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

Ph. No. 08622-212769, E-Mail: geethanjali@gist.edu.in, Website: www.gist.edu.in

Semester-6 (Theory-5, Lab-3, SC-1 MC-1)							
Sl. No.	**Category**	**Course Code**	**Course Title**	**Hours per week**			**Credits**
				L	**T**	**P**	**C**
1	PCC	22A0527T	Compiler Design	3	0	0	3
2	PCC	22A0528T	Machine Learning	3	0	0	3
3	PCC	22A0529T	Cloud Computing	3	0	0	3
4	PEC	22A0530Ta 22A0530Tb 22A0530Tc	**Professional Elective-II:** 1. Software Testing 2. Applied data science 3. Cryptography and Network Security	3	0	0	3
5	OEC	22A0431T 22A0215T 22A0150T 22A0329Tb	**Open Elective-II:** 1. Micro Controllers and Applications 2. Control Systems Engineering 3. Environmental Economics 4. Introduction to Composites	3	0	0	3
6	PCC(Lab)	22A0531P	Compiler Design Lab	0	0	3	1.5
7	PCC(Lab)	22A0532P	Machine Learning Lab	0	0	3	1.5
8	PCC(Lab)	22A0533P	Cloud Computing Lab	0	0	3	1.5
9	SC	22A0029P	**Skill Oriented Course:** Soft Skills	1	0	2	2
10	MC	22A0032T	**Mandatory Course:** Research Methodology	2	0	0	0
				Total credits			**21.5**

Category	Credits
Professional Core Courses (PCC)	13.5
Professional Elective Courses (PEC)	3
Open Elective Courses (OEC)	3
Skill Oriented Course (SC)	2
Industrial / Research Internship (Mandatory) 2 Months	-
Total	21.5

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
Ph. No. 08622-212769, E-Mail: geethanjali@gist.edu.in, Website: www.gist.edu.in

COMPILER DESIGN
(Common to CSE, AI&ML, DS, CS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0527T	3:0:0:0	3	CIE: 30 SEE:70	3 Hours	PCC

Course Objectives:

This course will enable students :

- To learn the various phases of compiler.
- To learn the various parsing techniques.
- To understand intermediate code generation and run-time environment.
- To learn the various optimization techniques
- To learn to implement code generator.

Course Outcomes(CO):

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

- Discuss the major phases of compilers and use the knowledge of the Lex tool
- Develop the parsers and experiment with the knowledge of different parsers design
- Describe intermediate code representations using syntax trees and DAG's as well as use this knowledge to generate intermediate code
- Classify various storage allocation strategies and explain various data structures used in symbol tables
- Summarize various optimization techniques and Implement these in dataflow analysis
- Examine the design issues of code generator and generate machine code from the source code of a language.

Syllabus		Total Hours:48
Module -I	**Introduction & Lexical Analysis**	**10Hrs**

Introduction: Language processors, The Structure of a Compiler, the science of building a complier **Lexical Analysis**: The Role of the lexical analyzer, Input buffering, Specification of tokens, Recognition of tokens, The lexical analyzer generator Lex, Design of a Lexical Analyzer generator. (Text Book 1)

Module -II	**Syntax Analysis**	**10Hrs**

Syntax Analysis: Introduction, Context Free Grammars, Writing a grammar, TOP Down Parsing, Bottom Up Parsing, Introduction to LR Parsing: Simple LR, More Powerful LR Parsers, Using ambiguous grammars, Parser Generators. (Text Book 1)

Module -III	**Intermediate Code Generation**	**9Hrs**

Syntax Directed Translation: Syntax Directed Definitions, Evaluation orders for SDD's, Application of SDT, SDT schemes, Implementing L-attribute SDD's.

Intermediate Code Generation: Variants of syntax trees, three address code, Types and declarations, Translations of expressions, Type checking. (Text Book 1)

Module -IV	**Run Time Environment & Symbol Table**	**9Hrs**

Run Time Environment : storage organization, , Stack allocation of space, Access to non-local data

on stack , Heap management. (Text Book 1)

Symbol Table: Introduction, symbol table entries, operations on the symbol table, symbol table organizations, non block structured language, block structured language.(Text Book 2)

Module –V	**Code Optimization & Code Generation**	**10Hrs**

Code Optimization: Introduction, where and how to optimize, principle source of optimization, function preserving transformations, loop optimizations, global flow analysis, machine dependent optimization. (Text Book 1)

Code Generation: Issues in the design of a code generator, The Target language, Basic blocks and flow graphs, optimization of basic blocks, a simple code generator, register allocation and assignment, optimal code generation for expressions, dynamic programming code generation. (Text Book 1)

Text Books:

1. Compilers Principles, Techniques and Tools‖, Second Edition, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman., Pearson,2014.
2. Compiler Construction‖, K.V.N Sunitha, Pearson, 2013

Reference Books:

1. Compilers Principles and Practice‖, Parag H. Dave, Himanshu B. Dave, PEARSON.
2. Lex &Yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly .
3. Compiler Construction, Louden, Thomson.

Web References:

1. https://onlinecourses.nptel.ac.in/noc21_cs07/preview
2. https://nptel.ac.in/courses/106105190

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
Ph. No. 08622-212769, E-Mail: geethanjali@gist.edu.in, Website: www.gist.edu.in

MACHINE LEARNING
(Common to CSE, AI&ML, DS, CS)

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	PCC

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

- Interpret the basic concepts of Human Learning, Machine Learning, Building and Evaluating a Model, Classification, Regression and Clustering
- Building, training and evaluating a Model
- Apply different Classification algorithms to real world problems
- Apply different Regression techniques to real world problems
- Apply Partitioning Methods of Clustering to real world problems
- Apply Density-based methods of Clustering to real world Scenarios

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 References:

1. https://onlinecourses.nptel.ac.in/noc20_cs29/preview
2. https://nptel.ac.in/courses/106106139

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

Ph. No. 08622-212769, E-Mail: geethanjali@gist.edu.in, Website: www.gist.edu.in

CLOUD COMPUTING

(Common to CSE, AI&ML, DS, CS)

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	PCC

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

- To Understand the basic concepts about cloud computing vision and its developments and gain the Knowledge of virtualization technology.
- Analyze the concepts of cloud services and the deployment models.
- Choose among various cloud technologies for implementing applications(GAE, Openstack,etc)
- Construct the virtual machines by using VMware simulator.
- Build scientific applications by using Cloud environment.
- 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.

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.
6. Cloud computing a practical approach - Anthony T.Velte , Toby J. Velte Robert Elsenpeter, TATA McGraw- Hill , New Delhi – 2010.
7. George Reese, "Cloud Application Architectures: Building Applications and Infrastructure in the Cloud" O'Reilly

Web References:

1. https://onlinecourses.nptel.ac.in/noc21_cs14/preview

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
Ph. No. 08622-212769, E-Mail: geethanjali@gist.edu.in, Website: www.gist.edu.in

SOFTWARE TESTING
(Common **to CSE, AI&ML, CS, DS**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0530Ta	3:0:0:0	3	CIE: 30 SEE:70	3 Hours	PEC

Course Objectives:

This course will enable students to:

- To learn the criteria for test cases.
- To learn the design of test cases.
- To understand test management and test automation techniques.
- To apply test metrics and measurements

Course Outcomes(CO):

On completion of this course, student will be able to

- To interpret test cases suitable for a software development for different paths, domains and state graphs.
- Discover suitable tests to be carried out.
- Categorize Transaction flow testing and data flow testing.
- Illustrate Domain testing and Logic based testing.
- Solve path products and regular expressions.
- Connect state, state graphs and transition testing.

Syllabus		Total Hours:48
Module-I	**INTRODUCTION TO TESTING**	**10Hrs**

Introduction: Purpose of testing, dichotomies, model for testing, consequences of bugs, taxonomy of bugs. Flow graphs and path testing: Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

Module-II	**TRANSACTION FLOW TESTING**	**9Hrs**

Transaction flow testing: Transaction flows, transaction flow testing techniques, dataflow testing, basics of data flow testing, strategies in data flow testing, application of data flow testing.

Module-III	**PATH PRODUCTS**	**10Hrs**

Domain testing: Domains and paths, nice and ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.

Logic based testing: Overview, decision tables, path expressions, kv charts and specifications

Module-IV	**ARCHITECTURE REQUIREMENTS AND DESIGNING**	**9Hrs**

Paths, path products and regular expressions: Path products and path expression, reduction procedure, applications, regular expressions and flow anomaly detection.

Module-V	**TRANSITION TESTING**	**10Hrs**

State, state graphs and transition testing: State graphs, good and bad state graphs, state testing, testability tips.

Text Books:

1. Boris Beizer,—Software Testing Techniques‖,DreamtechPress,2nd Edition,2003

Reference Books:

1. Ron Patton, —Software Testing‖, Second Edition, Sams Publishing, Pearson Education, 2007.AU Library.com
2. P.C.Jorgenson,—Software Testing: A Craft men,, Approach, Auerbach Publications, 3rd Edition, 2013
3. Perry,—Effective Methods of Software Testing, JohnWiley,2nd Edition, 1999.
4. P.NageswaraRao,—Software Testing Concepts and Tools, Dream Tech Press, 2nd Edition, 2007.
5. Srinivasan Desikan and Gopalaswamy Ramesh, —Software Testing – Principles and Practices, Pearson Education, 2006.

Web References:

1. https://onlinecourses.nptel.ac.in/noc22_cs61/preview

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
Ph. No. 08622-212769, E-Mail: geethanjali@gist.edu.in, Website: www.gist.edu.in

APPLIED DATA SCIENCE
(Common to CSE)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0530Tb	3:0:0:0	3	CIE: 30 SEE:70	3 Hours	PEC

Course Objectives:

This course will enable students to:

- Understand the skill sets and technologies required for data science.
- Gain knowledge of data science process and basic tools for Exploratory Data Analysis
- Learn various data science algorithms and its application domain.
- Understand and implement recommendation systems and social networks using fundamental mathematical and algorithmic ingredients.
- Understand the use of data visualization tool.

Course Outcomes(CO):

On completion of this course, student will be able to

- Apply statistical measures to fit a model to a data.
- Apply data science algorithms such as Linear Regression, k-Nearest Neighbors (k-NN), k-means, Naive Bayes to solve the given real-world problems.
- Apply Feature Selection algorithms such as Filters, Wrappers, Decision Trees, Random Forests to solve a given problem.
- Acquire real world data from different sources to build Recommendation Systems and social networks as well as represent knowledge using Visualization tools.

Syllabus		Total Hours:48
Module-I	**INTRODUCTION**	**10Hrs**

Introduction to Data Science, Data vs. Big Data, Statistical Inference - Populations and samples, Statistical modeling, probability distributions, fitting a model. Data Science Process, Exploratory Data Analysis, Basic tools - plots, graphs and summary statistics of EDA. Introduction to R Programming.

Module-II	BASIC MACHINE LEARNING ALGORITHMS	9Hrs

Basic Machine Learning Algorithms - Linear Regression - K-Nearest Neighbors (K-NN) - Kmeans, K-Medoids, Naive Bayes. Case Study: Real Direct (online real estate firm), Filtering Spam - Linear Regression and K-NN and Naive Bayes for Filtering Spam. Data Wrangling: APIs and other tools for scrapping the Web - Feature Generation and Feature Selection (Extracting Meaning from Data) - Motivating Application and Case Study: User (customer) retention - Feature Generation - Feature Selection algorithms – Filters; Wrappers; Decision Trees; Random Forests.

Module-III	RECOMMENDATION SYSTEMS	10Hrs

Recommendation Systems: Building a User-Facing Data Product - Algorithmic ingredients of a Recommendation Engine - Dimensionality Reduction - Singular Value Decomposition - Principal Component Analysis

Module-IV	MINING SOCIAL-NETWORK GRAPHS	9Hrs

Mining Social-Network Graphs - Social networks as graphs - Clustering of graphs - Direct discovery of communities in graphs - Partitioning of graphs - Neighborhood properties in graphs.

Module-V	DATA VISUALIZATION	10Hrs

Data Visualization - Basic principles, ideas and tools for data visualization – Case Study 1 on industry projects – Case Study 2: Create Complex visualization dataset - Data Science and Ethical Issues - Discussions on privacy, security, ethics - Next-generation data scientists.

Text Books:

1. Sinan Ozdemir, Sunil Kakade. Principles of Data Science - Second Edition Released December 2018 Publisher(s): Packt Publishing ISBN: 9781789804546.
2. Cathy O'Neil and Rachel Schutt Doing Data Science, Straight Talk from The Frontline. O'Reilly. 2014.

Reference Books:

1. Jure Leskovek, Anand Rajaraman and Jeffrey Ullman Mining of Massive Datasets v2.1, Cambridge University Press 2014 (free online).
2. Kevin P. Murphy. Machine Learning: A Probabilistic Perspective. ISBN 0262018020. 2013.
3. Foster Provost and Tom Fawcett. Data Science for Business: What You Need to Know about Data Mining and Data-analytic Thinking. ISBN 1449361323. 2013.
4. Trevor Hastie, Robert Tibshirani and Jerome Friedman Elements of Statistical Learning, Second Edition ISBN 0387952845 2009 (free online).
5. Avrim Blum, John Hopcroft and Ravindran Kannan Foundations of Data Science (Note: this is a book currently being written by the three authors. The authors have made the first draft of their notes for the book available online. The material is intended for a modern theoretical course in computer science.)
6. Mohammed J. Zaki and Wagner Miera Jr. Data Mining and Analysis: Fundamental Concepts and Algorithms. Cambridge University Press. 2014.
7. Jiawei Han, MichelineKamber and Jian Pei Data Mining: Concepts and Techniques, Third Edition. ISBN 0123814790 2011.

Web References:

1. https://onlinecourses.nptel.ac.in/noc21_cs69/preview

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

Ph. No. 08622-212769, E-Mail: geethanjali@gist.edu.in, Website: www.gist.edu.in

CRYPTOGRAPHY AND NETWORK SECURITY

(Common to CSE, AIML, CS, DS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0530Tc	3:0:0:0	3	CIE: 30 SEE:70	3 Hours	PEC

Course Objectives:

This course will enable students to:

- Introduce the basic categories of threats to computers and networks
- Illustrate various cryptographical agorithms.
- Demonstrate public-key cryptosystem.
- Discuss the fundamental ideas of public-key cryptography.
- Explore Web security threats and protection mechanisms.

Course Outcomes(CO):

On completion of this course, student will be able to

- Understand and apply the cryptographic algorithms to safe guard from intruders
- Compare and contrast symmetric and asymmetric encryption systems and their vulnerability to attack
- Implement the various key distribution, management and message authentication Schemes to send the messages with security
- Identify information system requirements for Transport level, wireless network, E-Mail and IP
- Design a network security system by implementing all the concepts of encryption and decryption algorithms
- Design a web security system by implementing all the concepts

Syllabus		Total Hours:48
Module-I	**Attacks on Computers and Computer Security**	**10Hrs**

Introduction, The need for security, Principles of security, Types of Security attacks, Security services, Security Mechanisms, A model for Network Security Cryptography, plain text and cipher text, encryption and decryption, substitution techniques, transposition techniques, symmetric and asymmetric key cryptography, Steganography

Module-II	Symmetric key Ciphers & Asymmetric key Ciphers	9Hrs

Symmetric key Ciphers: Block Cipher principles, Block cipher modes of operation, Stream ciphers, DES, AES, Blowfish, Key distribution.

Asymmetric key Ciphers: Principles of public key cryptosystems, RSA, DiffieHellman Key Exchange, and Elliptic Curve Cryptography, Key Distribution.

Module-III	Message Authentication and Hash Functions	10Hrs

Authentication requirements, Functions, Message authentication codes, Hash Functions, Secure hash algorithm, Whirlpool, HMAC, CMAC, Digital signatures.

Module-IV	E-Mail Security	9Hrs

Pretty Good Privacy, S/MIME, IP Security: IP Security overview, IPSecurity architecture, Authentication Header, Encapsulating Security Payload (ESP), Security Associations, Key-

Management.

Module-V	Web Security	10Hrs

Web security considerations, Secure Socket Layer and Transport Layer Security, Secure electronic transaction Intruders, Virus and Firewalls: Intruders, Intrusion detection, password management, Virus and related threats, Firewall design principles, Types of firewalls.
Case Studies on Cryptography and security: Secure Inter-branch Payment Transactions, Virtual Elections.

Text Books:

1. William Stallings, "Cryptography and Network Security", 5th Edition, Pearson Education, 2011.
2. Bernard Menezes "Network Security and Cryptography",1st Edition, CENGAGE Learning, 2010.

Reference Books:

1. C K Shyamala, N Harini, Dr T R Padmanabhan, Wiley India, "Cryptography and Network Security",1st Edition, Wiley India Pvt Ltd,2011.
2. Forouzan Mukhopadhyay "Cryptography and Network Security", 2nd Edition, McGrawHill, 2010.
3. Mark Stamp, Wiley India, "Information Security, Principles and Practice", 2nd Edition,Wiley, 2011.

Web References:

1. https://nptel.ac.in/courses/106105031
2. https://onlinecourses.swayam2.ac.in/cec22_cs15/preview
3. https://onlinecourses.nptel.ac.in/noc22_cs90/preview

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
Ph. No. 08622-212769, E-Mail: geethanjali@gist.edu.in, Website: www.gist.edu.in

MICRO CONTROLLERS AND APPLICATIONS
(Common to CSE, AI&ML, DS, CS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0431T	3:0:0:0	3	CIE: 30 SEE:70	3 Hours	OEC

Course Objectives:

This course will enable students to:

- Describe the Architecture of 8051 Microcontroller and Interfacing of 8051 to external memory.
- Write 8051 Assembly level programs using 8051 instruction set.
- Describe the Interrupt system, operation of Timers/Counters and Serial port of 8051.
- Interface simple switches, simple LEDs, ADC 0804, LCD and Stepper Motor to 8051

Course Outcomes(CO):

On completion of this course, student will be able to

- Understand the importance of Microcontroller
- Acquire the knowledge of Architecture of 8051 Microcontroller.
- Apply and Interface simple switches, simple LEDs, ADC 0804, LCD and Stepper Motor to using 8051 I/O ports.
- Develop the 8051 Assembly level programs using 8051 instruction set.
- Design the Interrupt system
- Understand the operation of Timers/Counters and Serial port of 8051.

Syllabus		Total Hours:48
Module-I	**8051 Microcontroller**	**10Hrs**

8051 Microcontroller: Microprocessor Vs Microcontroller, Embedded Systems, Embedded Microcontrollers, 8051 Architecture- Registers, Pin diagram, I/O ports functions, Internal Memory organization. External Memory (ROM & RAM) interfacing..

Module-II	Addressing Modes	9Hrs

Addressing Modes, Data Transfer instructions, Arithmetic instructions, Logical instructions, Branch instructions, Bit manipulation instructions. Simple Assembly language program examples to use these instructions.

Module-III	8051 Stack, Stack and Subroutine instructions	9Hrs

8051 Stack, Stack and Subroutine instructions: Simple Assembly language program examples to use subroutine instructions.8051 Timers and Counters – Operation and Assembly language programming to generate a pulse using Mode-1 and a square wave using Mode- 2 on a port pin.

Module-IV	8051 Serial Communication	10Hrs

8051 Serial Communication- Basics of Serial Data Communication, RS- 232 standard, 9 pin RS232 signals, Simple Serial Port programming in Assembly and C to transmit a message and to receive data serially.8051 Interrupts. 8051 Assembly language programming to generate an external interrupt using a switch.

Module-V	8051 C programming	10Hrs

8051 C programming to generate a square waveform on a port pin using a Timer interrupt. Interfacing 8051 to ADC-0804, DAC, LCD and Interfacing with relays and Opto isolators, Stepper Motor Interfacing, DC motor interfacing, PWM generation using 8051.

Text Books:

1. Muhammad Ali Mazidi and Janice Gillespie Mazidi and Rollin D. McKinlay; "The 8051 Microcontroller and Embedded Systems – using assembly and C", PHI, 2006 / Pearson, 2006.
2. Kenneth J. Ayala, "The 8051 Microcontroller", 3rd Edition, Thomson/Cengage Learning

Reference Books:

1. Manish K Patel, "The 8051 Microcontroller Based Embedded Systems", McGraw Hill, 2014, ISBN: 978-93-329-0125-4.
2. Raj Kamal, "Microcontrollers: Architecture, Programming, Interfacing and System Design", Pearson Education, 2005. Wayne Wolf, FPGA based system design, Prentice hall, 2004.

Web References:

1. https://nptel.ac.in/courses/117104072
2. https://onlinecourses.nptel.ac.in/noc22_ee12/preview

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

Ph. No. 08622-212769, E-Mail: geethanjali@gist.edu.in, Website: www.gist.edu.in

CONTROL SYSTEMS ENGINEERING

(Common to CSE, AI&ML, DS, CS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0215T	3:0:0:0	3	CIE: 30 SEE:70	3 Hours	OEC

Course Objectives:

This course will enable students to:

- Merits and demerits of open loop and closed loop systems; the effects of feedback
- The use of block diagram algebra and Mason's gain formula
- Transient and steady state responses , time domain specifications
- Frequency domain specifications, Bode diagrams and Nyquist plots
- The fundamental aspects of modern control

Course Outcomes(CO):

On completion of this course, student will be able to

- Evaluate the effective transfer function of a system from (i) block diagram reduction techniques (ii) Mason's gain formula
- Compute the steady state errors and transient response characteristics
- Determine the absolute stability and relative stability of a system
- Design a compensator to accomplish desired performance
- Derive state space model of a given physical system and solve the state equation

Syllabus		Total Hours:48
Module-I	**INTRODUCTION**	**10Hrs**

Open Loop and closed loop control systems and their differences- Examples of control systems- Classification of control systems, Feedback Characteristics, Effects of positive and negative feedback. Mathematical models – Differential equations of Translational and Rotational mechanical systems, and Electrical Systems, Block diagram reduction methods – Signal flow graph - Reduction using Mason's gain formula. Transfer Function of DC Servo motor - AC Servo motor - Synchro transmitter and Receiver.

Module-II	TIME RESPONSE ANALYSIS	10Hrs

Step Response - Impulse Response - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants

Module-III	STABILITY	9Hrs

The concept of stability – Routh's stability criterion – Stability and conditional stability – limitations of Routh's stability. The root locus concept - construction of root loci effects of adding poles and zeros to G(s)H(s) on the root loci.

Module-IV	FREQUENCY RESPONSE ANALYSIS	10Hrs

Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram Stability Analysis from Bode Plots. Polar Plots- Phase margin and Gain margin-Stability Analysis.

Module-V	STATE SPACE ANALYSIS	10Hrs

Concepts of state, state variables and state model, derivation of state models from differential equations. Transfer function models. Block diagrams. Diagonalization. Solving the Time invariant state Equations- State Transition Matrix and it's Properties. System response through State Space models. The concepts of controllability and observability

Text Books:

1. Modern Control Engineering, Katsuhiko Ogata, PEARSON, 1st Impression 2015.
2. Control Systems Engineering, I. J. Nagrath and M. Gopal, New Age International Publishers, 5th edition, 2007, Reprint 2012.

Reference Books:

1. Automatic Control Systems, Farid Golnaraghi and Benjamin. C. Kuo, WILEY, 9th Edition, 2010.
2. Control Systems, Dhanesh N. Manik, CENGAGE Learning, 2012.
3. John J D'Azzo and C. H. Houpis , "Linear Control System Analysis and Design: Conventional and Modern", McGraw - Hill Book Company, 1988.

Web References:

1. https://archive.nptel.ac.in/courses/107/106/107106081/
2. https://onlinecourses.nptel.ac.in/noc20_ee90/preview

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

Ph. No. 08622-212769, E-Mail: geethanjali@gist.edu.in, Website: www.gist.edu.in

ENVIRONMENTAL ECONOMICS

(Common to CSE, AI&ML, DS, CS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0150T	3:0:0:0	3	CIE: 30 SEE:70	3 Hours	OEC

Course Objectives:

This course will enable students to:

- To impart knowledge on sustainable development and economics of energy
- To teach regarding environmental degradation and economic analysis of degradation
- To inculcate the knowledge of economics of pollution and their management
- To demonstrate the understanding of cost benefit analysis of environmental resources
- To make the students to understand principles of economics of biodiversity

Course Outcomes(CO):

On completion of this course, student will be able to

- The information on sustainable development and economics of energy
- The information regarding environmental degradation and economic analysis of degradation
- The identification of economics of pollution and their management
- The cost benefit analysis of environmental resources
- The principles of economics of biodiversity

Syllabus		Total Hours:48
Module-I	**SUSTAINABLE DEVELOPMENT**	**9Hrs**

Introduction to sustainable development - Economy-Environment interlinkages - Meaning of sustainable development - Limits to growth and the environmental Kuznets curve – The sustainability debate - Issues of energy and the economics of energy.

Module-II	**ENVIRONMENTAL DEGRADATION**	**9Hrs**

Economic significance and causes of environmental degradation - The concepts of policy failure, externality and market failure - Economic analysis of environmental degradation – Equi –marginal principle.

Module-III	**ECONOMICS OF POLLUTION**	**10Hrs**

Economics of optimal pollution, regulation, monitoring and enforcement - Managing pollution using existing markets: Bargaining solutions – Managing pollution through market intervention: Taxes, subsidies and permits.

Module-IV	**COST – BENEFIT ANALYSIS**	**10Hrs**

Cost – Benefit Analysis: Economic value of environmental resources and environmental damage - Concept of Total Economic Value - Alternative approaches to valuation – Cost-benefit analysis and discounting.

Module-V	**ECONOMICS OF BIODIVERSITY**	**10Hrs**

Economics of biodiversity: Economics of biodiversity conservation - Valuing individual species and diversity of species -Policy responses at national and international levels. Economics of Climate Change – stern Report

Text Books:

1. An Introduction to Environmental Economics by N. Hanley, J. Shogren and B. White Oxford University Press.(2001)
2. Blueprint for a Green Economy by D.W. Pearce, A. Markandya and E.B. Barbier Earthscan, London.(1989)

Reference Books:

1. Environmental Economics: An Elementary Introduction by R.K. Turner, D.W. Pearce and I. Bateman Harvester Wheatsheaft, London. (1994),
2. Economics of Natural Resources and the Environment by D.W. Pearce and R.K. Turner Harvester Wheat sheaf, London. (1990),

Web References:

1. https://nptel.ac.in/courses/109107171

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

Ph. No. 08622-212769, E-Mail: geethanjali@gist.edu.in, Website: www.gist.edu.in

INTRODUCTION TO COMPOSITES

(Common to CSE, AI&ML, DS, CS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0329Tb	3:0:0:0	3	CIE: 30 SEE:70	3 Hours	OEC

Course Objectives:

This course will enable students to:

- To be familiar with classification and characteristics of composite material and their applications.
- To gain the knowledge about manufacturing methods of composites.
- To know the testing methods related to composite materials.

Course Outcomes(CO):

To provide knowledge on characteristics of composites

- To get knowledge on manufacturing and testing methods and mechanical behaviour of composites.
- To get the exposure of different materials.

Syllabus		Total Hours:48
Module-I	**Introduction**	**10Hrs**

Definitions, Composites, Reinforcements and matrices, Types of reinforcements, Types of matrices, Types of composites, Carbon Fibre composites, Properties of composites in comparison with standard materials, Applications of metal, ceramic and polymer matrix composites.

Module-II	Manufacturing Methods	9Hrs

Hand and spray lay - up, injection molding, resin injection,filament winding, pultrusion, centrifugal casting and prepregs. Fibre/Matrix Interface, mechanical. Measurement of interface strength.

Module-III	Mechanical Properties	9Hrs

Stiffness and Strength: Geometrical aspects – volume and weight fraction. Unidirectional continuous fibre, discontinuous fibers, Short fiber systems, woven reinforcements –Mechanical Testing: Determination of stiffness and strengths of unidirectional composites; tension, compression, flexure and shear.

Module-IV	Laminates	10Hrs

Plate Stiffness and Compliance, Assumptions, Strains, Stress Resultants, Plate Stiffness and Compliance, Computation of Stresses, Types of Laminates -, Symmetric Laminates, Anti-symmetric Laminate, Balanced Laminate, Quasi-isotropic Laminates, Crossply Laminate, Angle-ply Laminate. Orthotropic Laminate, Laminate Moduli, Hygrothermal Stresses.

Module-V	Joining Methods and Failure Theories	10Hrs

Joining –Advantages and disadvantages of adhesive and mechanically fastened joints. Typical bond strengths and test procedures.

Text Books:

1. K.K. Chawla, (1998), Composite Materials, Springer-Verlag, New York 2. B.T. Astrom, (1997),
2. Manufacturing of Polymer Composites, Chapman & Hall
3. Composite materials by J.N.Reddy

Reference Books:

1. Stuart M Lee, J. Ian Gray, Miltz, (1989), Reference Book for Composites Technology,CRC press
2. Frank L Matthews and R D Rawlings, (2006), Composite Materials: Engineering and Science, Taylor and Francis.

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
Ph. No. 08622-212769, E-Mail: geethanjali@gist.edu.in, Website: www.gist.edu.in

COMPILER DESIGN LAB
(Common to CSE, AI&ML, DS, CS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0531P	0: 0:3:0	1.5	CIE: 30 SEE:70	3 Hours	PCC

Course Objectives:

This course will enable students :

- To introduce LEX and YACC tools
- To learn to develop algorithms to generate code for a target machine
- To implement LL and LR parsers

Course Outcomes(CO):

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

- Design and implement fundamental concepts of finite Automata
- Design and implement a lexical analyzer for given language
- Use LEX and YACC tools for developing a scanner and a parser
- Design and implement LL and LR parsers
- Design algorithms to perform code optimization in order to improve the performance of program
- Design and implement code generation for given expression

Syllabus | **Total Hours:48**

List of Experiments:

Experiment 1:
Write program to find ε – closure of all states of any given NFA with ε transition.

Experiment 2:
Write program to convert NFA with ε transition to NFA without ε transition.

Experiment 3:
Write program to convert NFA to DFA

Experiment 4:
Design and implement a lexical analyzer for given language using C and the lexical analyzer should ignore redundant spaces, tabs and new lines.

Experiment 5:
Implementation of Lexical Analyzer using Lex Tool

Experiment 6:
Program to recognize a valid arithmetic expression that uses operator +, – , * and /.

Experiment 7:
Implementation of Calculator using LEX and YACC

Experiment 8:
Write program to find Simulate First and Follow of any given grammar.

Experiment 9:
Construct a recursive descent parser for an expression.

Experiment 10:
Construct a Shift Reduce Parser for a given language.

Experiment 11:
Write a program to perform constant propagation.

Experiment 12:
Implement Intermediate code generation for simple expressions

Reference Books:

- Compilers: Principles, Techniques and Tools, Second Edition, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffry D. Ullman, Pearson. Compiler Construction-Principles and Practice, Kenneth C Louden, Cengage Learning.
- Modern compiler implementation in C, Andrew W Appel, Revised edition, Cambridge University Press.
- The Theory and Practice of Compiler writing, J. P. Tremblay and P. G. Sorenson, TMH
- Writing compilers and interpreters, R. Mak, 3rd edition, Wiley student edition.

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
Ph. No. 08622-212769, E-Mail: geethanjali@gist.edu.in, Website: www.gist.edu.in

MACHINE LEARNING LAB
(Common to CSE, AI&ML, DS, CS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0532P	0:0:3:0	1.5	CIE: 30 SEE:70	3 Hours	PCC

Course Objectives:

This course will enable students to:

- Make use of Data sets in implementing the machine learning algorithms
- Implement the machine learning concepts and algorithms in any suitable language of choice.

Course Outcomes(CO):

On completion of this course, student will be able to

- Understand the Mathematical and statistical prospective of machine learning algorithms through python programming
- Appreciate the importance of visualization in the data analytics solution
- Derive insights using Machine learning algorithms

Syllabus | **Total Hours:48**

List of Experiments

Experiment 1:
Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file.

Experiment 2:
For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate-Elimination algorithm to output a description of the set of all hypotheses consistent with the training examples.

Experiment 3:
Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.

Experiment 4:
Build an Artificial Neural Network by implementing the Back-propagation algorithm and test the same using appropriate data sets.

Experiment 5:
Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.

Experiment 6:
Assuming a set of documents that need to be classified, use the naïve Bayesian Classifier model to perform this task. Built-in Java classes/API can be used to write the program. Calculate the accuracy, precision, and recall for your data set.

Experiment 7:
Write a program to construct a Bayesian network considering medical data. Use this model to demonstrate the diagnosis of heart patients using standard Heart Disease Data Set. You can use Java/Python ML library classes/API.

Experiment 8:
Apply EM algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering. You can add Java/Python ML library classes/API in the program.

Experiment 9:
Write a program to implement k-Nearest Neighbour algorithm to classify the iris data set. Print both correct and wrong predictions. Java/Python ML library classes can be used for this problem.

Experiment 10:
Implement parametric and non-parametric Locally Weighted Regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs.

Reference Book:

1. Python Machine Learning Workbook for beginners, AI Publishing, 2020

Web Reference:

1. **https://www.udemy.com/course/machinelearning/**

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
Ph. No. 08622-212769, E-Mail: geethanjali@gist.edu.in, Website: www.gist.edu.in

CLOUD COMPUTING LAB
(Common to CSE, AI&ML, DS, CS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0533P	0:0:3:0	1.5	CIE: 30 SEE:70	3 Hours	PCC

Course Objectives:

This course will enable students to:

- To develop web applications in cloud
- To learn the design and development process involved in creating a cloud based application
- Understand transfer of file form one virtual machine to another
- To learn to implement and use parallel programming using Hadoop

Course Outcomes(CO):

On completion of this course, student will be able to

- Configure various virtualization tools such as Virtual Box, VMware workstation.
- Design and deploy a web application in a PaaS environment.
- Learn how to simulate a cloud environment to implement new schedulers.
- Install and use a generic cloud environment that can be used as a private cloud.
- Manipulate large data sets in a parallel environment.

Syllabus | **Total Hours:48**

List of Experiments

Experiment 1:
Install VirtualBox/VMware Workstation with different flavours of Linux or windows OS on top of windows operating systems.

Experiment 2:
Install a C compiler in the virtual machine created using virtual box and execute Simple Programs

Experiment 3:
Install Google App Engine. Create hello world app and other simple web applications using python/java.

Experiment 4:
Use GAE launcher to launch the web applications.

Experiment 5:
Simulate a cloud scenario using CloudSim and run a scheduling algorithm that is not present in CloudSim.

Experiment 6:
Find a procedure to transfer the files from one virtual machine to another virtual machine.

Experiment 7:
Find a procedure to launch virtual machine using try stack (Online Open stack Demo Version)

Experiment 8:
Install Hadoop single node cluster and run simple applications like word count

Reference:

1. Google Cloud Computing Foundations Course - Course (nptel.ac.in)

Web References:

1. https://www.vmware.com/products/workstation-pro/workstation-pro-evaluation.html
2. http://code.google.com/appengine/downloads.html
3. http://code.google.com/appengine/downloads.html

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
Ph. No. 08622-212769, E-Mail: geethanjali@gist.edu.in, Website: www.gist.edu.in

SOFT SKILLS (SKILL)
(Common to CSE, AI&ML, DS, CS)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0029P	1:0:2:0	2	CIE: 30 SEE:70	3 Hours	SC

Course Objectives:

This course will enable students to:

- To encourage all round development of the students by focusing on soft skills.
- To make the students aware of critical thinking and problem-solving skills.
- To develop leadership skills and organizational skills through group activities.
- To function effectively with heterogeneous teams.

Course Outcomes(CO):

On completion of this course, student will be able to

- Memorize various elements of effective communicative skills.
- Interpret people at the emotional level through emotional intelligence.
- Apply critical thinking skills in problem solving.
- Analyze the needs of an organization for team building.
- Judge the situation and take necessary decisions as a leader.
- Develop social and work-life skills as well as personal and emotional well-being.

Syllabus		Total Hours:48
Module-I	**Soft Skills & Communication Skills**	**10Hrs**

Introduction, meaning, significance of soft skills –Vital Components of communication skills - Inter-personal skills - Verbal and Non-verbal Communication.

Activities: Narration about self- strengths and weaknesses- clarity of thought - Interpersonal Skills- Group Discussion – Debate – Mutual Understanding - Book and film Reviews by groups - Group leader presenting views (non- controversial and secular) on contemporary issues or on a given topic. Verbal Communication- Oral Presentations- Extempore- brief addresses and speeches- Negotiation skills –Role Play- Non-verbal communication – Public speaking – Mock interviews – Anchoring Skills..

Module-II	Critical Thinking	9Hrs

Active Listening – Observation – Curiosity – Introspection – Analytical Thinking – Open-mindedness – Creative Thinking.

Activities: Gathering information and statistics on a topic - sequencing – assorting – reasoning – critiquing issues – placing the problem – finding the root cause - seeking viable solution – judging with rationale – evaluating the views of others - Case Study, Story Analysis.

Module-III	Problem Solving & Decision Making	10Hrs

Meaning & features of Problem Solving – Managing Conflict – Conflict resolution – Methods of decision making – Effective decision making in teams – Methods & Styles.

Activities: Placing a problem which involves conflict of interests, choice and views – formulating the problem – exploring solutions by proper reasoning – Discussion on important professional, career and organizational decisions and initiate debate on the appropriateness of the decision. Case Study & Group Discussion.

Module-IV	Emotional Intelligence & Stress Management	9Hrs

Managing Emotions – Thinking before Reacting – Empathy for Others – Self-awareness – Self-Regulation – Stress factors – Controlling Stress – Tips.

Activities: Providing situations for the participants to express emotions such as happiness, enthusiasm, gratitude, and sympathy, and confidence, compassion in the form of written or oral presentations. Providing opportunities for the participants to narrate certain crisis and stress –ridden situations caused by failure, anger, jealousy, resentment and frustration in the form of written and oral presentation, Organizing Debates.

Module-V	Leadership Skills	10Hrs

Team-Building – Decision-Making – Accountability – Planning – Public Speaking – Motivation – Risk Taking - Team Building - Time Management.

Activities: Forming group with a consensus among the participants- choosing a leader- encouraging the group members to express views on leadership- democratic attitude- sense of sacrifice – sense of adjustment – vision – accommodating nature- eliciting views on successes and failures of leadership using the past knowledge and experience of the participants, Public Speaking, Activities on Time Management, Motivation, Decision Making, Group discussion etc.

Text Books:

1. Personality Development and Soft Skills (English, Paperback, MitraBarunK.)Publisher: Oxford University Press; Pap/Cdr edition (July 22, 2012)
2. Personality Development and Soft Skills: Preparing for Tomorrow, Dr Shikha Kapoor Publisher : I K International Publishing House; 0 edition (February 28, 2018)

Reference Books:

1. Soft skills: personality development for life success by Prashant Sharma, BPB publications 2018.
2. Soft Skills By Alex K. Published by S.Chand
3. Soft Skills: An Integrated Approach to Maximise Personality Gajendra Singh Chauhan, Sangeetha Sharma Published by Wiley.
4. Communication Skills and Soft Skills (Hardcover, A. Sharma) Publisher: Yking books
5. SOFT SKILLS for a BIG IMPACT (English, Paperback, RenuShorey) Publisher: Notion Press .
6. Life Skills Paperback English Dr. Rajiv Kumar Jain, Dr. Usha Jain Publisher: Vayu Education of India

Web Resources:

1. https://youtu.be/DUlsNJtg2L8?list=PLLy_2iUCG87CQhELCytvXh0E_y-bOO1_q
2. https://youtu.be/xBaLgJZ0t6A?list=PLzf4HHlsQFwJZel_j2PUy0pwjVUgj7KlJ
3. https://youtu.be/-Y-R9hDl7lU
4. https://youtu.be/gkLsn4ddmTs
5. https://youtu.be/2bf9K2rRWwo
6. https://youtu.be/FchfE3c2jzc

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

Ph. No. 08622-212769, E-Mail: geethanjali@gist.edu.in, Website: www.gist.edu.in

RESEARCH METHODOLOGY

(Common **to CSE, AI&ML, CS, DS, ECE, EEE, ME**)

Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0032T	**2:0:0:0**	**0**	**CIE: 30**	**-**	**MC**

Course Objectives:

This course will enable students to:

- To understand the basic concepts of research and research problem
- To make the students learn about various types of data collection and sampling
- Design to enable them to know the method of statistical evaluation
- To make the students understand various testing tools in research
- To make the student learn how to write a research report
- To create awareness on ethical issues n research

Course Outcomes(CO):

On completion of this course, student will be able to

- Understand basic concepts and its methodologies
- Understand the concept of sampling and sampling design
- Design survey questionnaires for different kinds of research
- Read. comprehend and explain research articles in their academic discipline
- Analyze various types of testing tools used in research
- Design a research paper without any ethical issues

Syllabus		Total Hours:48
Module-I	**INTRODUCTION TO RESEARCH METHODOLOGY**	**10Hrs**

Meaning of Research – Objectives of Research – Types of Research – Research Approaches – Guidelines for Selecting and Defining Research Problem – Research Design – Concepts related to Research Design – Basic Principles of Experimental Design.

Module-II	**SAMPLING AND DATA COLLECTION METHODS**	**9Hrs**

Sampling Design – steps in Sampling Design –Characteristics of a Good Sample Design – Random Sampling Design. Measurement and Scaling Techniques-Errors in Measurement – Tests of Sound Measurement – Scaling and Scale Construction Techniques – Time Series Analysis – Interpolation and Extrapolation. Data Collection Methods – Primary Data – Secondary data – Questionnaire Survey and Interviews.

Module-III	**CORRELATION**	**10Hrs**

Correlation and Regression Analysis – Method of Least Squares – Regression vs Correlation – Correlation vs Determination – Types of Correlations and Their Applications

Module-IV	**STATISTICAL INFERENCE**	**9Hrs**

Statistical Inference: Tests of Hypothesis – Parametric vs Non-parametric Tests – Hypothesis Testing Procedure – Sampling Theory – Sampling Distribution – Chi-square Test – Analysis of variance and Co-variance – Multivariate Analysis

Module-V	**REPORT WRITING**	**10Hrs**

Report Writing and Professional Ethics: Interpretation of Data – Report Writing – Layout of a Research Paper – Techniques of Interpretation- Making Scientific Presentations in Conferences and Seminars – Professional Ethics in Research

Text Books:

1. C.R.Kothari, "Research Methodology: Methods and Techniques",2nd edition, New Age International Publishers.
2. A Step by Step Guide for Beginners, "Research Methodology": Ranjit Kumar, Sage Publications

Reference Books:

1. P.Narayana Reddy and G.V.R.K.Acharyulu, "Research Methodology and Statistical Tools", 1st Edition, Excel Books,New Delhi.
2. Donald R. "Business Research Methods", Cooper & Pamela S Schindler, 9th edition.
3. 3. S C Gupta, "Fundamentals of Statistics", 7th edition Himalaya Publications

Web Reference:

1. https://onlinecourses.swayam2.ac.in/cec20_hs17/preview
2. https://onlinecourses.nptel.ac.in/noc22_ge08/preview