Standardization. Design thinking to meet corporate needs.

Design thinking for Startups. Defining and testing Business Models and Business Cases. Developing & testing prototypes. Activity: How to market our own product, About maintenance, Reliability and plan for startup.

Text Books:

1. Change by design, Tim Brown, Harper Bollins (2009)
2. Design Thinking for Strategic Innovation, Idris Mootee, 2013, John Wiley & Sons

Reference Books:

1. Design Thinking in the Classroom by David Lee, Ulysses press
2. Design the Future, by Shrrutin N Shetty, Norton Press
3. Universal principles of design- William lidwell, kritinaholden, Jill butter.
4. The era of open innovation – chesbrough.H

Online Learning Resources:

1. https://nptel.ac.in/courses/110/106/110106124/
2. https://nptel.ac.in/courses/109/104/109104109/
3. https://swayam.gov.in/nd1_noc19_mg60/preview