



**GEETHANJALI INSTITUTE OF SCIENCE & TECHNOLOGY:  
NELLORE  
(AUTONOMOUS)**

**NELLORE-524317 (A.P) INDIA**

**B.TECH IN COMPUTER SCIENCE & ENGINEERING  
(CYBER SECURITY)  
COURSE STRUCTURE AND  
SYLLABI UNDER RG 22  
REGULATION**



## 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](http://www.gist.edu.in)

Semester-5 (Theory-5, Lab-2, SC-1, MC-1)							
Sl. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	
1	PCC	22A3303T	Automata and Compiler Design	3	0	0	3
2	PCC	22A0534b	Cyber Security	3	0	0	3
3	PCC	22A0528T	Machine Learning	3	0	0	3
4	PEC	22A0508T 22A0514T <b>22A3703T</b>	<b>Professional Elective-I:</b> 1. Software Engineering 2. Data warehousing and mining 3. Ethical hacking	3	0	0	3
5	OEC	22A0430T 22A0214Ta 22A0149T 22A0321Ta	<b>Open Elective-I:</b> 1. Principles of Communication Systems 2. Power Electronics 3. Building Materials 4. Automobile Engineering	3	0	0	3
6	PCC(Lab)	<b>22A3704P</b>	Cyber Security Lab	0	0	3	1.5
7	PCC(Lab)	22A0532P	Machine Learning Lab	0	0	3	1.5
8	SC	22A0029P	<b>Skill Advanced Course:</b> Soft Skills	1	0	2	2
9	MC	22A0526	<b>Mandatory Course:</b> Design Thinking and Innovation	2	0	0	0
<b>Community Service Project 2 Months (Mandatory) after second year (to be evaluated during V semester)</b>				0	0	0	1.5
						<b>Total credits</b>	<b>21.5</b>

Category	Credits
Professional Core Courses (PCC)	12
Professional Elective Courses (PEC)	3
Open Elective Courses (OEC)	3
Skill Advanced Course (SC)	2
Summer Internship	1.5
<b>Total</b>	<b>21.5</b>



## 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](http://www.gist.edu.in)

<b>AUTOMATA AND COMPILER DESIGN</b> (Common to CSE, AI&ML, CS, DS)					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A3303T</b>	<b>3: 0:0:0</b>	<b>3</b>	<b>CIE:30 SEE:70</b>	<b>3 Hours</b>	<b>PCC</b>
<b>Course Objectives:</b>					
This course will enable students: <ul style="list-style-type: none"> <li>• Understand formal definitions of machine models</li> <li>• To illustrate finite state machines to solve problems in computing</li> <li>• Understanding of formal grammars</li> <li>• To learn the various phases of compiler.</li> <li>• To learn the various parsing techniques.</li> </ul>					
<b>Course Outcomes (CO):</b>					
<b>On completion of this course, student will be able to:</b> <ul style="list-style-type: none"> <li>• Understand the fundamental concepts of Formal Languages and Automata</li> <li>• Apply the knowledge of Automata Theory, Grammars &amp; Regular Expressions for solving various problems.</li> <li>• Design of Context Free Grammar for formal language</li> <li>• Discuss the major phases of compilers and use the knowledge of the Lex tool</li> <li>• Develop the parsers and experiment with the knowledge of different parsers design</li> <li>• Summarize various optimization techniques and examine the design issues of code generator</li> </ul>					
<b>Syllabus</b>					<b>Total Hours:48</b>
<b>Module-I</b>	<b>Finite Automata</b>				<b>10Hrs</b>
Why Study Automata Theory? The Central Concepts of Automata Theory, Automation, Finite Automata, Transition Systems, Acceptance of a String by a Finite Automaton, DFA, Design of DFAs, NFA, Design of NFA, Equivalence of DFA and NFA, Conversion of NFA into DFA, Finite Automata with $\epsilon$ - Transition, Minimization of Finite Automata, Mealy and Moore Machines, Applications and Limitation of Finite Automata.					
<b>Module-II</b>	<b>Regular Expressions</b>				<b>9Hrs</b>
Regular Expressions, Equivalence of two Regular Expressions, Finite Automata and Regular Expressions, Inter Conversion, Equivalence between Finite Automata and Regular Expressions, Pumping Lemma, Closers Properties, Applications of Regular Expressions, Grammars, Classification of Grammars- Chomsky Hierarchy, Finite Automata and Regular Grammars, Regular Expressions and Regular Grammars.					
<b>Module-III</b>	<b>Context Free Grammars</b>				<b>10Hrs</b>
Context Free Grammar, Leftmost and Rightmost Derivations, Parse Trees, Ambiguous Grammars, Simplification of Context Free Grammars-Elimination of Useless Symbols, E-Productions and Unit Productions, Normal Forms for Context Free Grammars-Chomsky Normal Form and Greibach Normal Form, Pumping Lemma, Closure Properties, Applications of Context Free Grammars.					
<b>Module-IV</b>	<b>Introduction To Compiling</b>				<b>9Hrs</b>
Introduction To Compiling: Overview of Compilers, Phases of a Compiler. Lexical Analysis: The Role of Lexical Analyzer, Input Buffering, Specification of Tokens,					

Recognition of Tokens, The lexical analyzer generator Lex, Design of a Lexical Analyzer generator		
<b>Module-V</b>	<b>Syntax Analysis</b>	<b>10Hrs</b>
<p>Syntax Analysis: The role of the Parser, First and Follow, Predictive Parsing, LR Parsers-SLR, Canonical LR, LALR, Parser Generator(YACC).</p> <p>Syntax-Directed Definition, S-Attributed SDD, L-Attributed SDD, Translation Schemes, three address code, Principle Sources Of Code Optimizations, Issues Code generation</p>		
<p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>3. Introduction to Automata Theory, Languages and Computation, J.E.Hopcroft, R.Motwani and J.D.Ullman, 3rd Edition, Pearson, 2008.</li> <li>4. Compilers Principles, Techniques and Tools, Second Edition, Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman., Pearson,2014.</li> </ol>		
<p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. Theory of Computer Science-Automata, Languages and Computation, K.L.P.Mishra and N.Chandrasekaran, 3rd Edition, PHI, 2007.</li> <li>2. Introduction to Automata Theory, Formal Languages and Computation, Shyamalendu Kandar, Pearson, 2013.</li> <li>3. Compilers Principles and Practicel, Parag H. Dave, Himanshu B. Dave, PEARSON.</li> <li>4. Lex &amp;Yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly .</li> </ol>		
<p><b>Web References:</b></p> <p><a href="https://onlinecourses.nptel.ac.in/noc21_cs07/preview">https://onlinecourses.nptel.ac.in/noc21_cs07/preview</a></p>		



## 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](http://www.gist.edu.in)

<b>CYBER SECURITY (Common to CSE and CS)</b>					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A0534b</b>	<b>3: 0:0:0</b>	<b>3</b>	<b>CIE:30 SEE:70</b>	<b>3Hours</b>	<b>PCC</b>
<b>Course Objectives:</b>					
This course will enable students :					
<ul style="list-style-type: none"> <li>• 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.</li> <li>• Students will gain insight into the importance of Cyber Security and the integral role of Cyber Security professionals.</li> <li>• Evaluate the trends and patterns that will determine the future state of cyber security.</li> </ul>					
<b>Course Outcomes(CO):</b>					
<b>On completion of this course, student will be able to:</b>					
<ul style="list-style-type: none"> <li>• Cyber Security architecture principles</li> <li>• Identifying System and application security threats and vulnerabilities</li> <li>• Identifying different classes of attacks</li> <li>• Cyber Security incidents to apply appropriate response</li> <li>• Identifying different tools in cyber crime</li> <li>• Describing risk management processes and practices</li> </ul>					
<b>Syllabus</b>				<b>Total Hours:48</b>	
<b>Module-I</b>	<b>Introduction to Cybercrime</b>			<b>9Hrs</b>	
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					
<b>Module-II</b>	<b>Cyber Offenses</b>			<b>10Hrs</b>	
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.					
<b>Module-III</b>	<b>Cybercrime Mobile and Wireless Devices</b>			<b>9Hrs</b>	
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.					
<b>Module-IV</b>	<b>Tools and Methods Used in Cybercrime</b>			<b>10Hrs</b>	
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).					
<b>Module-V</b>	<b>Cyber Crimes and security</b>			<b>10Hrs</b>	
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.

**Web Resources:**

[https://www.tutorialspoint.com/fundamentals\\_of\\_science\\_and\\_technology/cyber\\_crime\\_and\\_cyber\\_security.htm](https://www.tutorialspoint.com/fundamentals_of_science_and_technology/cyber_crime_and_cyber_security.htm)

<https://www.javatpoint.com/cyber-security-tutorial>

<https://www.youtube.com/watch?v=lpa8uy4DyMo&list=PL9ooVrP1hQOGPQVeapGsJCktzIO4DtI4>



## 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](http://www.gist.edu.in)

<b>MACHINE LEARNING</b> (Common to CSE, AI&ML, DS, CS)					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A0528T</b>	<b>3:0:0:0</b>	<b>3</b>	<b>CIE:30 SEE:70</b>	<b>3 Hours</b>	<b>PCC</b>
<b>Course Objectives:</b>					
<p>This course will enable students to:</p> <ul style="list-style-type: none"> <li>• Understand basic concepts of Machine Learning</li> <li>• Study different learning algorithms</li> <li>• Illustrate evaluation of learning algorithms</li> </ul>					
<b>Course Outcomes (CO):</b>					
<b>On completion of this course, student will be able to</b>					
<ul style="list-style-type: none"> <li>• Interpret the basic concepts of Human Learning, Machine Learning, Building and Evaluating a Model, Classification, Regression and Clustering</li> <li>• Building, training and evaluating a Model</li> <li>• Apply different Classification algorithms to real world problems</li> <li>• Apply different Regression techniques to real world problems</li> <li>• Apply Partitioning Methods of Clustering to real world problems</li> <li>• Apply Density-based methods of Clustering to real world Scenarios</li> </ul>					
<b>Syllabus</b>					<b>Total Hours:48</b>
<b>Module-I</b>	<b>Introduction – Human Learning &amp; Machine Learning</b>				<b>10Hrs</b>
<p>Human Learning, Types of Human Learning, Machine Learning, Types of Machine Learning, Applications of Machine Learning, Issues in Machine Learning.</p> <p>Basic types of Data in Machine Learning, Data Preprocessing: Data Cleaning, Data transformation and Data Reduction</p>					
<b>Module-II</b>	<b>Modeling and Evaluation</b>				<b>9Hrs</b>
<p>Introduction, selecting a Model, training a Model, Model Representation and Interpretability, Evaluating Performance of a Model, Improving Performance of a Model</p>					
<b>Module-III</b>	<b>Supervised Learning: Classification</b>				<b>10Hrs</b>
<p>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</p>					
<b>Module-IV</b>	<b>Supervised Learning : Regression</b>				<b>10Hrs</b>
<p>Regression – Assumptions in Regression Analysis, Types of Regression: Simple Linear Regression, Multiple Linear Regression, Polynomial Regression, Logistic Regression, Curve Fitting- Method of Least Squares.</p>					
<b>Module-V</b>	<b>Unsupervised Learning : Clustering</b>				<b>9Hrs</b>
<p>Clustering- Different types of clustering techniques, Partitioning Methods: K-Means Algorithm, K-Medoid's algorithm, Hierarchical Clustering Methods, Density based Clustering Methods-</p>					

DBSCAN, DENCLUE, OPTICS

**Text Books:**

1. Machine Learning, Saikat Dutt, 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 Guidefor Data Scientists", Oreilly.

**Web References:**

1. Andrew Ng, "Machine Learning Yearning"
2. <https://www.deeplearning.ai/machine-learning->
3. <https://www.cse.huji.ac.il/~shais/UnderstandingMachineLearning/index.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](http://www.gist.edu.in)

<b>SOFTWARE ENGINEERING</b> (Common to CSE, AI&ML, DS, CS)					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A0508T</b>	<b>3:0:0:0</b>	<b>3</b>	<b>CIE: 30 SEE:70</b>	<b>3 Hours</b>	<b>PCC</b>
<b>Course Objectives:</b>					
<p>This course will enable students to:</p> <ul style="list-style-type: none"> <li>• To learn the basic concepts of software engineering and life cycle models.</li> <li>• To understand the requirements engineering and agile models.</li> <li>• To interpret the basic concepts of software design</li> <li>• To understand the basic concepts of black box and white box software testing and enable to design test cases for unit, integration, and system testing</li> <li>• To understand the basic concepts in risk management and reengineering.</li> </ul>					
<b>Course Outcomes (CO):</b>					
<b>On completion of this course, student will be able to</b>					
<ul style="list-style-type: none"> <li>• Use software life cycle activities for process models (L3).</li> <li>• Use software requirements specifications for given problems (L3).</li> <li>• Apply design concepts, component Level and user interface design for a given problems(13)</li> <li>• Apply various test cases for a given problems (L3).</li> <li>• Apply quality management concepts at the application level. (L3)</li> <li>• Determine risk management plans and implementation(13)</li> </ul>					
<b>Syllabus</b>					<b>Total Hours:48</b>
<b>Module-I</b>	<b>Software, Software Engineering and Software Process</b>				<b>10 Hrs</b>
<p><b>Basic concepts:</b> abstraction versus decomposition, evolution of software engineering techniques, Software development life cycle (SDLC) models: Iterative waterfall model, Prototype model, Evolutionary model, Spiral model, RAD model, Agile models, software project management: project planning, project estimation, COCOMO, project scheduling, Organization and team structure, risk management.</p>					
<b>Module-II</b>	<b>Requirements Engineering and Agile Models</b>				<b>9 Hrs</b>
<p>The Nature of software, The unique nature of web apps, The software myths</p> <p><b>Requirements Engineering:</b> Functional and non-functional requirements, the software requirements document, Requirements specification, Requirements engineering processes, Requirements elicitation and analysis, Requirements validation, Requirements management</p> <p><b>Agile development model:</b> What is agility, what is an agile process, XP, Agile process models, CMMI</p>					
<b>Module-III</b>	<b>Design Concepts, Component Level and User Interface Design</b>				<b>9 Hrs</b>
<p><b>Design Concepts:</b> Good Software Design, Cohesion and coupling, The design Process, Design concepts, design models</p> <p><b>Component Level Design:</b> Introduction to components, designing class-based components</p>					

<b>User Interface Design:</b> Golden rules, User Interface analysis and design		
<b>Module-IV</b>	<b>Software Testing Strategies, Project Metrics and Quality Management</b>	<b>10 Hrs</b>
<p><b>Software Testing Strategies:</b> coding standards and guidelines, code review, testing, types of testing.</p> <p><b>Process and project metrics:</b> software measurement, A framework for product metrics.</p> <p><b>Quality Management:</b> Quality, Software quality, metrics for software quality, software quality assurance.</p>		
<b>Module-V</b>	<b>Risk Management and Reengineering</b>	<b>10 Hrs</b>
<p><b>Risk Management:</b> Risk identification, Risk projection, risk refinement, RMMM</p> <p><b>Maintenance and reengineering:</b> Software maintenance, reengineering, reverse engineering and forward engineering</p> <p><b>Case Study:</b> Implementation of safe home system using software engineering principles.</p>		
<b>Text Books:</b>		
<ol style="list-style-type: none"> <li>1. Pressman R, "Software Engineering- Practioner Approach", McGraw Hill.</li> <li>2. Somerville, "Software Engineering", Pearson 2.</li> </ol>		
<b>Reference Books:</b>		
<ol style="list-style-type: none"> <li>1. Rajib Mall, "Fundamentals of Software Engineering", 5th Edition, PHI, 2018.</li> <li>2. Richard Fairley, "Software Engineering Concepts", Tata McGraw Hill.</li> <li>3. Jalote Pankaj, "An integrated approach to Software Engineering", Narosa.</li> </ol>		
<p>Web Resources:</p> <p><a href="https://nptel.ac.in/courses/106/105/106105182/">https://nptel.ac.in/courses/106/105/106105182/</a></p> <p><a href="http://peterindia.net/SoftwareDevelopment.html">http://peterindia.net/SoftwareDevelopment.html</a></p>		



## 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](http://www.gist.edu.in)

<b>DATA WARE HOUSING &amp; MINING</b>					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A0514T</b>	<b>3:0:0:0</b>	<b>3</b>	<b>CIE:30 SEE:70</b>	<b>3 Hours</b>	<b>PEC</b>
<b>Course Objectives:</b>					
This course will enable students to: <ul style="list-style-type: none"> <li>• To know the basic concepts and principles of Data Warehouse.</li> <li>• Study the Data Mining and Major Issues in Data Mining.</li> <li>• Learn pre-processing techniques and Data Transformation.</li> <li>• Study the performance of Frequent Item sets and Classification.</li> <li>• Understand and compare different types of Cluster Analysis.</li> </ul>					
<b>Course Outcomes (CO):</b>					
<b>On completion of this course, student will be able to</b> <ul style="list-style-type: none"> <li>• Understand the basic concepts of data warehouse and data mining.</li> <li>• Determine the Data Warehouse Design and Data Warehouse Schemas.</li> <li>• Use the Data Mining Technologies and Major Issues in Data Mining.</li> <li>• Apply pre-processing techniques for data cleaning.</li> <li>• Apply the Frequent Patterns and Classification Methods for item sets.</li> <li>• Determine the performance of the different Cluster algorithms.</li> </ul>					
<b>Syllabus</b>					<b>Total Hours:48</b>
<b>Module-I</b>	<b>Data Warehousing and Online Analytical Processing</b>				<b>10 Hrs</b>
Data Warehouse: Basic Concepts, Data Warehouse Modeling: Data Cube and OLAP, Data Warehouse Design and Usage, Data Warehouse Schemas for Decision Support, Data Warehouse Implementation.					
<b>Module-II</b>	<b>Introduction to Data Mining</b>				<b>10Hrs</b>
Why Data Mining, What Kinds of Data Can Be Mined, What Kinds of Patterns Can Be Mined, Which Technologies Are Used, Major Issues in Data Mining.					
<b>Module-III</b>	<b>Data Preprocessing</b>				<b>9 Hrs</b>
Data Preprocessing: An Overview, Data Cleaning, Data Integration, Data Reduction, Data Transformation and Data Discretization.					
<b>Module-IV</b>	<b>Mining Frequent Patterns, Association rule mining and Classification</b>				<b>10Hrs</b>
Basic Concepts, Frequent Itemset Mining Methods, Classification: Basic Concepts, Decision Tree Induction, Bayes Classification Methods, Rule-Based Classification, Support vector machine.					
<b>Module-V</b>	<b>Cluster Analysis</b>				<b>9 Hrs</b>
Cluster Analysis: Partitioning Methods, Hierarchical Methods, Density-Based Methods, outlier analysis and detection methods.					

**Text Books:**

1. Data Mining: concepts and techniques / Jiawei Han, Micheline Kamber, Jian Pei. – 3rd ed.
2. Introduction to Data Mining – Pang-Ning Tan, Michael Steinbach and Vipin Kumar, Pearson Education.

**Reference Books:**

1. Data Mining Techniques, Arun K Pujari, Second Edition, Universities Press.
2. Data Warehousing in the Real World, Sam Aanhory & Dennis Murray Pearson EdnAsia.
3. Insight into Data Mining, K. P. Soman, S. Diwakar, V. Ajay, PHI,2008.

**Web Reference:**

<https://www.digimat.in/nptel/courses/video/106105174/L01.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](http://www.gist.edu.in)

<b>ETHICAL HACKING</b>					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A3703T</b>	<b>3:0:0:0</b>	<b>3</b>	<b>CIE:30 SEE:70</b>	<b>3 Hours</b>	<b>PEC</b>
<b>Course Objectives:</b>					
This course will enable students :					
<ul style="list-style-type: none"> <li>• The ethical hacking covers the theory and practices of finding the vulnerabilities through forming the different attacks.</li> <li>• Defining the appropriate security policy including the action to detect or prevent the attacks and thus reduce the damages.</li> <li>• Security of digital infrastructure is an utmost need for an organization.</li> <li>• The variety of security attacks makes it compulsion to analyze the way newer attacks.</li> </ul>					
<b>Course Outcomes (CO):</b>					
<b>On completion of this course, student will be able to</b>					
<ul style="list-style-type: none"> <li>• Describe and understand the basics of the ethical hacking</li> <li>• Perform the foot printing and scanning</li> <li>• Demonstrate the techniques for system hacking</li> <li>• Characterize the malware and their attacks and detect and prevent them</li> <li>• Determine the signature of different attacks and prevent them</li> <li>• Detect and prevent the security attacks in different environments</li> </ul>					
<b>Syllabus</b>				<b>Total Hours:48</b>	
<b>Module-I</b>	<b>Introduction To Hacking</b>			<b>9 Hrs</b>	
Introduction to Hacking – Important Terminologies – Penetration Test – Vulnerability Assessments versus Penetration Test – Pre-Engagement – Rules of Engagement -Penetration Testing Methodologies – OSSTMM – NIST – OWASP – Categories of Penetration Test – Types of Penetration Tests – Vulnerability Assessment Summary –Reports.					
<b>Module-II</b>	<b>Technical Foundations of Hacking</b>			<b>10 Hrs</b>	
The Technical Foundations of Hacking: The Attacker’s Process, The Ethical Hacker’s Process, Security and the Stack. Foot printing and scanning : Information Gathering, Determining the Network Range, Identifying Active Machines, Finding Open Ports and Access Points, OS Fingerprinting Services, Mapping the Network Attack Surface.					
<b>Module-III</b>	<b>Vulnerability Data Resources</b>			<b>9 Hrs</b>	

Vulnerability Data Resources – Exploit Databases – Network Sniffing – Types of Sniffing - Promiscuous versus Non promiscuous Mode – MITM Attacks – ARP Attacks – Denial of Service Attacks -Hijacking Session with MITM Attack – SSL Strip: Stripping HTTPS Traffic -DNS Spoofing – ARP Spoofing Attack Manipulating the DNS Records – DHCP Spoofing -Remote Exploitation – Attacking Network Remote Services – Overview of Brute Force Attacks – Traditional Brute Force – Attacking SMTP – Attacking SQL Servers – Testing for Weak Authentication

<b>Module-IV</b>	<b>Malware Threats</b>	<b>10 Hrs</b>
------------------	------------------------	---------------

Viruses and Worms, Trojans, Covert Communication, Keystroke Logging and Spyware, Malware Counter measures. Sniffers, Session Hijacking and Denial of Service: Sniffers, Session Hijacking, Denial of Service and Distributed Denial of Service.

<b>Module-V</b>	<b>Wireless Hacking</b>	<b>10 Hrs</b>
-----------------	-------------------------	---------------

Introducing Air crack- Cracking the WEP – Cracking a WPA/WPA2 Wireless Network Using Aircrack-ng – Evil Twin Attack – Causing Denial of Service on the Original AP – Web Hacking – Attacking the Authentication – Brute Force and Dictionary Attacks – Types of Authentication – Log-In Protection Mechanisms – Captcha Validation Flaw – Captcha RESET Flaw – Manipulating User-Agents to Bypass Captcha and Other Protection – Authentication Bypass Attacks – Testing for the Vulnerability – Automating It with Burp Suite – Session Attacks – SQL Injection Attacks – XSS (Cross-Site Scripting) -Types of CrossSite Scripting – Cross-Site Request Forgery (CSRF) – SSRF Attacks

**Text Books:**

1. Rafay Baloch, “Ethical Hacking and Penetration Testing Guide”, CRC Press, 2014
2. Certified Ethical Hacker, Version 9, Second Edition, Michael Gregg, Pearson IT Certification.
3. Hacking the Hacker, Roger Grimes, Wiley

**Reference Books:**

1. The Unofficial Guide to Ethical Hacking, Ankit Fadia, Premier Press
2. Kevin Beaver, “Ethical Hacking for Dummies”, Sixth Edition, Wiley, 2018.
3. Jon Erickson , “Hacking: The Art of Exploitation”, Second Edition, Rog Unix, 2007.

**Web References:**

1. . [https://www.tutorialspoint.com/ethical\\_hacking/index.html](https://www.tutorialspoint.com/ethical_hacking/index.html)
2. . <https://www.javatpoint.com/ethical-hacking>
3. <https://www.youtube.com/watch?v=dz7Ntp7KQGA>



## 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](http://www.gist.edu.in)

<b>PRINCIPLES OF COMMUNICATION SYSTEMS</b> (Common to CSE, AI&ML, DS, CS)					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A0430T</b>	<b>3:0:0:0</b>	<b>3</b>	<b>CIE:30 SEE:70</b>	<b>3 Hours</b>	<b>OEC</b>
<b>Course Objectives:</b>					
This course will enable students to: <ul style="list-style-type: none"> <li>• To understand the concept of various modulation schemes and multiplexing.</li> <li>• To apply the concept of various modulation schemes to solve engineering problems.</li> <li>• To analyze various modulation schemes.</li> <li>• To evaluate various modulation scheme in real time applications.</li> </ul>					
<b>Course Outcomes (CO):</b>					
<b>On completion of this course, student will be able to</b> <ul style="list-style-type: none"> <li>• Understand the concept of various modulation schemes.</li> <li>• Understand the concept of Different multiplexing techniques.</li> <li>• Apply the concept of various modulation schemes to solve engineering problems.</li> <li>• Analyze various modulation schemes.</li> <li>• Evaluate various modulation schemes in real time applications.</li> <li>• Understand the concept of various Communication systems.</li> </ul>					
<b>Syllabus</b>					<b>Total Hours:48</b>
<b>Module-I</b>	<b>Amplitude Modulation</b>				<b>10Hrs</b>
<b>Amplitude Modulation:</b> Introduction to Noise and Fourier Transform. An overview of Electronic Communication Systems. Need for Frequency Translation Amplitude Modulation: DSB-FC, DSB-SC, SSB-SC and VSB, Radio Transmitter and Receiver. Theta notation ( $\Theta$ ), Mathematical analysis of Non- Recursive and recursive Algorithms with Examples.					
<b>Module-II</b>	<b>Frequency Modulation</b>				<b>9Hrs</b>
<b>Frequency Modulation:</b> Introduction to Angle Modulation, Tone modulated FM Signal, Arbitrary Modulated FM Signal, FM Modulation and Demodulation. Stereophonic FM Broad casting.					
<b>Module-III</b>	<b>Pulse Modulation</b>				<b>10Hrs</b>
<b>Pulse Modulation:</b> Sampling Theorem- Low pass and Band pass Signals. Pulse Amplitude Modulation and Concept of Time Division Multiplexing and Frequency Division Multiplexing. Pulse Width Modulation. Digital Representation of Analog Signals					
<b>Module-IV</b>	<b>Digital Modulation</b>				<b>9Hrs</b>
<b>Digital Modulation:</b> Binary Amplitude Shift Keying, Binary Phase Shift Keying and Quadrature Phase Shift Keying, Binary Frequency Shift Keying. Regenerative Repeater, M-ary and comparison					
<b>Module-V</b>	<b>NP-Complete and NP-Hard problems</b>				<b>10Hrs</b>
<b>Communication Systems:</b> Satellite, RADAR, Optical, Micro wave communication, Mobile and Computer Communication (Block diagram approach only).					

**Text Books:**

1. Herbert Taub, Donald L Schilling and Goutam Saha, “Principles of Communication Systems”, 3 rd Edition, Tata McGraw-Hill Publishing Company Ltd., 2008.

**Reference Books:**

1. B. P. Lathi, Zhi Ding and Hari M. Gupta, “Modern Digital and Analog Communication Systems”, 4th Edition, Oxford University Press, 2017.
2. K. Sam Shanmugam “Digital and Analog Communication Systems”, Wiley India Edition, 2008.

**Web References:**

[https://onlinecourses.nptel.ac.in/noc22\\_ee05/preview](https://onlinecourses.nptel.ac.in/noc22_ee05/preview)

<https://archive.nptel.ac.in/courses/108/104/108104091/>





## 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](http://www.gist.edu.in)

<b>POWER ELECTRONICS</b> (Common to CSE, AI&ML, DS, CS)					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0214Ta	3:0:0:0	3	CIE:30 SEE:70	3 Hours	OEC
<b>Course Objectives:</b>					
The objectives of the course are to make the students learn about:					
<ol style="list-style-type: none"> <li>1. Get an overview of semi-conductor devices (such as PN junction diode &amp; Transistor) and their switching characteristics.</li> <li>2. Understand the characteristics of AC to DC converters.</li> <li>3. Understand about the practical applications Electronics in industries</li> </ol>					
<b>Course Outcomes (CO):</b>					
<b>On completion of this course, student will be able to</b>					
<ul style="list-style-type: none"> <li>• basic concepts of diode and transistor and its operation</li> <li>• basic operating principles of power semiconductor switching devices.</li> <li>• the operation of power electronic converters, inverters, AC voltage controllers, and cyclo converter</li> <li>• How to apply the learnt principles and methods to practical applications.</li> </ul>					
<b>Syllabus</b>					<b>Total Hours:48</b>
<b>Module-I</b>	<b>POWER SEMI CONDUCTOR DEVICES -I</b>				<b>9Hrs</b>
Classification of Switching Devices Based on Frequency and Power Handling Capacity , Thyristors – Silicon Controlled Rectifiers (SCR’s) – TRIACs, GTOs - Characteristics and Principles of Operation and other Thyristors.					
<b>Module-II</b>	<b>POWER SEMI CONDUCTOR DEVICES-II</b>				<b>10Hrs</b>
BJT – Power Transistor - Power MOSFET – Power IGBT – Static Characteristics – Turn On and Turn Off Methods SCR- Dynamic Characteristics of SCR - Two Transistor Analogy – Triggering Circuits- Series and Parallel Connections of SCR’s – Specifications and Ratings of SCR’s, BJT, IGBT					
<b>Module-III</b>	<b>PHASE CONTROLLED CONVERTERS</b>				<b>9Hrs</b>
Phase Control Technique – Single Phase Line Commutated Converters – Mid Point and Bridge Connections – Half Controlled Converters, Fully Controlled Converters with Resistive, RL Loads and RLE Load– Derivation of Average Load Voltage and Current – Effect of Source Inductance – Numerical Problems.					
<b>Module-IV</b>	<b>INVERTERS</b>				<b>10Hrs</b>
Inverters – Single Phase Inverter – Basic Series Inverter – Basic Parallel Capacitor Inverter Bridge Inverter – Waveforms – Simple Forced Commutation Circuits for Bridge Inverters – Single Phase Half and Full Bridge Inverters-Pulse Width Modulation Control-Harmonic Reduction Techniques- Voltage Control Techniques for Inverters – Numerical Problems,					
<b>Module-V</b>	<b>AC VOLTAGE CONTROLLERS &amp; CYCLO</b>				<b>10Hrs</b>
<b>CONVERTERS</b>					

AC Voltage Controllers – Single Phase Two SCR's in Anti Parallel – With R and RL Loads – Modes of Operation of TRIAC – TRIAC with R– Derivation of RMS Load Voltage, Current and Power Factor Wave Forms – Firing Circuits -Numerical Problems

Cyclo Converters – Single Phase Mid Point Cycloconverters with Resistive and Inductive Load (Principle of Operation only) – Bridge Configuration of Single Phase Cycloconverter (Principle of Operation only) – Waveforms

**Text Books:**

- Power Electronics, M. D. Singh and K. B. Khanchandani, Mc Graw Hill Education (India) Pvt. Ltd., 2nd Edition, 2007, 23rd Reprint 2015.
- Power Electronics: Circuits, Devices and Applications, Muhammad H. Rashid, Pearson, 3rd Edition, 2014, 2nd Impression 2015

**Reference Books:**

- Power Electronics, K. R. Varmah, Chikku Abraham, CENGAGE Learning, 1st Edition, 2016.
- Power Electronics, P. S. Bimbhra, Khanna Publishers, 2012.
- Power Electronics: Devices, Circuits, and Industrial Applications, V. R. Moorthi, OXFORD University Press, 1st Edition, 2005, 12th Impression 2012

**Web References:**

<https://nptel.ac.in/courses/108105066>

<https://archive.nptel.ac.in/courses/108/102/108102145/>



## 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](http://www.gist.edu.in)

<b>BUILDING MATERIALS</b>					
(Common to CSE, AI&ML, DS, CS)					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A0149T</b>	<b>3:0:0:0</b>	<b>3</b>	<b>CIE:30 SEE:70</b>	<b>3 Hours</b>	<b>OEC</b>
<b>Course Objectives:</b>					
To identify the traditional materials that is used for building constructions.					
<ul style="list-style-type: none"> <li>• To explain basic concepts of building components such as stair case and masonry</li> <li>• To know the causes of dampness in structures and its preventive measures</li> <li>• To understand the building rules, building bye laws and acoustics of building</li> </ul>					
<b>Course Outcomes (CO):</b>					
<b>On completion of this course, student will be able to</b>					
<ul style="list-style-type: none"> <li>• To understand the characteristics of different building materials</li> <li>• Differentiate brick masonry, stone masonry construction and bonds used in construction of walls of buildings</li> <li>• To know about the causes of dampness in buildings and its ill effects</li> <li>• To understand the principles of planning in buildings</li> <li>• Describe capable of understanding building rules and knowledge about, bye-laws and building elements.</li> </ul>					
<b>Syllabus</b>					<b>Total Hours:48</b>
<b>Module-I</b>	<b>MATERIALS</b>				<b>9Hrs</b>
Traditional materials: Stones- Types of stone masonry -Brick-types of brick masonry- lime Cement – Timber – Seasoning of timber - their uses in building works					
<b>Module-II</b>	<b>BUILDING COMPONENTS</b>				<b>9Hrs</b>
Lintels, Arches and Vaults – Staircases, Lifts – Types. Different types of flooring-Concrete, Mosaic, Terrazzo floors; Different types of roofs- Pitched, Flat and Curved Roofs. Lean-to-Roof, Coupled Roofs, Trussed roofs - King and Queen Post Trusses. Doors & Windows- Types and Specifications					
<b>Module-III</b>	<b>DAMPNESS</b>				<b>10Hrs</b>
Dampness and its prevention: Causes of dampness- ill effects of dampness-requirements of an ideal material for damp proofing-materials for damp proofing –methods of damp proofing.					
<b>Module-IV</b>	<b>BUILDING PLANNING</b>				<b>10Hrs</b>
Elements of building planning- basic requirements-orientation-planning for energy efficiency- planning based on utility-other requirements					
<b>Module-V</b>	<b>BUILDING RULES AND BYE-LAWS</b>				<b>10Hrs</b>
Zoning regulations; Regulations regarding layouts or subdivisions; Building regulations; Rules for special type of buildings; Calculation of plinth, floor and carpet area; Floor space index. Building Information System.					

**Text Books:**

- Building Drawing by M.G. Shah, C.M. Kale and S.Y. Patki, Tata McGraw-Hill, New
- B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, 'Building Construction' - Laxmi Publications (P) Ltd., New Delhi

**Reference Books:**

- Building Materials, S. K. Duggal, New Age International Publications.
- N. Kumaraswamy, A. Kameswara Rao, building planning and drawing, 7th Ed, Charotar

**Web References:**

1. <http://nptel.ac.in/courses/105104103/>
2. <http://www.academicpub.org/jwrhe/>
3. [http://www.peo.on.ca/index.php/ci\\_id/21843/la\\_id/1](http://www.peo.on.ca/index.php/ci_id/21843/la_id/1)



## 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](http://www.gist.edu.in)

<b>AUTOMOBILE ENGINEERING</b> (Common to CSE,AI&ML,DS,CS)					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0321Ta	3:0:0:0	3	CIE:30 SEE:70	3 Hours	OEC
<b>Course Objectives:</b>					
This course will enable students: <ul style="list-style-type: none"> <li>• Impart the knowledge of vehicle structure and its components.</li> <li>• Demonstrate various components of petrol engines and diesel engines.</li> <li>• Trains about the various electrical system, circuits, and testing of automobiles.</li> <li>• Explain the concepts of steering, suspension and braking system in automobile.</li> </ul>					
<b>Course Outcomes (CO):</b>					
<b>On completion of this course, student will be able to</b> <ul style="list-style-type: none"> <li>• Identify different parts of automobile</li> <li>• Explain the working of various parts like engine and brakes</li> <li>• Describe the working of steering and the suspension systems.</li> <li>• Summarize the wheels and tires</li> <li>• Outline the future developments in the automobile industry</li> </ul>					
<b>Syllabus</b>					<b>Total Hours:48</b>
<b>Module-I</b>	<b>Introduction to vehicle structure and engine components</b>				<b>9Hrs</b>
Vehicle construction - Chassis and body - Specifications - Engine - Types - Construction - Location of engine - Cylinder arrangement - Construction details - Cylinder block - Cylinder head - Cylinder liners - Piston – piston rings - Piston pin - Connecting rod - Crankshaft - Valves. Lubrication system - Types - Oil pumps - Filters. Crankcase ventilation					
<b>Module-II</b>	<b>Ignition and fuel supply systems</b>				<b>10Hrs</b>
Ignition system - Coil and Magneto - Spark plug - Distributor – Electronic ignition system - Fuel system - Carburetor - Fuel pumps - Fuel injection systems - Mono point and Multi point – Unit Injector – Nozzle types - Electronic Fuel Injection system (EFI) – GDI, MPFI, DTSI.					
<b>Module-III</b>	<b>Steering and suspension system</b>				<b>9Hrs</b>
Principle of steering - Steering Geometry and wheel alignment - Steering linkages – Steering gearboxes - Power steering - front axle - Suspension system - Independent and Solid axle – coil, leaf spring and air suspensions - torsion bar - shock absorbers.					
<b>Module-IV</b>	<b>Wheels, Tyres and Braking System</b>				<b>10Hrs</b>
Wheels and Tyres - Construction - Type and specification - Tyre wear and causes - Brakes - Needs – Classification –Drum and Disc Mechanical - Hydraulic and pneumatic - Vacuum assist – Retarders – Anti-lock Braking System (ABS).					
<b>Module-V</b>	<b>Automobile electrical systems and advances in automobile engineering</b>				<b>10Hrs</b>
Battery-General electrical circuits- Active Suspension System (ASS) - Electronic Brake Distribution (EBD) – Electronic Stability Program (ESP), Traction Control System (TCS) - Global Positioning System (GPS), Hybrid vehicle, Fuel Cell.					

**Text Books:**

1. Kirpal Singh, Automobile Engineering, Vol.1&2, Standard Publications, 13/e, 2020.
2. William.H.Crouse, Automotive Mechanics, 10/e , McGraw-Hill, 2006.

**Reference Books:**

1. Bosch, Automotive Hand Book, 6/e, SAE Publications, 2007.
2. K. Newton and W. Steeds, The motor vehicle, 13/e, Butterworth-Heinemann Publishing Ltd, 1989.
1. Joseph Heitner, Automotive Mechanics Principles and Practices, 2/e, CBS publishing 2004 .
3. David A. Corolla, Automotive Engineering: Powertrain, Chassis System and Vehicle Body, Butterworth-Heinemann Publishing Ltd, 2009.
4. Richard Stone, Jeffrey K. Ball, Automotive Engineering Fundamentals" SAE International, 2004

**Web References:**

<https://archive.nptel.ac.in/courses/107/106/107106088/>

<https://nptel.ac.in/courses/107106088>



## 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](http://www.gist.edu.in)

<b>CYBERSECURITY LAB (Cyber Security)</b>					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A3704P</b>	<b>0:0:3:0</b>	<b>1.5</b>	<b>CIE:30 SEE:70</b>	<b>3Hours</b>	<b>PCC</b>
<b>Course Objectives:</b>					
This course will enable students to: <ul style="list-style-type: none"> <li>• Student to get the knowledge about audit and information security management, which makes the student to get the real-world experience.</li> <li>• To learn and implement Data leakage in a website database.</li> </ul>					
<b>Course Outcomes (COs):</b>					
After completion of this course, students will be able to: <ul style="list-style-type: none"> <li>• Analyze and implement Audit security policy in windows environment, create a Demilitarized zone creation in Network environment</li> <li>• Illustrate the Resource harvesting attack and mitigation, Window Patch management policy, Trojans and mitigation strategies</li> <li>• Apply the knowledge of Metasploit, Access control list creation and content filtering limiting the traffic</li> <li>• Build an Audit Policy management, Media handling policy and event log analysis and Installation of Trojan, Network DOS attack and proof of bandwidth utilization</li> </ul>					
<b>Syllabus</b>				<b>Total Hours: 48</b>	
<b>List of Experiments:</b> <b>Experiment 1:</b> Audit security policy implementation in windows environment. <b>Experiment 2:</b> Create a Demilitarized zone creation in Network environment for information security. <b>Experiment 3:</b> Implement Resource harvesting attack and mitigation. <b>Experiment 4:</b> Implement Window Patch management policy. <b>Experiment 5:</b> Knowing the Behavior of Trojans and mitigation strategies. <b>Experiment 6:</b> Create a Metasploit and make it to implement. <b>Experiment 7:</b> Access control list creation and content filtering limiting the traffic. <b>Experiment 8:</b> Data leakage in a website database and preventive measures. <b>Experiment 9:</b> Password policy implementations and verification. <b>Experiment 10:</b> Patch management implementation using MBSA tool on windows machine.					

**Text Books:**

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

**Reference Books:**

Information Security, Mark Rhodes, Ousley, MGH





## 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](http://www.gist.edu.in)

<b>MACHINE LEARNING LAB</b> (Common to CSE, AI&ML, DS, CS)					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A0532P</b>	<b>0:0:3:0</b>	<b>1.5</b>	<b>CIE:30 SEE:70</b>	<b>3 Hours</b>	<b>PCC</b>
<b>Course Objectives:</b>					
This course will enable students to: <ul style="list-style-type: none"> <li>• Make use of Data sets in implementing the machine learning algorithms</li> <li>• Implement the machine learning concepts and algorithms in any suitable language of choice.</li> </ul>					
<b>Course Outcomes (CO):</b>					
<b>On completion of this course, student will be able to</b> <ul style="list-style-type: none"> <li>• Understand the Mathematical and statistical prospective of machine learning algorithms through python programming</li> <li>• Appreciate the importance of visualization in the data analytics solution</li> <li>• Derive insights using Machine learning algorithms</li> </ul>					
<b>Syllabus</b>				<b>Total Hours:48</b>	
<b>List of Experiments</b>					
<p><b>Experiment 1:</b> 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.</p> <p><b>Experiment 2:</b> 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.</p> <p><b>Experiment 3:</b> 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.</p> <p><b>Experiment 4:</b> Build an Artificial Neural Network by implementing the Back-propagation algorithm and test the same using appropriate data sets.</p> <p><b>Experiment 5:</b> 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.</p> <p><b>Experiment 6:</b> 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.</p> <p><b>Experiment 7:</b> 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.</p> <p><b>Experiment 8:</b> 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.</p> <p><b>Experiment 9:</b> Write a program to implement k-Nearest Neighbor algorithm to classify the iris data set. Print both correct and wrong predictions. Java/Python ML library classes can be used for this problem.</p> <p><b>Experiment 10:</b> 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.</p>					

**Reference Book:**

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

**Web Reference:**

**<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](http://www.gist.edu.in)

<b>SOFT SKILL (SKILL)</b> (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
<b>Course Objectives:</b>					
<p>This course will enable students to:</p> <ul style="list-style-type: none"> <li>• To encourage all round development of the students by focusing on soft skills.</li> <li>• To make the students aware of critical thinking and problem-solving skills.</li> <li>• To develop leadership skills and organizational skills through group activities.</li> <li>• To function effectively with heterogeneous teams.</li> </ul>					
<b>Course Outcomes (CO):</b>					
<b>On completion of this course, student will be able to</b>					
<ul style="list-style-type: none"> <li>• Memorize various elements of effective communicative skills.</li> <li>• Interpret people at the emotional level through emotional intelligence.</li> <li>• Apply critical thinking skills in problem solving.</li> <li>• Analyze the needs of an organization for team building.</li> <li>• Judge the situation and take necessary decisions as a leader.</li> <li>• Develop social and work-life skills as well as personal and emotional well-being.</li> </ul>					
<b>Syllabus</b>					<b>Total Hours:48</b>
<b>Module-I</b>	<b>Soft Skills &amp; Communication Skills</b>				<b>10Hrs</b>
<p>Introduction, meaning, significance of soft skills –Vital Components of communication skills - Inter-personal skills - Verbal and Non-verbal Communication.</p> <p><b>Activities:</b> 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..</p>					
<b>Module-II</b>	<b>Critical Thinking</b>				<b>9Hrs</b>
<p>Active Listening – Observation – Curiosity – Introspection – Analytical Thinking – Open-minded ones – Creative Thinking.</p> <p><b>Activities:</b> 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.</p>					
<b>Module-III</b>	<b>Problem Solving &amp; Decision Making</b>				<b>10Hrs</b>
<p>Meaning &amp; features of Problem Solving – Managing Conflict – Conflict resolution – Methods o decision making – Effective decision making in teams – Methods &amp; Styles.</p> <p><b>Activities:</b> 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 &amp; Group Discussion.</p>					

<b>Module-IV</b>	<b>Emotional Intelligence &amp; Stress Management</b>	<b>9Hrs</b>
<p>Managing Emotions – Thinking before Reacting – Empathy for Others – Self-awareness – Self-Regulation – Stress factors – Controlling Stress – Tips.</p> <p><b>Activities:</b> 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.</p>		
<b>Module-V</b>	<b>Leadership Skills</b>	<b>10Hrs</b>
<p>Team-Building – Decision-Making – Accountability – Planning – Public Speaking – Motivation – Risk Taking - Team Building - Time Management.</p> <p><b>Activities:</b> 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.</p>		
<p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>1. Personality Development and Soft Skills (English, Paperback, MitraBarunK.)Publisher: Oxford University Press; Pap/Cdr edition (July 22, 2012)</li> <li>2. Personality Development and Soft Skills: Preparing for Tomorrow, Dr Shikha Kapoor Publisher : I K International Publishing House; 0 edition (February 28, 2018)</li> </ol>		
<p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. Soft skills: personality development for life success by Prashant Sharma, BPB publications 2018.</li> <li>2. Soft Skills By Alex K. Published by S.Chand</li> <li>3. Soft Skills: An Integrated Approach to Maximize Personality Gajendra Singh Chauhan, Sangeetha Sharma Published by Wiley.</li> <li>4. Communication Skills and Soft Skills (Hardcover, A. Sharma) Publisher: Yking books</li> <li>5. SOFT SKILLS for a BIG IMPACT (English, Paperback, RenuShorey) Publisher: Notion Press .</li> <li>6. Life Skills Paperback English Dr. Rajiv Kumar Jain, Dr. Usha Jain Publisher: Vayu Education of India</li> </ol>		
<p><b>Web References:</b></p> <ol style="list-style-type: none"> <li>1. <a href="https://youtu.be/DUIsNJtg2L8?list=PLLy_2iUCG87CQhELCytvXh0E_y-bOO1_g">https://youtu.be/DUIsNJtg2L8?list=PLLy_2iUCG87CQhELCytvXh0E_y-bOO1_g</a></li> <li>2. <a href="https://youtu.be/xBaLgJZ0t6A?list=PLzf4HHlsQFwJZel_j2PUy0pwjVUgj7KIJ">https://youtu.be/xBaLgJZ0t6A?list=PLzf4HHlsQFwJZel_j2PUy0pwjVUgj7KIJ</a></li> <li>3. <a href="https://youtu.be/-Y-R9hDI7IU">https://youtu.be/-Y-R9hDI7IU</a></li> <li>4. <a href="https://youtu.be/gkLsn4ddmTs">https://youtu.be/gkLsn4ddmTs</a></li> <li>5. <a href="https://youtu.be/2bf9K2rRWwo">https://youtu.be/2bf9K2rRWwo</a></li> <li>6. <a href="https://youtu.be/FchfE3c2jzc">https://youtu.be/FchfE3c2jzc</a></li> </ol>		



## 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](http://www.gist.edu.in)

<b>Design Thinking and Innovation</b> (Common to CSE, AI&ML, DS, CS)					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A0526</b>	<b>2: 0:0:0</b>	<b>0</b>	<b>CIE:30</b>	<b>-</b>	<b>MC</b>
<b>Course Objectives:</b>					
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.					
<b>Course Outcomes (CO):</b>					
<b>On completion of this course, student will be able to:</b>					
<ul style="list-style-type: none"> <li>• Define the concepts related to design thinking.</li> <li>• Explain the fundamentals of Design Thinking and innovation</li> <li>• Apply the design thinking techniques for solving problems in various sectors.</li> <li>• Analyze to work in a multidisciplinary environment</li> <li>• Evaluate the value of creativity</li> <li>• Formulate specific problem statements of real time issues</li> </ul>					
<b>Syllabus</b>					<b>Total Hours:48</b>
<b>MODULE-I</b>	<b>Introduction to Design Thinking</b>				<b>9Hrs</b>
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.					
<b>MODULE -II</b>	<b>Design Thinking Process</b>				<b>9Hrs</b>
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.					
<b>MODULE -III</b>	<b>Innovation</b>				<b>10Hrs</b>
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.					
<b>MODULE -IV</b>	<b>Product Design</b>				<b>10Hrs</b>
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.					
<b>MODULE -V</b>	<b>Design Thinking in Business Processes</b>				<b>10Hrs</b>
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- Williamlidwell, kritinaholden, Jill butter.
4. The era of open innovation – chesbrough.H

**Web References:**

<https://nptel.ac.in/courses/110/106/110106124/>

<https://nptel.ac.in/courses/109/104/109104109/>

[https://swayam.gov.in/nd1\\_noc19\\_mg60/preview](https://swayam.gov.in/nd1_noc19_mg60/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](http://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	<b>22A3705T</b>	Digital forensics	3	0	0	3
2	PCC	<b>22A3706T</b>	Penetration Testing and Cyber Operations	3	0	0	3
3	PCC	22A0529T	Cloud Computing	3	0	0	3
4	PEC	<b>22A3707a</b> <b>22A3707b</b> <b>22A3707c</b>	<b>Professional Elective-II:</b> 1. Software Testing 2. Applied data science 3. Malware Analysis	3	0	0	3
5	OEC	22A0431T 22A0213Ta 22A0150T 22A0327Tb	<b>Open Elective-II:</b> 1. Micro Controllers and Applications 2. Control Systems 3. Environmental Economics 4. Introduction to Composite Materials	3	0	0	3
6	PCC(Lab)	<b>22A3708P</b>	Digital forensics lab	0	0	3	1.5
7	PCC(Lab)	<b>22A3709P</b>	Penetration Testing and Cyber Operations Lab	0	0	3	1.5
8	PCC(Lab)	22A0533P	Cloud Computing Lab	0	0	3	1.5
9	SC	22A0511	<b>Skill Oriented Course:</b> Web design and Web Application Testing	1	0	2	2
10	MC	22A0032T	<b>Mandatory Course:</b> Research Methodology	2	0	0	0
				<b>Total credits</b>			<b>21.5</b>

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	-
<b>Total</b>	<b>21.5</b>



## 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](http://www.gist.edu.in)

<b>DIGITAL FORENSICS</b>					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A3705T</b>	<b>3:0:0:0</b>	<b>3</b>	<b>CIE:30 SEE:70</b>	<b>3 Hours</b>	<b>PCC</b>
<b>Course Objectives:</b>					
This course will enable students: <ul style="list-style-type: none"> <li>• To understand the basic digital forensics and techniques for conducting the forensic examination on different digital devices.</li> <li>• To understand how to examine digital evidences such as the data acquisition, identification analysis.</li> </ul>					
<b>Course Outcomes (CO):</b>					
<b>On completion of this course, student will be able to:</b> <ul style="list-style-type: none"> <li>• Know how to apply forensic analysis tools to recover important evidence for identifying computer crime.</li> <li>• To be well-trained as next-generation computer crime investigators.</li> <li>• Apply digital evidences such as data acquisition for identification purpose.</li> <li>• To understand the processing crimes and incident scenes through digital evidence</li> <li>• Identify current computer forensic tools for understanding various digital usages.</li> <li>• Organize and prevent the security attacks in different environments</li> </ul>					
<b>Syllabus</b>					<b>Total Hours:43</b>
<b>MODULE -I</b>	<b>INTRODUCTION TO HACKING</b>				<b>10Hrs</b>
<ul style="list-style-type: none"> <li>• .Computer forensics fundamentals, Benefits of forensics, computer crimes, computer forensics evidence and courts, legal concerns and private issues.</li> </ul>					
<b>MODULE -II</b>	<b>IMPROVING SOFTWARE ECONOMICS</b>				<b>10Hrs</b>
educing Software product size, improving software processes, improving team effectiveness, Improving automation, Achieving required quality, peer inspections. The old way and the new: The principles of conventional software engineering, principles of modern software management					
<b>MODULE -III</b>	<b>COMPUTING INVESTIGATIONS</b>				<b>10Hrs</b>
Understanding Computing Investigations – Procedure for corporate High-Tech investigations, understanding data recovery work station and software, conducting and investigations					
<b>MODULE -IV</b>	<b>COMPUTING INVESTIGATIONS</b>				<b>9Hrs</b>
Data acquisition- understanding storage formats and digital evidence, determining the best acquisition method, acquisition tools, validating data acquisitions, performing RAID data acquisitions, remote network acquisition tools, other forensics acquisitions tools.					



MODULE -V	DATA ACQUISITION	9Hrs
<p>Current computer forensics tools- software, hardware tools, validating and testing forensic software, addressing data-hiding techniques, performing remote acquisitions, E-Mail investigations, investigating email crime and violations, understanding E-Mail servers, specialized E-Mail forensics tool.</p>		
<p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>1. Mario Dobler, Tim Grobmann, “Data Visualization with Python”, O’Reilly, First Edition, 2019.</li> <li>2. Samuel Burns, “Python Data Visualization: An Easy Introduction to Data Visualization in Python with Matplotlib, Pandas, and Seaborn”, Kindle Edition, 2019.</li> </ol>		
<p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. Kristen Sosulski, “Data Visualization Made Simple”, Taylor &amp; Francis, 2019.</li> <li>2. Robert Collins, “Data Visualization: Introduction to Data Visualization with Python, R and Tableau”, Kindle Edition, 2018.</li> <li>3. Robert Grant, “Data Visualization-Charts, Maps, and Interactive Graphs”, CRC Press, 2019.</li> </ol>		
<p><b>Web References:</b></p> <p><a href="https://www.simplilearn.com/free-data-visualization-course-online-skillup">https://www.simplilearn.com/free-data-visualization-course-online-skillup</a></p>		



# GEETHANJALI INSTITUTE OF SCIENCE & TECHNOLOGY

*RG 22 Regulations*

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](http://www.gist.edu.in)

<b>PENETRATION TESTING AND CYBER OPERATIONS</b>					
<b>(Cyber Security)</b>					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A3706T</b>	<b>3:0:0:0</b>	<b>3</b>	<b>CIE:30 SEE:70</b>	<b>3 Hours</b>	
<b>Course Objectives:</b>					
This course will enable students :					
<ul style="list-style-type: none"> <li>• This course mainly focuses on port scanning and web application scanning.</li> <li>• It also give information about different attacks like password attacks and detection of vulnerabilities.</li> <li>• This Covers wireless security and penetration tools like Trace routes and Neo trace.</li> <li>• Information about Database access and security at different levels is also defined</li> </ul>					
<b>Course Outcomes (CO):</b>					
<b>On completion of this course, student will be able to:</b>					
<ul style="list-style-type: none"> <li>• Understand the concepts of Vulnerabilities ,Attacks, Wireless privacy and Application protocols,</li> <li>• Describe different port and Web scanning techniques</li> <li>• Analyze Wired vs wireless Privacy Protocols and Encryption Cracking Tools.</li> <li>• Illustrate the attacking networks that deploy various security protocols in Wireless Security.</li> <li>• Choose different techniques protocols that can be used to perform the vulnerability Attacks</li> <li>• List the different types of factors, control measures, mechanisms that defined the database security</li> </ul>					
<b>Syllabus</b>					<b>Total Hours:4</b>
<b>MODULE -I</b>	<b>INFORMATION GATHERING AND DETECTING VULNERABILITIES</b>				<b>8Hours</b>
<ul style="list-style-type: none"> <li>• Open source intelligence gathering – port scanning – Nessus policies – web application scanning manual analysis-traffic capturing.</li> </ul>					
<b>MODULE -II</b>	<b>ATTACKS AND EXPLOITS</b>				<b>8Hours</b>
<ul style="list-style-type: none"> <li>• Password Attacks Client side Exploitation Social Engineering – Bypassing Antivirus Applications. Metasploit Payloads Open php My Admin- Buffer overflow: Windows and Linux, Web scanning exploits, port scanning exploits, SQL exploits.</li> </ul>					
<b>MODULE -III</b>	<b>WIRELESS SECURITY</b>				<b>9Hours</b>
<ul style="list-style-type: none"> <li>• Wired vs wireless Privacy Protocols – Wireless Frame Generation Encryption Cracking Tools-Wireless DoS Attacks</li> </ul>					
<b>MODULE -IV</b>	<b>COMMON VULNERABILITY ANALYSIS OF APPLICATION PROTOCOLS</b>				<b>9Hours</b>

- Simple Mail Transfer Protocol – File Transfer Protocol – Trivial File Transfer Protocol-  
HyperText Transmission Protocol-ICMPSMURF-UDP-DNS-PING-SYN.

MODULE -V	PENETRATION TOOLSANDDATABASESECURITY	9Hrs
<ul style="list-style-type: none"> <li>Trace routes, Neotrace, What web. Database Security: Access control in database systems– Inference control -Multilevel database security</li> </ul>		
<p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>Georgia Weidman, “Penetration Testing: A Hands on Introduction to Hacking”, No Starch Press, 1<sup>st</sup> Edition, 2014.</li> <li>B. Singh, H. Joseph and Abhishek Singh, “Vulnerability Analysis and Defense for the Internet”, Springer, 2008.</li> </ol>		
<p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>Rafay Baloch, “Ethical Hacking and Penetration Testing Guide”, CRC Press, 2015,</li> <li>Dr. Patrick Egebreton, “The Basics of Hacking and Penetration Testing”, Syngress Publications Elsevier, 2013.</li> <li>Prakhar Prasad, “Mastering Modern Web Penetration Testing”, Packt Publishing, 2016.</li> </ol>		
<p><b>Web Reference:</b>  <a href="https://www.youtube.com/watch?v=3Kq1MifTWCE">https://www.youtube.com/watch?v=3Kq1MifTWCE</a></p>		



## 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](http://www.gist.edu.in)

<b>CLOUD COMPUTING</b>					
(Common to CSE, AI&ML, DS, CS)					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A0529T</b>	<b>3:0:0:0</b>	<b>3</b>	<b>CIE:30 SEE:70</b>	<b>3 Hours</b>	<b>PCC</b>
<b>Course Objectives:</b>					
This course will enable students to: <ul style="list-style-type: none"> <li>• To introduce the broad perceptive of cloud architecture and model</li> <li>• To understand the concept of Virtualization and familiar with the lead players in cloud.</li> <li>• To understand the features of cloud simulator and apply different cloud programming model</li> <li>• To design of cloud Services and explore the trusted cloud Computing system</li> </ul>					
<b>Course Outcomes (CO):</b>					
<b>On completion of this course, student will be able to</b>					
<ul style="list-style-type: none"> <li>• To Understand the basic concepts about cloud computing vision and its developments and gain the <b>Knowledge</b> of virtualization technology.</li> <li>• Analyze the concepts of cloud services and the deployment models.</li> <li>• Choose among various cloud technologies for implementing applications (GAE, Open stack,etc)</li> <li>• Construct the virtual machines by using VMware simulator.</li> <li>• Build scientific applications by using Cloud environment.</li> <li>• Develop Business and Consumer Applications.</li> </ul>					
<b>Syllabus</b>					<b>Total Hours:48</b>
<b>Module-I</b>	<b>Basics of Cloud Computing</b>				<b>10Hrs</b>
<p><b>Introduction to Cloud:</b> Introduction to Cloud, Cloud Computing Reference Model, Characteristics and Benefits, Challenges Ahead, Elasticity in Cloud, On-demand Provisioning.</p> <p><b>Virtualization:</b> Introduction, Characteristics of Virtualized Environment, Taxonomy of Virtualization Techniques, Virtualization, and Cloud computing.</p>					
<b>Module-II</b>	<b>Cloud Architecture, Models and Security</b>				<b>9Hrs</b>
<p><b>Cloud Computing Architecture:</b> Introduction, Cloud Reference Model, Architecture, Infrastructure / Hardware as a Service, Platform as a Service, Software as a Service, Types of Clouds.</p> <p><b>Cloud Deployment Model:</b> Public Clouds, Private Clouds, Hybrid Clouds, Community Clouds, Economics of the Cloud.</p>					
<b>Module-III</b>	<b>Cloud Technologies and Advancements</b>				<b>10Hrs</b>
Apache Hadoop, Map Reduce, Hadoop Cluster setup, Virtual Box, Google App Engine, Programming Environment for Google App Engine – Open Stack					
<b>Module-IV</b>	<b>VMware Simulator</b>				<b>9Hrs</b>
<p><b>VMWare:</b> 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.</p>					

Module-V	Cloud Applications	10Hrs
<p><b>Cloud Applications:</b> Scientific Applications – Health Care, Geoscience.</p> <p><b>Business And Consumer Applications</b> - CRM and ERP, Social Networking, Media Applications, and Multiplayer Online Gaming.</p>		
<p><b>Text Books:</b></p> <p>Mastering Cloud Computing by RajkumarBuyya, Christian Vecchiola, S.Thamarai Selvi fromTMH 2013.</p> <p>George Reese, “Cloud Application Architectures: Building Applications and Infrastructure in theCloud” O'Reilly</p>		
<p><b>Reference Books:</b></p> <ul style="list-style-type: none"> <li>• Cloud computing for dummies- Judith Hurwitz , Robin Bloor , Marcia Kaufman ,Fern Halper, Wiley Publishing, Inc, 2010</li> <li>• Cloud Computing (Principles and Paradigms), Edited by Rajkumar Buyya, James Broberg, Andrzej Goscinski, John Wiley &amp; Sons, Inc. 2011</li> <li>• Enterprise Cloud Computing, Gautam Shroff, Cambridge University Press, 2010.</li> <li>• Cloud Application Architectures: Building Applications and Infrastructure in the Cloud, George Reese, O ‘Reilly, SPD, rp2011.</li> <li>• Essentials of Cloud Computing by K. Chandrasekaran. CRC Press. Cloud computing A Hands-On Approach by ArshdeepBahga and Vijay Madiseti.</li> <li>• Cloud computing a practical approach - Anthony T.Velte , Toby J. Velte Robert Elsenpeter, TATA McGraw- Hill , New Delhi – 2010.</li> </ul>		
<p><b>Web References:</b></p> <p><a href="https://nptel.ac.in/courses">https://nptel.ac.in/courses</a></p> <p><a href="https://freevideolectures.com/university/iitm">https://freevideolectures.com/university/iitm</a></p>		



## 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](http://www.gist.edu.in)

<b>SOFTWARE TESTING</b> (Common to CSE, AI&ML, DS, CS)					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A3707a</b>	<b>3:0:0:0</b>	<b>3</b>	<b>CIE:30 SEE:70</b>	<b>3 Hours</b>	<b>PEC</b>
<b>Course Objectives:</b>					
<p><b>This course will enable students to:</b></p> <ul style="list-style-type: none"> <li>• To learn the criteria for test cases.</li> <li>• To learn the design of test cases.</li> <li>• To understand test management and test automation techniques.</li> <li>• To apply test metrics and measurements.</li> </ul>					
<b>Course Outcomes (CO):</b>					
<p><b>On completion of this course, student will be able to</b></p> <ul style="list-style-type: none"> <li>• To interpret test cases suitable for a software development for different paths, domains and state graphs. (Understand)</li> <li>• Discover suitable tests to be carried out.(apply)</li> <li>• Categorize Transaction flow testing and data flow testing .(analyze)</li> <li>• Illustrate Domain testing and Logic based testing . (analyze)</li> <li>• Solve path products and regular expressions. .(apply)</li> <li>• Connect state, state graphs and transition testing. (analyze)</li> </ul>					
<b>Syllabus</b>					<b>Total Hours:48</b>
<b>Module-I</b>	<b>INTRODUCTION TO TESTING</b>				<b>10Hrs</b>
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.					
<b>Module-II</b>	<b>TRANSACTION FLOW TESTING</b>				<b>9Hrs</b>
<b>Transaction flow testing:</b> Transaction flows, transaction flow testing techniques, dataflow testing, basics of data flow testing, strategies in data flow testing, application of data flow testing.					
<b>Module-III</b>	<b>PATH PRODUCTS</b>				<b>10Hrs</b>
<b>Domain testing:</b> Domains and paths, nice and ugly domains, domain testing, domains and interfaces testing, domain and interface testing, domains and testability.					
<b>Logic based testing:</b> Overview, decision tables, path expressions, kv charts and specifications.					
<b>Module-IV</b>	<b>ARCHITECTURE REQUIREMENTS AND DESIGNING</b>				<b>9Hrs</b>
Paths, path products and regular expressions: Path products and path expression, reduction procedure, applications, regular expressions and flow anomaly detection					

<b>Module-V</b>	<b>TRANSITION TESTING</b>	<b>10Hrs</b>
State, state graphs and transition testing: State graphs, good and bad state graphs, state testing, testability tips		
<p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>1. BorisBeizer,—Software Testing Techniquesl,DreamtechPress,2<sup>nd</sup> Edition,2003</li> <li>2. Srinivasan Desikan and Gopaldaswamy Ramesh, —Software Testing – Principles and Practicesl, Pearson Education, 2006.</li> </ol>		
<p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. Ron Patton, —Software Testingl, Second Edition, Sams Publishing, Pearson Education, 2007.AU Library.com</li> <li>2. P.C.Jorgenson,—Software Testing: A Craft men,, Approach, Auerbach Publications, 3<sup>rd</sup> Edition, 2013</li> <li>3. Perry,—Effective Methods of Software Testing, JohnWiley,2<sup>nd</sup> Edition, 1999</li> <li>4. P.NageswaraRao,—Software Testing Concepts and Tools, Dream Tech Press, 2<sup>nd</sup> Edition, 2007.</li> </ol>		
<p><b>Web References:</b></p> <ol style="list-style-type: none"> <li>1. <a href="https://nptel.ac.in/courses/106105031/">https://nptel.ac.in/courses/106105031/</a></li> <li>2. <a href="https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-858-computer-systems-security-fall-2014/index.html">https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-858-computer-systems-security-fall-2014/index.html</a></li> </ol>		





## 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](http://www.gist.edu.in)

### (22A3707b) Applied Data Science

#### Course Objective:

- To Introduce Students to the basic concepts of Data Science.
- To acquire an in depth understanding of the Data Exploration and Data visualization.
- To be familiar with various anomaly decision techniques.
- To understand the Data science techniques for different applications

#### Learning Outcomes:

The students on the completion of this course would be able to

- To gain fundamental knowledge of data science Process.
- To apply data exploration and data visualization techniques.
- To apply anomaly decision techniques.
- To apply data science techniques in real world applications.

#### **UNIT -1 Introduction to Data Science**

**Lecture 8Hrs**

Introduction to Data Science, Data science process, volume, dimensions, complexity, Data Science Tasks.

Over view of Data processing, modeling, difference between Data science and Data analytics.

#### **UNIT -2 Data Exploration**

**Lecture 10Hrs**

Types of Data Science and Process of data Science.

Descriptive statistics: Measures of tendency, Measures of spread, symmetry, skewness: Karl Pearson co-efficient of skewness, bowley's, come efficient, kurtosis coefficient, kurtosis multivariate exploration: central data point, correlation, different form of correlation, Karl Pearson correlation coefficient for bivariate distribution.

#### **UNIT-3 Methodology and visualization**

**Lecture 8Hrs**

Methodology: overview of model building, cross validation, k-fold cross validation, leave -1out, Boot strapping.

Visualization: Histogram, quartile, scatter plot, double chart.

#### **UNIT-4 Anomaly Detection**

**Lecture 8Hrs**

Outlier, cause of outlier, anomaly detection techniques, outlier detection using statistics.

Outlier detection using distance based method, density based method, SMOTE.

#### **UNIT-5 Applications for Data Science.**

**Lecture 8Hrs**

Predictive modeling: house price prediction, frauds detection Clustering, customer segmentation.

Time series forecasting: weather forecasting

Recommendation engine: Product recommendation.

#### Text books:

1. Prof.R.M.Bhavana, Prof. K. S. Londhe, Tech-neo Publications, 2019.

#### Reference books:

1. Larose, D.T. and Larose, C.D., Data Mining and Predictive Analytics, 2<sup>nd</sup> edition, Wiley, 2015
2. Shmueli, G., Bruce, P.C., Yahav, I., Patel, N.R. and Lichtendahl Jr., K.C., Data Mining for Business Analytics – Concepts, Techniques, and Application in R, Wiley, 2018
3. Ankam, V., Big Data Analytics, Packt, 2016

4. Walkowiak, S., Big Data Analytics with R, Packt, 2016
5. Grolemund, G., Hands-on Programming with R, O'Reilly, 2014
  
6. Wickham, H. and Grolemund, G., R for Data Science, O'Reilly, 2017
7. Wexler, S., Shaffer, J. and Cotgreave, A., The Big Book of Dashboards: Visualizing Your Data Using Real-World Business Scenarios, Wiley, 2017
8. O'Corr, E., Microsoft Power BI Dashboards Step by Step, Practice Files, 2019

**Online learning Resources:**

1. <https://www.edureka.co/masters-program/data-scientist-certification>.



## 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](http://www.gist.edu.in)

### (22A3707c) Malware Analysis

#### Course Objective:

This class provides insights about the motivations of malware developers and the software weaknesses commonly exploited. In addition, the course will provide students with concepts, tools and methods associated with reverse engineering malicious code. Different attacking methods will be examined and analyzed to defend against malicious code. Safe handling practices for malware analysis will be taught/practiced.

#### Learning Outcomes:

The students on the completion of this course would be able to

- Understand and describe the behavior of typical malware.
- Understand how malware exploits and infects vulnerable systems.
- Perform static and dynamic analysis to study malware behavior.
- Detect and defeat the stealthy techniques used by malware.
- Design countermeasures to handle malware related threats.

#### **UNIT -1 Introduction**

**Lecture 8Hrs**

INTRODUCTION: Introduction to malware, OS security concepts, malware threats, evolution of malware, malware types of viruses, worms, rootkits, Trojans, bots, spyware, adware, logic bombs, malware analysis, static malware analysis, dynamic malware analysis.

#### **UNIT -2**

**Lecture 10Hrs**

STATIC ANALYSIS: X86 Architecture- Main Memory, Instructions, Opcodes and Endianness, Operands, Registers, Simple Instructions, The Stack, Conditionals, Branching, Rep Instructions, C Main Method and Offsets. Antivirus Scanning, Fingerprint for Malware, Portable Executable File Format, The PE File Headers and Sections, The Structure of a Virtual Machine, Reverse Engineering- x86 Architecture, recognizing c code constructs in assembly, c++ analysis

#### **UNIT-3**

**Lecture 8Hrs**

DYNAMIC ANALYSIS: Live malware analysis, dead malware analysis, analyzing traces of malware- system-calls, api-calls, registries, network activities. Anti-dynamic analysis techniques anti-vm, runtime-evasion techniques, Malware Sandbox, Monitoring with Process Monitor, Packet Sniffing with Wireshark, Kernel vs. User-Mode Debugging, OllyDbg, Breakpoints, Tracing, Exception Handling, Patching

#### **UNIT-4**

**Lecture 8Hrs**

Malware Functionality: Downloader, Backdoors, Credential & 10% Stealers, Persistence Mechanisms, Privilege Escalation, Covert malware launching- Launchers, Process Injection, Process Replacement, Hook Injection, Detours, APC injection

#### **UNIT-5**

**Lecture 8Hrs**

Malware Detection Techniques: Signature-based techniques: malware signatures, packed malware signature, metamorphic and polymorphic malware signature Non-signature based techniques: similarity-based techniques, machine-learning methods, invariant inferences

### **Text books:**

- Practical malware analysis The Hands-On Guide to Dissecting Malicious Software by Michael Sikorski and Andrew Honig ISBN-10: 159327-290-1, ISBN-13: 978-1-59327-290-6, 2012 2
- Computer viruses: from theory to applications by Filiol, Eric Springer Science & Business Media, 2006

### **Reference books:**

- Android Malware by Xuxian Jiang and Yajin Zhou, Springer ISBN 978-1-4614-7393-0, 2005
- Hacking exposed™ malware & rootkits: malware & rootkits security secrets & Solutions by Michael Davis, Sean Bodmer, Aaron Lemasters, McGraw-Hill, ISBN: 978-0-07-159119-5, 2010
- Windows Malware Analysis Essentials by Victor Marak, Packt Publishing, 2015

### **Online learning Resources:**

- <https://www.infosecinstitute.com/resources/malware-analysis/malware-analysis-basic-dynamic-techniques/#gref>



## 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](http://www.gist.edu.in)

<b>MICRO CONTROLLERS AND APPLICATIONS</b>					
(Common to CSE, AI&ML, DS, CS)					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A0431T</b>	<b>3:0:0:0</b>	<b>3</b>	<b>CIE:30 SEE:70</b>	<b>3 Hours</b>	<b>OEC</b>
<b>Course Objectives:</b>					
This course will enable students to: <ul style="list-style-type: none"> <li>• Describe the Architecture of 8051 Microcontroller and Interfacing of 8051 to external memory.</li> <li>• Write 8051 Assembly level programs using 8051 instruction set.</li> <li>• Describe the Interrupt system, operation of Timers/Counters and Serial port of 8051.</li> <li>• Interface simple switches, simple LEDs, ADC 0804, LCD and Stepper Motor to 8051</li> </ul>					
<b>Course Outcomes (CO):</b>					
<b>On completion of this course, student will be able to</b> <ul style="list-style-type: none"> <li>• Understand the importance of Microcontroller</li> <li>• Acquire the knowledge of Architecture of 8051 Microcontroller.</li> <li>• Apply and Interface simple switches, simple LEDs, ADC 0804, LCD and Stepper Motor to using 8051 I/O ports.</li> <li>• Develop the 8051 Assembly level programs using 8051 instruction set.</li> <li>• Design the Interrupt system</li> <li>• Understand the operation of Timers/Counters and Serial port of 8051.</li> </ul>					
<b>Syllabus</b>					<b>Total Hours:48</b>
<b>Module-I</b>	<b>8051 Microcontroller</b>				<b>10Hrs</b>
<b>8051 Microcontroller:</b> Microprocessor Vs Microcontroller, Embedded Systems, Embedded Microcontrollers, 8051 Architecture- Registers, Pin diagram, I/O ports functions, Internal Memory organization. External Memory (ROM & RAM) interfacing.					
<b>Module-II</b>	<b>Addressing Modes</b>				<b>9Hrs</b>
Addressing Modes, Data Transfer instructions, Arithmetic instructions, Logical instructions, Branch instructions, Bit manipulation instructions. Simple Assembly language program examples to use these instructions.					
<b>Module-III</b>	<b>8051 Stack, Stack and Subroutine instructions</b>				<b>9Hrs</b>
<b>8051 Stack, Stack and Subroutine instructions:</b> 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.					
<b>Module-IV</b>	<b>8051 Serial Communication</b>				<b>10Hrs</b>
<b>8051 Serial Communication-</b> 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.

<b>Module-V</b>	<b>8051 C programming</b>	<b>10Hrs</b>
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.		
<b>Text Books:</b> <ol style="list-style-type: none"><li>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.</li><li>2. Kenneth J. Ayala, “The 8051 Microcontroller”, 3rd Edition, Thomson/Cengage Learning</li></ol>		
<b>Reference Books:</b> <ol style="list-style-type: none"><li>1. Manish K Patel, “The 8051 Microcontroller Based Embedded Systems”, McGraw Hill, 2014, ISBN: 978-93-329-0125-4.</li><li>2. Raj Kamal, “Microcontrollers: Architecture, Programming, Interfacing and System Design”, Pearson Education, 2005. Wayne Wolf, FPGA based system design, Prentice hall, 2004.</li></ol>		
<b>Web References:</b> <a href="https://nptel.ac.in/courses/117104072">https://nptel.ac.in/courses/117104072</a> <a href="https://onlinecourses.nptel.ac.in/noc22_ee12/preview">https://onlinecourses.nptel.ac.in/noc22_ee12/preview</a>		



## GEETHANJALI INSTITUTE OF SCIENCE & TECHNOLOGY

*RG 22 Regulations*

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](http://www.gist.edu.in)

<b>CONTROLSYSTEMS</b> (Common to CSE, AI&ML,DS,CS)					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A0213Ta</b>	<b>3:0:0:0</b>	<b>3</b>	<b>CIE:30 SEE:70</b>	<b>3 Hours</b>	<b>OEC</b>
<b>Course Objectives:</b>					
This course will enable students to: <ul style="list-style-type: none"> <li>• Merits and demerits of open loop and closed loop systems; the effects of feedback</li> <li>• The use of block diagram algebra and Mason's gain formula</li> <li>• Transient and steady state responses , time domain specifications</li> <li>• Frequency domain specifications, Bode diagrams and Nyquist plots</li> <li>• The fundamental aspects of modern control</li> </ul>					
<b>Course Outcomes(CO):</b>					
<b>On completion of this course, student will be able to</b> <ul style="list-style-type: none"> <li>• Evaluate the effective transfer function of a system from (i) block diagram reduction techniques (ii) Mason's gain formula</li> <li>• Compute the steady state errors and transient response characteristics</li> <li>• Determine the absolute stability and relative stability of a system</li> <li>• Design a compensator to accomplish desired performance</li> <li>• Derive state space model of a given physical system and solve the state equation</li> </ul>					
<b>Syllabus</b>				<b>Total Hours:48</b>	
<b>Module-I</b>	<b>INTRODUCTION</b>			<b>10Hrs</b>	
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.					
<b>Module-II</b>	<b>TIME RESPONSE ANALYSIS</b>			<b>10Hrs</b>	
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					
<b>Module-III</b>	<b>STABILITY</b>			<b>9Hrs</b>	
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.					

<b>Module-IV</b>	<b>FREQUENCY RESPONSE ANALYSIS</b>	<b>10Hrs</b>
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.		
<b>Module-V</b>	<b>STATE SPACE ANALYSIS</b>	<b>10Hrs</b>
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		
<p><b>Text Books:</b></p> <ul style="list-style-type: none"> <li>• Modern Control Engineering, Katsuhiko Ogata, PEARSON, 1st Impression 2015.</li> <li>• Control Systems Engineering, I. J. Nagrath and M. Gopal, New Age International Publishers, 5th edition, 2007, Reprint 2012.</li> </ul>		
<p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. Automatic Control Systems, Farid Golnaraghi and Benjamin. C. Kuo, WILEY, 9th Edition, 2010.</li> <li>2. Control Systems, Dhanesh N. Manik, CENGAGE Learning, 2012.</li> <li>3. John J D'Azzo and C. H. Houpis , “Linear Control System Analysis and Design: Conventional and Modern”, McGraw - Hill Book Company, 1988.</li> </ol>		
<p><b>Web References:</b></p> <p><a href="https://archive.nptel.ac.in/courses/107/106/107106081/">https://archive.nptel.ac.in/courses/107/106/107106081/</a></p> <p><a href="https://onlinecourses.nptel.ac.in/noc20_ee90/preview">https://onlinecourses.nptel.ac.in/noc20_ee90/preview</a></p>		





## 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](http://www.gist.edu.in)

<b>ENVIRONMENTAL ECONOMICS</b> (Common to CSE, AI&ML, DS, CS)					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A0150T</b>	<b>3:0:0:0</b>	<b>3</b>	<b>CIE:30 SEE:70</b>	<b>3 Hours</b>	<b>OEC</b>
<b>Course Objectives:</b>					
This course will enable students to: <ul style="list-style-type: none"> <li>• To impart knowledge on sustainable development and economics of energy</li> <li>• To teach regarding environmental degradation and economic analysis of degradation</li> <li>• To inculcate the knowledge of economics of pollution and their management</li> <li>• To demonstrate the understanding of cost benefit analysis of environmental resources</li> <li>• To make the students to understand principles of economics of biodiversity</li> </ul>					
<b>Course Outcomes (CO):</b>					
<b>On completion of this course, student will be able to</b> <ul style="list-style-type: none"> <li>• The information on sustainable development and economics of energy</li> <li>• The information regarding environmental degradation and economic analysis of degradation</li> <li>• The identification of economics of pollution and their management</li> <li>• The cost benefit analysis of environmental resources</li> <li>• The principles of economics of biodiversity</li> </ul>					
<b>Syllabus</b>					<b>Total Hours:48</b>
<b>Module-I</b>	<b>SUSTAINABLE DEVELOPMENT</b>				<b>9Hrs</b>
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.					
<b>Module-II</b>	<b>ENVIRONMENTAL DEGRADATION</b>				<b>9Hrs</b>
Economic significance and causes of environmental degradation - The concepts of policy failure, externality and market failure - Economic analysis of environmental degradation – Equi –marginal principle.					
<b>Module-III</b>	<b>ECONOMICS OF POLLUTION</b>				<b>10Hrs</b>
Economics of optimal pollution, regulation, monitoring and enforcement - Managing pollution using existing markets: Bargaining solutions – Managing pollution through market intervention: Taxes, subsidies and permits.					
<b>Module-IV</b>	<b>COST – BENEFIT ANALYSIS</b>				<b>10Hrs</b>
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.					

<b>Module-V</b>	<b>ECONOMICS OF BIODIVERSITY</b>	<b>10Hrs</b>
<p>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</p>		
<p><b>Text Books:</b></p> <ul style="list-style-type: none"> <li>• An Introduction to Environmental Economics by N. Hanley, J. Shogren and B. White Oxford University Press.(2001)</li> <li>• Blueprint for a Green Economy by D.W. Pearce, A. Markandya and E.B. Barbier Earthscan, London.(1989)</li> </ul>		
<p><b>Reference Books:</b></p> <ul style="list-style-type: none"> <li>• Environmental Economics: An Elementary Introduction by R.K. Turner, D.W. Pearce and I. Bateman Harvester Wheatsheaf, London. (1994),</li> <li>• Economics of Natural Resources and the Environment by D.W. Pearce and R.K. Turner Harvester Wheat sheaf, London. (1990),</li> </ul>		
<p><b>Web References:</b></p> <p>1. <a href="http://nptel.ac.in/courses/109107171">s://nptel.ac.in/courses/109107171</a> <span style="float: right;"><a href="http">http</a></span></p>		



## 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](http://www.gist.edu.in)

<b>INTRODUCTION TO COMPOSITE MATERIALS</b> (Common to CSE, AI&ML, DS, CS)					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A0327Tb</b>	<b>3:0:0:0</b>	<b>3</b>	<b>CIE:30 SEE:70</b>	<b>3 Hours</b>	<b>OEC</b>
<b>Course Objectives:</b>					
This course will enable students to: <ul style="list-style-type: none"> <li>• To be familiar with classification and characteristics of composite material and their applications.</li> <li>• To gain the knowledge about manufacturing methods of composites.</li> <li>• To know the testing methods related to composite materials.</li> </ul>					
<b>Course Outcomes (CO):</b>					
To provide knowledge on characteristics of composites <ul style="list-style-type: none"> <li>• To get knowledge on manufacturing and testing methods and mechanical behaviour of composites.</li> <li>• To get the exposure of different materials.</li> </ul>					
<b>Syllabus</b>					<b>Total Hours:48</b>
<b>Module-I</b>	<b>Introduction</b>				<b>10Hrs</b>
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.					
<b>Module-II</b>	<b>Manufacturing Methods</b>				<b>9Hrs</b>
Hand and spray lay - up, injection molding, resin injection, filament winding, pultrusion, centrifugal casting and prepregs. Fibre/Matrix Interface, mechanical. Measurement of interface strength.					
<b>Module-III</b>	<b>Mechanical Properties</b>				<b>9Hrs</b>
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.					
<b>Module-IV</b>	<b>Laminates</b>				<b>10Hrs</b>
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.					
<b>Module-V</b>	<b>Joining Methods and Failure Theories</b>				<b>10Hrs</b>
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), Manufacturing of Polymer Composites, Chapman & Hall

**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.
3. Composite materials by J.N.Reddy



## 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](http://www.gist.edu.in)

<b>DIGITAL FORENSICS LAB</b>					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A3708P	0:0:3:0	1.5	CIE:30 SEE:70	3Hours	
Course Objectives:					
<p>This course will enable students to:</p> <ul style="list-style-type: none"> <li>❖ To provide students with a comprehensive overview of collecting, investigating, preserving, and presenting evidence of cyber crime left in digital storage devices, emails, browsers, mobile devices using different Forensics tools.</li> <li>❖ To understand the network analysis ,Registry analysis and analyze attacks using different forensics tools.</li> </ul>					
Syllabus				Total Hours: 42	
<b>List of Experiments</b>					
<p><b>Exercise – 1:</b> <b>Perform email analysis</b> using the tools like Exchange EDB viewer , MBOX viewer and View user mailboxes and public folders , Filter the mailbox data based on various criteria, Search for particular items in user mailboxes and public folders.</p> <p><b>Exercise – 2:</b> <b>Perform Browser history analysis</b> and get the downloaded content , history ,saved logins, searches, websites visited etc using Foxton Forensics tool, Dumpzilla.</p> <p><b>Exercise – 3:</b> <b>Perform mobile analysis</b> in the form of retrieving call logs , SMS log ,all contacts list using the forensics tool like SAFT.</p> <p><b>Exercise – 4:</b> <b>Perform Registry analysis</b> and get boot time logging using process monitor tool.</p> <p><b>Exercise – 5:</b> <b>Perform Disk imaging and cloning</b> the using the X-way Forensics tools.</p> <p><b>Exercise- 6 :</b> <b>Perform Data Analysis</b> i.e. History about open file and folder, and view folder actions using Last view activity tool.</p> <p><b>Exercise-7 :</b> <b>Perform Network analysis</b> using the Network Miner tool.</p> <p><b>Exercise-8 :</b> <b>Perform information for incident response</b> using the Crowd Response Tool.</p>					

**Exercise-9 :**

**Perform File type detection** using Auto spy tool.

**Exercise-10 :**

**Perform Memory capture analysis** using the Live RAM capture or any forensic Tool.

**Course Outcomes:**

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

- ❖ Learn the importance of a systematic procedure for investigation of data found on digital storage media that might provide evidence of wrong-doing.
- ❖ To learn the file system storage mechanisms and retrieve files in hidden format.
- ❖ Learn the use of computer forensics tools used in data analysis.
- ❖ Learn how to find data that may be clear or hidden on a computer disk, find out the open ports for the attackers through network analysis, Registry analysis.

**Text Books:**

1. Real Digital Forensics for Handheld Devices, E. P. Dorothy, Auerback Publications.
2. The Basics of Digital Forensics: The Primer for Getting Started in Digital Forensics, J. Sammons, Syngress Publishing.

**Reference Books:**

1. Handbook of Digital Forensics and Investigation, E. Casey, Academic Press.
2. Malware Forensics Field Guide for Windows Systems: Digital Forensics Field Guides, C. H. Malin, E. Casey and J. M. Aquilina, Syngress.
3. The Best Damn Cybercrime and Digital Forensics Book Period, J. Wiles and A.Reyes, Syngress.



## 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](http://www.gist.edu.in)

<b>PENETRATION TESTING AND CYBER OPERATIONS LABORATORY</b>					
<b>(Cyber Security)</b>					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A3709P</b>	<b>0:0:3:0</b>	<b>1.5</b>	<b>CIE:30 SEE:70</b>	<b>3 Hours</b>	
<b>Course Objectives:</b>					
The students will Able to learn:					
<ul style="list-style-type: none"> <li>• The different packet crafting techniques using different Networking tools.</li> <li>• The different network Script programmes to measure the performance of Network.</li> <li>• The understanding of different Protocols that measure the scope and lifetime of network.</li> </ul>					
<b>Course Outcomes(CO):</b>					
<b>On successful completion of this course, the student will be able to:</b>					
<ul style="list-style-type: none"> <li>• Apply various Google and u se tools to gather information about the target specification.</li> <li>• Identify appropriate tools to encrypt and decrypt passwords in network.</li> <li>• Apply Nessus tool to identify vulnerability attacks and monitor the networking mechanism.</li> <li>• Analyze the Crypt and OSINT tools to detailed network information of the target.</li> <li>• Implement the SQL injection Atta cks to detect malware on the network.</li> <li>• Apply Ettercap tool to scan the network and performing an ARP poisoning attack</li> </ul>					
<b>Syllabus</b>					<b>Total Hours:48 hrs</b>

## **LIST OF EXPERIMENTS:**

### **Experiment -1:**

- Use Google and Whois for Reconnaissance

### **Experiment -2:**

- Use CryptTool to encrypt and decrypt passwords using RC4 algorithm.
- Use Cain and Abel for cracking Windows account password using Dictionary attack and to decode wirelessnetwork passwords

### **Experiment -3:**

- Use TraceRoute, ping, ifconfig, netstat Command

### **Experiment -4:**

- To perform ARP poisoning

### **Experiment -5:**

- Use Nmap scanner to perform port scanning of various forms – ACK, SYN, FIN, NULL, XMAS

### **Experiment -6:**

- Use Wire Shark sniffer to capture network traffic and analyze.

### **Experiment -7:**

- Simulate persistent Cross Site Scripting attack.

### **Experiment -8:**

- Session impersonation using Firefox

### **Experiment -9:**

- Session impersonation using Tamper Data add-on

### **Experiment -10:**

- Perform SQL injection attack.

### **Experiment -11:**

- Create a simple key logger using Python

### **Experiment -12:**

- Use Metasploit to exploit the data

### **Text Books:**

1. RafayBaloch, “Ethical Hacking and Penetration Testing Guide”, CRC Press, 2015.
2. Dr.Patrick Engebretson, “The Basics of Hacking and Penetration Testing”, Syngress Publications Elseveir, 2013.

### **Reference Books:**

1. RafayBaloch, “EthicalHackingandPenetrationTestingGuide”,CRCPress,2015,
2. Dr.Patrick Engebretson, “The Basics of Hacking and Penetration Testing”, Syngress Publications Elseveir, 2013.
3. PrakharPrasad,“MasteringModern Web Penetration Testing”,Packtet Publishing,2016.
4. Prakhar Prasad, “Mastering Modern Web Penetration Testing”, Packt Publishing, 2016.
5. Gilberto Najera Gutierrez, “Kali Linux Web Penetration Testing”, Cookbook, 2016.
6. Robert Svensson, “From Hacking to Report Writing: An Introduction to Security and Penetration Testing”,2016.

### **Web References:**

<https://www.youtube.com/watch?v=3Kq1MifTWCE>





## 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](http://www.gist.edu.in)

<b>CLOUD COMPUTING LAB</b> (Common to CSE, AI&ML, DS, CS)					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A0533P</b>	<b>0:0:3:0</b>	<b>1.5</b>	<b>CIE:30 SEE:70</b>	<b>3 Hours</b>	<b>PCC</b>
<b>Course Objectives:</b>					
This course will enable students to: <ul style="list-style-type: none"> <li>• To develop web applications in cloud</li> <li>• To learn the design and development process involved in creating a cloud based application</li> <li>• Understand transfer of file form one virtual machine to another</li> <li>• To learn to implement and use parallel programming using Hadoop</li> </ul>					
<b>Course Outcomes (CO):</b>					
<b>On completion of this course, student will be able to</b> <ul style="list-style-type: none"> <li>• Configure various virtualization tools such as Virtual Box, VMware workstation.</li> <li>• Design and deploy a web application in a PaaS environment.</li> <li>• Simulate a cloud scenario using Cloud Sim</li> <li>• Learn how to simulate a cloud environment to implement new schedulers.</li> <li>• Install and use a generic cloud environment that can be used as a private cloud.</li> <li>• Manipulate large data sets in a parallel environment.</li> </ul>					
<b>Syllabus</b>					<b>Total Hours:48</b>
List of Experiments <ul style="list-style-type: none"> <li>• Install Virtual Box/VMware Workstation with different flavours of Linux or windows OS on top of windows operating systems.</li> <li>• Install a C compiler in the virtual machine created using virtual box and execute Simple Programs</li> <li>• Install Google App Engine. Create hello world app and other simple web applications using python/java.</li> <li>• Use GAE launcher to launch the web applications.</li> <li>• Simulate a cloud scenario using Cloud Sim and run a scheduling algorithm that is not present in Cloud Sim.</li> <li>• Find a procedure to transfer the files from one virtual machine to another virtual machine.</li> <li>• Find a procedure to launch virtual machine using try stack (Online Open stack Demo Version)</li> <li>• Install Hadoop single node cluster and run simple applications like word count</li> </ul>					
<b>References:</b>					
Google Cloud Computing Foundations Course - Course (nptel.ac.in)					
<b>Web References:</b>					
1. <a href="https://www.vmware.com/products/workstation-pro/workstation-pro-evaluation.html">https://www.vmware.com/products/workstation-pro/workstation-pro-evaluation.html</a> 2. <a href="http://code.google.com/appengine/downloads.html">http://code.google.com/appengine/downloads.html</a> 3. <a href="http://code.google.com/appengine/downloads.html">http://code.google.com/appengine/downloads.html</a>					



## 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](http://www.gist.edu.in)

<b>Basic Web Design (SKILL)</b> (Common to CSE, AI&ML, DS, CS)					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A0511</b>	<b>1:0:2:0</b>	<b>2</b>	<b>CIE:30 SEE:70</b>	<b>3 Hours</b>	<b>SC</b>
<b>Course Objectives:</b>					
This course will enable students to: <ul style="list-style-type: none"> <li>• Learn website development using HTML, CSS, and JavaScript.</li> <li>• Understand the concepts of responsive web development using the bootstrap framework</li> <li>• Learn the frame concepts to the websites and interactive websites.</li> <li>• Discover how development process to use Google Charts to provide a better way to visualize data on a website</li> <li>• Learn Content Management Systems to speed the development process</li> </ul>					
<b>Course Outcomes (CO):</b>					
<b>On completion of this course, student will be able to</b> <ul style="list-style-type: none"> <li>• Construct websites with valid HTML, CSS.</li> <li>• Create responsive monitors.</li> <li>• Develop websites using jQuery and bootstrap to provide interactivity and engaging user experiences</li> <li>• Design and Develop JavaScript applications.</li> <li>• Embed Google chart tools in a website for better visualization of data.</li> <li>• Design and develop web applications using Content Management Systems like Word Press</li> </ul>					
<b>Syllabus</b>				<b>Total Hours:48</b>	
<b>List of Experiments</b>					
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.					
<b>Experiment-1</b> 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.					
<b>Experiment-2</b> Design HTML page to display the list of departments in college by using ordered and unordered list.					
Module-3: HTML(continued):HTML Tables					
<b>Experiment-3</b> Design HTML page to display Class Timetable					

Module-4:  
HTML Frames and Frameset.

**Experiment-4** Design college website.

Module-5:  
HTML Form Elements.

**Experiment-5** 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

**Experiment-6** Apply CSS on student registration form.

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

**Experiment-7** Style the student registration Form designed in Module-5 still 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.

**Experiment-8** Analyze various HTTP requests (initiators, timing diagrams, responses) and identify problems

Module-9:  
JavaScript: Variables, Data Types, Operators.

**Experiment-9** Design a simple JavaScript program to perform arithmetic operations.

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

**Experiment-10** 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.

**Experiment-11** 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, 5<sup>th</sup> Edition,2011.
2. Web Technologies, Uttam K.Roy, Oxford Higher Education., 1<sup>st</sup> edition, 10<sup>th</sup> impression, 2015.
3. Stephen Wynkoop and John Burke—Running a Perfect Website,QUE,2<sup>nd</sup> Edition,1999.
4. Jeffrey C and Jackson, —Web Technologies A Computer Science Perspective Pearson Education, 2011.
5. Gopalan N.P. and AkilandeswariJ.,—WebTechnology,PrenticeHallofIndia,2011.

**Web References:**

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-CSS Framework:<https://getbootstrap.com/>
5. Browser Developer Tools:[https://developer.mozilla.org/enUS/docs/Learn/Common\\_questions/What\\_are\\_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. J Query: <https://jquery.com>
8. Google Charts:<https://developers.google.com/chart>
9. Word press :<https://wordpress.com>



## 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](http://www.gist.edu.in)

<b>RESEARCH METHODOLOGY</b>					
(Common to CSE, AI&ML, CS, DS, ECE, EEE, ME)					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A0032T</b>	<b>2:0:0:0</b>	<b>0</b>	<b>CIE:30</b>	<b>-</b>	<b>MC</b>
<b>Course Objectives:</b>					
This course will enable students to: <ul style="list-style-type: none"> <li>• To understand the basic concepts of research and research problem</li> <li>• To make the students learn about various types of data collection and sampling</li> <li>• Design to enable them to know the method of statistical evaluation</li> <li>• To make the students understand various testing tools in research</li> <li>• To make the student learn how to write a research report</li> <li>• To create awareness on ethical issues in research</li> </ul>					
<b>Course Outcomes (CO):</b>					
<b>On completion of this course, student will be able to</b> <ul style="list-style-type: none"> <li>• Understand basic concepts and its methodologies</li> <li>• Understand the concept of sampling and sampling design</li> <li>• Design survey questionnaires for different kinds of research</li> <li>• Read, comprehend and explain research articles in their academic discipline</li> <li>• Analyze various types of testing tools used in research</li> <li>• Design a research paper without any ethical issues</li> </ul>					
<b>Syllabus</b>				<b>Total Hours:48</b>	
<b>Module-I</b>	<b>INTRODUCTION TO RESEARCH METHODOLOGY</b>			<b>10Hrs</b>	
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.					
<b>Module-II</b>	<b>SAMPLING AND DATA COLLECTION METHODS</b>			<b>9Hrs</b>	
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.					
<b>Module-III</b>	<b>CORRELATION</b>			<b>10Hrs</b>	
Correlation and Regression Analysis – Method of Least Squares – Regression vs Correlation – Correlation vs Determination – Types of Correlations and Their Applications					
<b>Module-IV</b>	<b>STATISTICAL INFERENCE</b>			<b>9Hrs</b>	
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
<p>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</p>		
<p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>1. C.R.Kothari, “Research Methodology:Methods and Techniques”,2nd edition, New Age International Publishers.</li> <li>2. A Step by Step Guide for Beginners, “Research Methodology”: Ranjit Kumar, Sage Publications</li> </ol>		
<p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. P.Narayana Reddy and G.V.R.K.Acharyulu, “Research Methodology and Statistical Tools”, 1st Edition, Excel Books,New Delhi.</li> <li>2. Donald R. “Business Research Methods”, Cooper &amp; Pamela S Schindler, 9th edition.</li> <li>3. S C Gupta, “Fundamentals of Statistics”, 7th edition Himalaya Publications</li> </ol>		
<p><b>Web Reference:</b></p> <p><a href="https://onlinecourses.swayam2.ac.in/cec20_hs17/preview">https://onlinecourses.swayam2.ac.in/cec20_hs17/preview</a></p> <p><a href="https://onlinecourses.nptel.ac.in/noc22_ge08/preview">https://onlinecourses.nptel.ac.in/noc22_ge08/preview</a></p>		



**GEETHANJALI INSTITUTE OF SCIENCE & TECHNOLOGY::NELLORE**  
**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

Semester-7(Theory-6,SC-1)							
Sl. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	C
1	HSC	22A0023T 22A0024T 22A0025T	<b>Humanity Science Elective-I</b> 1. Management Science 2. Entrepreneurship and Innovation 3. Business Environment	3	0	0	3
2	PEC	<b>22A3710T</b> 22A0534c 22A0530c	<b>Professional Elective-III</b> 1. Software Project Management 2. Big Data Technologies 3. Internet of Things	3	0	0	3
3	PEC	22A0536c 22A3308T 22A0535c	<b>Professional Elective-IV</b> 1. Agile methodologies 2. Information Retrieval systems 3. Adhoc and wireless sensor networks	3	0	0	3
4	PEC	22A0530c 22A0535c 22A0535a	<b>Professional Elective-V:</b> 1. Design Patterns 2. Deep learning 3. Block Chain Technology	3	0	0	3
5	OEC	22A0241Ta 22A0432T 22A0151T 22A0327Tc	<b>Open Elective-III:</b> 1. Smart Grid 2. Basic VLSID Design 3. Disaster management 4. Measurements and Mechatronics	3	0	0	3
6	OEC	22A0232Ta 22A0433T 22A0152T 22A0331Tc	<b>Open Elective-IV:</b> 1. Electric Vehicles 2. Industrial Electronics 3. Construction Management 4. Introduction to Robotics	3	0	0	3
7	SC	22A0525	<b>Skill Advanced Course:</b> R Programming	1	0	2	2
<b>Industrial/Research Internship 2 Months (Mandatory) after Third year (to be evaluated during VII semester)</b>				0	0	0	3
				<b>Total credits</b>			<b>23</b>

  

Category	Credits
Professional Elective Courses(PEC)	9
Humanities and Social Science Course(HSC)	3
Open Elective Courses(OEC)	6
Skill Advanced Course(SC)	2
Industrial/Research Internship	3
<b>Total</b>	<b>23</b>



## 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](http://www.gist.edu.in)

<b>MANAGEMENT SCIENCE</b> (Common to CSE, AI&ML, DS, CS)					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A0023T</b>	<b>3:0:0:0</b>	<b>3</b>	<b>CIE:30SEE:70</b>	<b>3 Hours</b>	<b>HSC</b>
<b>Course Objectives:</b>					
<p>This course will enable students to:</p> <ul style="list-style-type: none"> <li>• To provide fundamental knowledge on Management, Administration, Organization &amp; its concepts.</li> <li>• To make the students understand the role of management in Production</li> <li>• To impart the concept of HRM in order to have an idea on Recruitment, Selection, Training &amp; Development, job evaluation and Merit rating concepts.</li> <li>• To create awareness on identify Strategic Management areas &amp; the PERT/CPM for better Project Management.</li> <li>• To make the students aware of the contemporary issues in management.</li> </ul>					
<b>Course Outcomes (CO):</b>					
<b>On completion of this course, student will be able to</b>					
<ul style="list-style-type: none"> <li>• Understand the concepts &amp; principles of management and designs of organization in a practical world</li> <li>• Apply the knowledge of Work-study principles &amp; Quality Control techniques in industry</li> <li>• Analyze the concepts of HRM in Recruitment, Selection and Training &amp; Development.</li> <li>• Evaluate PERT/CPM Techniques for projects of an enterprise and estimate time &amp; cost of project &amp; to analyze the business through SWOT.</li> <li>• Create Modern technology in management science.</li> </ul>					
<b>Syllabus</b>					<b>Total Hours:48</b>
<b>Module-I</b>	<b>INTRODUCTION TO MANAGEMENT</b>				<b>10Hrs</b>
<p>Management-Concept and meaning-Nature-Functions-Management as a Science and Art and both. Schools of Management Thought-Taylor's Scientific Theory-Henry Fayol's principles-Eltan Mayo's Human relations-Systems Theory -Organizational Designs-Line organization- Line &amp; Staff Organization-Functional Organization-Matrix Organization-Project Organization-Committee form of Organization-Social responsibilities of Management.</p>					
<b>Module-II</b>	<b>OPERATIONS MANAGEMENT</b>				<b>10Hrs</b>
<p>Principles and Types of Plant Layout - Methods of Production (Job, batch and Mass Production), Work Study-Statistical Quality Control-Deming's contribution to Quality. Material Management-Objectives - Inventory-Functions - Types, Inventory Techniques - EOQ-ABC Analysis - Purchase Procedure and Stores Management - Marketing Management - Concept - Meaning-Nature-Functions of Marketing-Marketing Mix-Channels of Distribution-Advertisement and Sales Promotion-Marketing Strategies based on Product Life Cycle.</p>					
<b>Module-III</b>	<b>HUMAN RESOURCES MANAGEMENT</b>				<b>10Hrs</b>



HRM -Definition and Meaning –Nature-Managerial and Operative functions-Evolution of HRM-Job Analysis - Human Resource Planning(HRP)- Employee Recruitment-Sources of Recruitment- Employee Selection-ProcessandTestsinEmployeeSelection–EmployeeTrainingandDevelopment-On-the-job & Off-the-job training methods-Performance Appraisal Concept- Methods of Performance Appraisal– Placement-Employee Induction–Wage and Salary Administration.

**Module–IV**

**STRATEGIC&PROJECTMANAGEMENT**

**10Hrs**

Definition & Meaning-Setting of Vision -Mission -Goals –Corporate Planning Process- Environmental Scanning-StepsinStrategyFormulationandImplementation-SWOTAnalysis–Project Management-NetworkAnalysis-ProgramEvaluationandReviewTechnique(PERT)-CriticalPathMethod (CPM) Identifying Critical Path - Probability of Completing the project with in given time- Project Cost-Analysis-Project Crashing(Simple problems).

**Module–V**

**CONTEMPORARY ISSUES IN  
MANAGEMENT**

**8Hrs**

The concept of Management Information System (MIS)-Materials Requirement Planning (MRP)- CustomerRelationsManagement(CRM)-TotalQualityManagement(TQM)–SixSigmaConcept-Supply Chain Management (SCM)-Enterprise Resource Planning (ERP)-Performance Management- Business Process Outsourcing (BPO)-Business Process Re-engineering and Bench Marking- Balanced Score Card- Knowledge Management.

**Text Books:**

1. A.RAryasri,“ManagementScience”,TMH,2013
2. Stoner,Freeman,Gilbert,Management,PearsonEducation,NewDelhi,2012.

**Reference Books:**

1. Koontz&Weihrich,“EssentialsofManagement”,6<sup>th</sup>edition,TMH,2005.
2. ThomasN.Duening&JohnM.Ivancevich,“ManagementPrinciplesandGuidelines”, Biztantra.
3. KanishkaBedi,“ProductionandOperationsManagement”,OxfordUniversityPress,2004.
4. SamuelC.Certo,“ModernManagement”,9<sup>th</sup>edition,PHI,2005



## 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](http://www.gist.edu.in)

<b>ENTREPRENEURSHIP AND INNOVATION</b>					
(Common to CSE, AI&ML, DS, CS)					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A0024T</b>	<b>3:0:0:0</b>	<b>3</b>	<b>CIE:30SEE:70</b>	<b>3 Hours</b>	<b>HSC</b>
<b>Course Objectives:</b>					
This course will enable students to:					
<ul style="list-style-type: none"> <li>• To make the student understand about Entrepreneurship</li> <li>• To enable the student in knowing various Sources of generating new ideas in setting up of New enterprise</li> <li>• To facilitate the student in knowing various sources of finance in starting up of a business</li> <li>• To impart knowledge about various government sources which provide financial assistance to entrepreneurs / women entrepreneurs</li> <li>• To encourage the student in creating and designing business plans</li> </ul>					
<b>Course Outcomes (CO):</b>					
<b>On completion of this course, student will be able to</b>					
<ul style="list-style-type: none"> <li>• Understand the concept of Entrepreneurship and challenges in the world of competition.(L2)</li> <li>• Apply the Knowledge in generating ideas for New Ventures.(L3)</li> <li>• Analyze various sources of finance and subsidies to entrepreneur/women Entrepreneurs.(L4)</li> <li>• Evaluate the role of central government and state government in promoting entrepreneurship. (L3)</li> <li>• Create and design business plan structure through incubations.(L3)</li> </ul>					
<b>Syllabus</b>					<b>Total Hours:48</b>
<b>Module-I</b>	<b>STARTING UP NEW VENTURE</b>				<b>10Hrs</b>
Entrepreneurship-Concept, knowledge and skills requirement- Characteristics of successful entrepreneurs- Entrepreneurship process-Factors impacting emergence of entrepreneurship- Differences between Entrepreneur and Intrepeneur- Understanding individual entrepreneurial mind set and personality- Recent trends in Entrepreneurship.					
<b>Module-II</b>	<b>STARTING UP NEW VENTURE</b>				<b>10Hrs</b>
Starting the New Venture-Generating business idea-Sources of new ideas & methods of generating ideas- Opportunity recognition-Feasibility study-Market feasibility, technical/ operational feasibility -Financial feasibility - Drawing business plan - Preparing project report – Presenting business plan to investors..					
<b>Module-III</b>	<b>SOURCES OF FINANCE</b>				<b>10Hrs</b>
Sources of finance - Various sources of Finance available - Long term sources - Short term sources - Institutional Finance-Commercial Banks,SFC's in India-NBFC's in India-their way of financing in India for small and medium business -Entrepreneurship development programs in India – The entrepreneurial journey-Institutions in aid of entrepreneurship development					

Module–IV	WOMENENTREPRENEURSHIP	10Hrs
<p>Women Entrepreneurship-Entrepreneurship Development and Government-Role of Central Government and State Government in promoting women Entrepreneurship</p> <p>Introduction to various incentives, subsidies and grants – Export- oriented Units - Fiscal and Tax concessions available -Women entrepreneurship - Role and importance - Growth of women entrepreneurship in India-Issues&amp;Challenges-Entrepreneurial motivations.</p>		
Module–V	INTRODUCTION TO INCUBATION & INNOVATION	8Hrs
<p>Fundamentals of Business Incubation- Principles and good practices of business incubation- Process of business incubation–Types, Advantages and Disadvantages of incubation.</p> <p>Innovation Meaning &amp; Definition-Forms of innovation-Innovation, features and characteristics- Factors initiating innovations-Innovation process and its stages.</p>		
<p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>1. DFKuratko and TVRao, “Entrepreneurship”-A South-Asian Perspective–Cengage Learning, 2012.(For PPT, Case Solutions Faculty may visit: login.cengage.com)</li> <li>2. Nandan H, “Fundamentals of Entrepreneurship”, PHI, 2013</li> </ol>		
<p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. Vasant Desai, “Small Scale Industries and Entrepreneurship”, Himalaya Publishing 2012.</li> <li>2. Rajeev Roy “Entrepreneurship”, 2<sup>nd</sup> Edition, Oxford, 2012.</li> <li>3. B. Janakiram and M. Rizwanal “Entrepreneurship Development: Text &amp; Cases”, Excel Books, 2011.</li> <li>4. Stuart Read, Effectual “Entrepreneurship”, Routledge, 2013.</li> </ol>		
<p><b>Web References:</b></p> <p><a href="https://onlinecourses.nptel.ac.in/noc21_mg63/preview">https://onlinecourses.nptel.ac.in/noc21_mg63/preview</a></p>		



## 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](http://www.gist.edu.in)

<b>BUSINESS ENVIRONMENT</b> (Common to CSE, AI&ML, DS, CS)					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A0025T</b>	<b>3:0:0:0</b>	<b>3</b>	<b>CIE:30SEE:70</b>	<b>3 Hours</b>	<b>HSC</b>
<b>Course Objectives:</b>					
This course will enable students to: <ul style="list-style-type: none"> <li>• To make the student understand about the business environment.</li> <li>• To enable the min knowing the importance of fiscal and monetary policy.</li> <li>• To facilitate the min understanding the export policy of the country.</li> <li>• Impart knowledge about the functioning and role of WTO.</li> <li>• Encourage the student in knowing the structure of stock market..</li> </ul>					
<b>Course Outcomes (CO):</b>					
<b>On completion of this course, student will be able to</b> <ul style="list-style-type: none"> <li>• Understand various types of business environment.</li> <li>• Evaluate fiscal and monetary policy</li> <li>• Analyze India's Trade Policy</li> <li>• Understand the role of WTO</li> <li>• Apply the knowledge of Money markets in future investment</li> </ul>					
<b>Syllabus</b>					<b>Total Hours:48</b>
<b>Module-I</b>	<b>AN OVERVIEW OF BUSINESS ENVIRONMENT</b>				<b>10Hrs</b>
Overview of Business Environment – Types of Environments - Internal & External –Micro and Macro environment- Competitive structure of industries - Environmental analysis - Scope of business- Characteristics of business-Process & limitations of environmental analysis.					
<b>Module-II</b>	<b>FISCAL POLICY &amp; MONETARY POLICY</b>				<b>10Hrs</b>
FISCAL POLICY-Public Revenues-Public Expenditure-Public debt Development activities financed by public expenditure-Evaluation of recent fiscal policy of Government of India-Highlights of Budget -MONETARY POLICY-Demand and Supply of Money–RBI–Objectives of monetary and credit policy- Recent trends-Role of Finance Commission.					
<b>Module-III</b>	<b>INDIA'S TRADE POLICY &amp; BALANCE OF PAYMENTS</b>				<b>10Hrs</b>
INDIA'S TRADE POLICY - Magnitude and direction of Indian International Trade – Bilateral and Multilateral Trade Agreements - EXIM policy and role of EXIM bank - BALANCE OF PAYMENTS– Structure & Major components-Causes for Disequilibrium in Balance of Payments- Correction measures– WTO - Nature and Scope - Organization and Structure – Role and functions of WTO in promoting world trade					

<b>Module–IV</b>	<b>MONEYMARKETSANDCAPITAL MARKETS</b>	<b>10Hrs</b>
FeaturesandcomponentsofIndianfinancialsystems-Objectives,featuresandstructureofmoneymarkets and capital markets -Reforms and recent development– SEBI-Stock Exchanges - Investor protection and role of SEBI.		
<b>Module–V</b>	<b>INTRODUCTIONTOINFLATION</b>	<b>8Hrs</b>
Inflation–Meaning&Definition–Causes–Effects–Types–Advantages&Disadvantages Deflation – Meaning& Definition- Causes& Effects.		
<b>Text Books:</b>		
<ol style="list-style-type: none"> <li>1. FrancisCherunilam(2009),“InternationalBusiness”:TextandCases,PrenticeHalof India.</li> <li>2. K.Asathappa,“EssentialsofBusinessEnvironment”:TextsandCases&amp;Exercises13<sup>th</sup> Revised Edition. HPH 2016.</li> </ol>		
<b>Reference Books:</b>		
<ol style="list-style-type: none"> <li>1. K.V.Sivayya,V.B.MDas(2009),IndianIndustrialEconomy,SultanChandPublishers,New Delhi, India.</li> <li>2. Sundaram,Black(2009),InternationalBusinessEnvironmentTextandCases,PrenticeHall of India, New Delhi, India.</li> <li>3. Chari.S.N(2009),InternationalBusiness,WileyIndia.</li> <li>4. E.Bhattacharya(2009),InternationalBusiness,ExcelPublications,NewDelhi.</li> </ol>		
<b>Web References:</b>		
<a href="https://onlinecourses.swayam2.ac.in/imb22_mg02/preview">https://onlinecourses.swayam2.ac.in/imb22_mg02/preview</a>		

**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](http://www.gist.edu.in)



SOFTWARE PROJECT MANAGEMENT					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A3710T	3: 0:0:0	3	CIE: 30SEE:70	3Hours	
<b>Course Objectives:</b>					
<ol style="list-style-type: none"> <li>To develop awareness regarding the theoretical and methodological issues related to software project management.</li> <li>To develop software projects based on current technologies.</li> </ol>					
<b>Course Outcomes (CO):</b>					
<b>On completion of this course, student will be able to</b>					
<ul style="list-style-type: none"> <li>Identify the theoretical and methodological issues involved in modern software engineering project management</li> <li>Develop the transferable skills in logical analysis, communication and Project management necessary for working within a team.</li> <li>Translate a specification to a design, and identify the components to build the architecture for a given problem, using an appropriate software Engineering methodology.</li> <li>Select and use project management frameworks that ensure successful outcomes.</li> <li>Illustrate the risk management of software configurations.</li> <li>Develop software projects based on current technologies, by managing resources economically and keeping ethical values</li> </ul>					
<b>Syllabus</b>				<b>Total Hours:45</b>	
<b>Module-I</b>	<b>Introduction to software engineering</b>			<b>9Hrs</b>	
<p><b>Introduction to software engineering-</b> scope of software engineering, historical aspects, economic aspects, maintenance aspects, specification and design aspects, team Programming aspects. Layered technology, processes, methods and tools. Phases in Software development</p> <p><b>Process models-</b> prescriptive process models- waterfall model, incremental models, Evolutionary models and concurrent models</p>					
<b>Module-II</b>	<b>Agile development</b>			<b>9Hrs</b>	
<p><b>Agile development-</b> agility, agile process. Extreme programming- XP Values, The XP Process, Industrial XP, The XP Debate. Agile development models- Adaptive Software Development (ASD), Scrum, Dynamic Systems Development Method (DSDM), Crystal, Feature Driven Development (FDD), Lean Software Development (LSD), Agile Modeling (AM) , Agile Unified Process (AUP).</p> <p><b>Project management concepts-</b> the management spectrum, people, product, process, and project</p>					
<b>Module-III</b>	<b>Process and project metrics</b>			<b>9Hrs</b>	
<p><b>Process and project metrics-</b> software measurement- size oriented, function oriented, LOC and function point, metrics for software quality- measuring quality, defect removal efficiency, integrating metrics within the software process</p> <p><b>Estimation for software projects-</b> project planning, software scope, resources. Software project estimation, decomposition techniques- Software Sizing, Problem-Based Estimation, Process- Based Estimation</p>					
<b>Module-IV</b>	<b>Empirical estimation models</b>			<b>9Hrs</b>	
<p>Empirical estimation models- structure of estimation models, COCOMO II model.          Estimation for agile development. Make/buy decision.</p>					

Project scheduling- relationship between people and effort, effort distribution. Task set, defining a task network. Scheduling- timeline chart, tracking the schedule. Earned value analysis

<b>Module-V</b>	<b>Risk management</b>	<b>9Hrs</b>
<p><b>Risk management-</b> risk strategies, software risks, risk identification, risk projection, risk refinement, Risk Mitigation, Monitoring, and Management. The RMMM Plan.</p> <p><b>Software Configuration Management</b> - An SCM Scenario, Elements of a Configuration Management System, Baselines, Software Configuration Items. The SCM Repository - The Role of the repository, General Features and Content, SCM Features. The SCM Process- Identification of Objects in the Software Configuration, Version Control, Change Control, and Configuration Audit, Status Reporting.</p>		
<p><b>Text Books:</b></p> <p>1. Roger S. Pressman, Software Engineering, 8/e, McGraw Hill, 2014</p>		
<p><b>Reference Books:</b></p> <p>1. Pressman R S, Software Engineering-A Practitioner’s Approach, 7th edition, McGrawHill 2. Ian Sommerville, Software Engineering, 7/e, University of Lancaster, Pearson Education, 2004. 3. Bob Huges, Mike Cotterell, Rajib Mall, Software Project Management, 8/e, McGraw Hill,2015. 4. Walker Royce, Software Project Management : A Unified Frame Work, Pearson Education.</p>		
<p><b>Web References:</b></p> <p>1. <a href="https://www.tutorialspoint.com/software_engineering/software_project_management.htm">https://www.tutorialspoint.com/software_engineering/software_project_management.htm</a> 2. <a href="https://www.javatpoint.com/software-project-management">https://www.javatpoint.com/software-project-management</a></p>		



## 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](http://www.gist.edu.in)

<b>BIG DATA ANALYTICS</b> (Common to CSE, AI&ML, DS, CS)					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A0534c</b>	<b>3:0:0:0</b>	<b>3</b>	<b>CIE:30 SEE:70</b>	<b>3 Hours</b>	<b>PEC</b>
<b>Course Objectives:</b>					
<ul style="list-style-type: none"> <li>• Understand the basic concepts and importance of Big Data</li> <li>• Familiarize with the installation of Hadoop and how to analyze the Big Data</li> <li>• Understand the design concepts of HDFS</li> <li>• Provide good insight for developing a MapReduce applications</li> <li>• Understand Hadoop environment.</li> <li>• Explore the concepts of Pig, Hive, Spark and HBase</li> </ul>					
<b>Course Outcomes (CO):</b>					
<p>After the completion of the course students will able to</p> <p>CO1: Understand the concepts and tools of big data.</p> <p>CO2: Analyzing the Data with Hadoop</p> <p>CO3: Develop MapReduce application</p> <p>CO4: Illustrate the Anatomy of MapReduce and Hadoop environment</p> <p>Determine why existing technologies are inadequate to analyze the large data</p> <p>CO5: Apply large-scale analytic tools to solve some of the open big data problems.</p> <p>CO6: Analyze analytic tools</p>					
<b>Syllabus</b>				<b>Total Hours:48</b>	
<b>Module-I</b>	<b>Introduction to Big Data</b>			<b>10Hrs</b>	
<p><b>Introduction to Big Data:</b> Big data fundamentals, importance of big data, Structuring Big Data, Big Data Analytics, Meet Hadoop: Data, Data Storage and Analysis, History of Apache Hadoop, Hadoop Ecosystem, Installation of Hadoop, Analyzing the Data with Hadoop, Scaling Out.</p>					
<b>Module-II</b>	<b>HDFS and MapReduce</b>			<b>9Hrs</b>	
<p><b>HDFS:</b> HDFS Concepts, HDFS Architecture, The Command-Line Interface, Data flow: Anatomy of a file read and Anatomy of a file write.</p> <p><b>Map Reduce:</b> Developing a MapReduce application: The Configuration API, setting up the Development Environment, Running Locally on Test Data, Running on a Cluster.</p>					
<b>Module-III</b>	<b>How MapReduce Works and Hadoop Environment</b>			<b>10Hrs</b>	
<p><b>How MapReduce Works:</b> Anatomy of a Map Reduce Job Run, Failures, Shuffle and Sort.</p> <p><b>Hadoop Environment:</b> Setting up a Hadoop Cluster, Cluster specification, Cluster Setup and Installation, Hadoop Configuration.</p>					
<b>Module-IV</b>	<b>Data Analyzation using Pig as a tool</b>			<b>9Hrs</b>	
<p><b>Pig:</b> Pig Concepts, Apache Pig Architecture, Installing and Running Pig, Comparison with Databases, Pig Latin, User Defined Functions, Data Processing Operators.</p>					
<b>Module-V</b>	<b>Open source tools for Big Data: Hive, Spark and HBase</b>			<b>10Hrs</b>	



**Hive:** Hive concepts, Hive Architecture, Installing Hive, Comparison with traditional Databases, HiveQL, Tables, Querying Data.

**Spark:** Spark Concepts, Architecture of Spark, Installing Spark, Anatomy of a Spark Job Run.

**HBase:** Introduction to HBase, HBase Architecture, Installation.

**Text Books:**

1. Tom White, "Hadoop: The Definitive Guide" Fourth Edition, O'Reilly Media, 2015.
2. Big Data Black Book, DT Editorial services, Dream tech Press
3. Big Data, Big Analytics: Emerging business intelligence and analytic trends for today's businesses, Michael Minnelli, Michelle Chambers, and Amiga Dhiraj, Wiley Cio Series

**Reference Books:**

1. Glenn J. Myatt, Making Sense of Data, John Wiley & Sons, 2007 Pete Warden, Big Data Glossary, O'Reilly, 2011.
2. Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer, 2007.
3. Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos, Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data, McGraw Hill Publishing, 2012.
4. Anand Rajaraman and Jeffrey David Ullman, Mining of Massive Datasets Cambridge University Press, 2012

**Web References:**

[https://onlinecourses.swavam2.ac.in/arp19\\_ap60/preview](https://onlinecourses.swavam2.ac.in/arp19_ap60/preview)

<https://www.shiksha.com/online-courses/big-data-analytics-courses-certification-training-by-nptel-st601-tg91>



## 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](http://www.gist.edu.in)

<b>Internet of Things</b>					
(Common to CSE, AI&ML, DS, CS)					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0530c	3:0:0:0	3	CIE:30 SEE:70	3 Hours	PEC
<b>Course Objectives:</b>					
<p>This course will enable students to:</p> <ul style="list-style-type: none"> <li>• Introduce the fundamental concepts of IoT and physical computing , Expose the student to a variety of embedded boards and IoT Platform, Create a basic understanding of the communication protocols in IoT communications. Familiarize the student with application program interfaces for IoT and Enable students to create simple IoT applications.</li> </ul>					
<b>Course Outcomes (CO):</b>					
<b>On completion of this course, student will be able to</b>					
<ul style="list-style-type: none"> <li>• Understand the Basic sensors and actuators for an IoT application.</li> <li>• Select protocols for a specific IoT application .</li> <li>• Utilize the cloud platform and APIs for IoT applications .</li> <li>• Experiment with embedded boards for creating IoT prototypes.</li> <li>• Design a solution for a given IoT application .</li> <li>• Able to understand the application areas of IOT.</li> </ul>					
<b>Syllabus</b>					<b>Total Hours:48</b>
<b>Module-I</b>	<b>Overview of IoT</b>				<b>10Hrs</b>
<p>The Internet of Things: <b>An Overview, The Flavour of the Internet of Things, The “Internet” of “Things”, The Technology of the Internet of Things, Enchanted Objects, Who is Making the Internet of Things?</b></p> <p><b>Design Principles for Connected Devices:</b> Calm and Ambient Technology, Privacy, Web Thinking for Connected Devices, Affordances.</p> <p><b>Prototyping:</b> Sketching, Familiarity, Costs Vs Ease of Prototyping, Prototypes and Production, Open source Vs Close source, Tapping into the community</p>					
<b>Module-II</b>	<b>Embedded Devices</b>				<b>9Hrs</b>
<p>Electronics, Embedded Computing Basics, Arduino, Raspberry Pi, Mobile phones and tablets, Plug Computing: Always-on Internet of Things</p>					
<b>Module-III</b>	<b>Communication in the IoT</b>				<b>9Hrs</b>
<p><b>Internet Communications:</b> An Overview, IP Addresses, MAC Addresses, TCP and UDP Ports,Application Layer Protocols</p> <p><b>Prototyping Online Components:</b></p> <p>Getting Started with an API, Writing a New API, Real-Time Reactions, Other Protocols Protocol</p>					
<b>Module-IV</b>	<b>Business Models</b>				<b>10Hrs</b>

**Business Models: A short history of business models, The business model canvas, Who is the business model for, Models, Funding an Internet of Things startup, Lean Startups.**

**Manufacturing: What are you producing, Designing kits, Designing printed circuit boards.**

**Module-V**

**Manufacturing Process**

**10Hrs**

**Manufacturing continued: Manufacturing printed circuit boards, Mass-producing the case and other fixtures, Certification, Costs, Scaling up software.**

**Ethics: Characterizing the Internet of Things, Privacy, Control, Environment, Solutions.**

**Text Books:**

1. Adrian McEwen, Hakim Cassimally - Designing the Internet of Things, Wiley Publications, 2012

**Reference Books:**

1. Arshdeep Bahga, Vijay Madisetti - Internet of Things: A Hands-On Approach, Universities Press, 2014.
2. The Internet of Things, Enabling technologies and use cases – Pethuru Raj, Anupama C. Raman, CRC Press.

**Web Resources:**

<https://www.arduino.cc/>

<https://www.raspberrypi.org/>



## 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](http://www.gist.edu.in)

<b>AGILE METHODOLOGIES</b>					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A0536c</b>	<b>3:0:0:0</b>	<b>3</b>	<b>CIE:30 SEE:70</b>	<b>3 Hours</b>	<b>PEC</b>
<b>Course Objectives:</b>					
<p>This course will enable students to:</p> <ul style="list-style-type: none"> <li>• to ensure that development teams complete projects on time and within budget.</li> <li>• It also helps to improve communication between the development team and the product owner. Additionally, Agile development methodology can help reduce the risks associated with complex projects</li> </ul>					
<b>Course Outcomes (CO):</b>					
<p><b>On completion of this course, student will be able to</b></p> <ul style="list-style-type: none"> <li>• include increased speed and agility in delivering products or services, improved customer satisfaction.</li> <li>• reducing cycle time, improving quality, and reducing waste. and reduced costs.</li> <li>• All successful Agile software development projects begin with an ideation stage.</li> <li>• To tangible product or service that is produced by an agile team.</li> <li>• This iterative approach allows teams to adapt to changes quickly, deliver value incrementally, and ensure that the final product meets the evolving needs of stakeholders</li> </ul>					
<b>Syllabus</b>					<b>Total Hours:48</b>
<b>Module-I</b>	<b>Fundamentals of Agile</b>				<b>10Hrs</b>
The Genesis of Agile - Introduction and background, Agile Manifesto and Principles Overview of Scrum, Extreme Programming, Feature Driven development, Lean Software Development, Agile project management, Design and development practices in Agile projects, Test Driven Development, Continuous Integration, Refactoring, Pair Programming, Simple Design, User Stories, Agile Testing Agile Tools.					
<b>Module-II</b>	<b>Agile Scrum Framework</b>				<b>9Hrs</b>
Introduction to Scrum, Project phases, Agile Estimation, Planning game, Product backlog, Sprint backlog, Iteration planning, User story definition, Characteristics and content of user stories, Acceptance tests and Verifying stories, Project velocity Burn down chart, Sprint planning and retrospective, Daily scrum, Scrum roles, Product Owner Scrum Master, Scrum Team, Scrum Case Study, Tools for Agile project management.					
<b>Module-III</b>	<b>Agile Testing</b>				<b>9Hrs</b>
The Agile lifecycle and its impact on testing, Test-Driven Development (TDD), xUnit framework and tools for TDD, Testing user stories acceptance tests and scenarios, Planning and managing testing cycle, Exploratory testing, Risk based testing, Regression tests, Test Automation-Tools to support the Agile tester					
<b>Module-IV</b>	<b>Agile Software Design and Development</b>				<b>10Hrs</b>
Agile design practices, Role of design Principles including Single Responsibility Principle, Open Closed Principle, Liskov Substitution Principle, Interface Segregation Principles, Dependency Inversion Principle in Agile Design, Need and significance of Refactoring, Refactoring Techniques,					

Continuous Integration, Automated build tools, Version		
<b>Module-V</b>	<b>Industry Trends</b>	<b>10Hrs</b>
Market Scenario and adoption of Agile, Agile ALM, Roles in an Agile project, Agile applicability, Agile in Distributed teams, Business benefits, Challenges in Agile, Risks and Mitigation, Agile projects on cloud, Balancing Agility with Discipline, Agile rapid development technologies		
<b>Text Books:</b> Sooner Safer Happier: Antipatterns and Patterns for Business Agility		
<b>Reference Books:</b> <ul style="list-style-type: none"> <li>• Ken Schwaber and Jeff Sutherland</li> </ul>		



## 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](http://www.gist.edu.in)

<b>Information Retrieval Systems</b> (Common to CSE, AI&ML, DS, CS)					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A3308T	3:0:0:0	3	CIE:30 SEE:70	3 Hours	PEC
<b>Course Objectives:</b>					
This course will enable students to: <ul style="list-style-type: none"> <li>• Teach how to retrieve information</li> <li>• Discuss indexing and how to use it</li> <li>• Demonstrate how to automate indexing</li> </ul>					
<b>Course Outcomes (CO):</b>					
After the completion of the course students will able to <ul style="list-style-type: none"> <li>• Recognize the Boolean Model, Vector Space Model, and Probabilistic Model.</li> <li>• Understand retrieval utilities.</li> <li>• Understand different formatting tags</li> <li>• Understand cross-language information retrieval</li> <li>• Understand the clustering techniques</li> <li>• Determine the efficiency.</li> </ul>					
<b>Syllabus</b>					<b>Total Hours:48</b>
<b>Module-I</b>	<b>Introduction</b>				<b>10Hrs</b>
Introduction to Information Retrieval Systems: Definition of Information Retrieval System, Objectives of Information Retrieval Systems, Functional Overview, Relationship to Database Management Systems, Digital Libraries and Data Warehouses.  Information Retrieval System Capabilities: Search Capabilities, Browse Capabilities, Miscellaneous Capabilities					
<b>Module-II</b>	<b>Cataloguing and Indexing, Data structure</b>				<b>9Hrs</b>
Cataloguing and Indexing: History and objectives of Indexing, Indexing Process, Automatic Indexing, Information extraction.  Data structure: Introduction to Data Structure, Stemming Algorithms, Inverted File Structure, N-Gram Data Structures, PAT Data Structure, Signature File Structure, Hypertext and XML Data Structures, Hidden Markov Models.					
<b>Module-III</b>	<b>Automatic Indexing, Document and Term Clustering</b>				<b>10Hrs</b>
Automatic Indexing: Classes of Automatic Indexing, Statistical Indexing, Natural Language, Concept Indexing, Hypertext Linkages.  Document and Term Clustering: Introduction to Clustering, Thesaurus Generation, Manual Clustering Automatic Term Clustering, Complete Term Relation Method, Clustering Using Existing Clusters, One Pass Assignments, Item Clustering, hierarchy of Clusters.					
<b>Module-IV</b>	<b>Automatic Indexing, Information visualization</b>				<b>9Hrs</b>
Automatic Indexing: Search Statements and Binding, Similarity Measures and Ranking, Relevance Feedback, Selective Dissemination of Information Search, Weighted Searches of Boolean Systems,					

<p>Searching the INTERNET and Hypertext.</p> <p>Information visualization: Introduction to Information visualization, Cognition and perception, Information Visualization Technologies.</p>		
<b>Module-V</b>	<b>Text Search Algorithms, Multimedia Information Retrieval, Information System Evaluation</b>	<b>10Hrs</b>
<p>Text Search Algorithms: Introduction to Text Search techniques, software Text Search algorithms, Hardware Text Search Systems.</p> <p>Multimedia Information Retrieval: Spoken Language Audio Retrieval, Non-Speech Audio Retrieval, Graph retrieval, Imagery Retrieval, Video Retrieval.</p> <p>Information System Evaluation: Introduction to Information System Evaluation, Measures Used in System Evaluation, Measurement Example- TREC results.</p>		
<p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>1. Information Storage and Retrieval Systems: Theory and Implementation by Gerald J. Kowalski, Mark T. Maybury, Springer, 2013.</li> </ol>		
<p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. Frakes, W.B., Ricardo Baeza-Yates: Information Retrieval Data Structures and Algorithms, Prentice Hall, 1992.</li> <li>2. Modern Information Retrieval by Yates Pearson Education.</li> <li>3. Information Storage &amp; Retrieval by Robert Korfhage – John Wiley &amp; Sons.</li> </ol>		
<p><b>Web References:</b></p> <p><a href="https://www.tutorialandexample.com/information-retrieval">https://www.tutorialandexample.com/information-retrieval</a></p>		



## 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](http://www.gist.edu.in)

<b>ADHOC AND WIRELESS SENSOR METHODS</b>					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A0535c</b>	<b>3:0:0:0</b>	<b>3</b>	<b>CIE:30 SEE:70</b>	<b>3 Hours</b>	<b>PEC</b>
<b>Course Objectives:</b>					
<p>This course will enable students to:</p> <ul style="list-style-type: none"> <li>• To Appreciate the importance of Adhoc and sensor networks for applications like environment monitoring, habitat monitoring, health care and data acquisition systems.</li> <li>• Understanding of data transmission technologies of the Adhoc and sensor devices with focus on channel access routing and security.</li> <li>• The objective of this course is to study the fundamentals of Adhoc and Sensor Networks useful in data acquisition and IoT systems</li> </ul>					
<b>Course Outcomes (CO):</b>					
<b>On completion of this course, student will be able to</b>					
<ul style="list-style-type: none"> <li>• Appreciate the importance of Adhoc and sensor networks for applications like environment monitoring, habitat monitoring, health care and data acquisition systems.</li> <li>• Understanding of data transmission technologies of the Adhoc and sensor devices with focus on channel access routing and security.</li> <li>• Appreciate the need and importance of converged networks, ubiquitous environment and ‘ Internet of things’ in the context of Adhoc and sensor networks.</li> <li>• Capable of model building ,new protocol design and strategies simulation of the systems.</li> <li>• To understand the issues pertaining to sensor networks and the challenges involved in managing a sensor network.</li> </ul>					
<b>Syllabus</b>					<b>Total Hours:48</b>
<b>Module-I</b>	<b>AD HOC NETWORKS – INTRODUCTION AND ROUTING PROTOCOLS</b>				<b>10Hrs</b>
Elements of Ad hoc Wireless Networks, Issues in Ad hoc wireless networks, Example commercial applications of Ad hoc networking, Ad hoc wireless Internet, Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks, Classifications of Routing Protocols, Table Driven Routing Protocols – Destination Sequenced Distance Vector (DSDV), On–Demand Routing protocols –Ad hoc On–Demand Distance Vector Routing (AODV).					
<b>Module-II</b>	<b>SENSOR NETWORKS – INTRODUCTION &amp; ARCHITECTURES</b>				<b>9Hrs</b>
Challenges for Wireless Sensor Networks, Enabling Technologies for Wireless Sensor Networks, WSN application examples, Single-Node Architecture – Hardware Components, Energy Consumption of Sensor Nodes, Network Architecture – Sensor Network Scenarios, Transceiver Design Considerations, Optimization Goals and Figures of Merit.					
<b>Module-III</b>	<b>WSN NETWORKING CONCEPTS AND PROTOCOLS</b>				<b>9Hrs</b>



MAC Protocols for Wireless Sensor Networks, Low Duty Cycle Protocols And Wakeup Concepts – S-MAC, The Mediation Device Protocol, Contention based protocols – PAMAS, Schedule based protocols – LEACH, IEEE 802.15.4 MAC protocol, Routing Protocols- Energy Efficient Routing, Challenges and Issues in Transport layer protocol.

<b>Module-IV</b>	<b>SENSOR NETWORK SECURITY</b>	<b>10Hrs</b>
<p>Network Security Requirements, Issues and Challenges in Security Provisioning, Network Security Attacks, Layer wise attacks in wireless sensor networks, possible solutions for jamming, tampering, black hole attack, flooding attack. Key Distribution and Management, Secure Routing – SPINS, reliability requirements in sensor networks.</p>		
<b>Module-V</b>	<b>SENSOR NETWORK PLATFORMS AND TOOLS</b>	<b>10Hrs</b>
<p>Sensor Node Hardware – Berkeley Motes, Programming Challenges, Node-level software platforms – TinyOS, nesC, CONTIKIOS, Node-level Simulators – NS2 and its extension to sensor networks, COOJA, TOSSIM, Programming beyond individual nodes – State centric programming.</p>		
<p><b>Text Books:</b></p> <ul style="list-style-type: none"> <li>• "Ad Hoc Wireless Networks: Architectures and Protocols" by MURTHY.</li> </ul>		
<p><b>Reference Books:</b></p> <ul style="list-style-type: none"> <li>• "AD HOC Wireless Networks: A Communication-Theoretic Perspective" by Ozan K Tonguz, Gianluigi Ferrari</li> </ul>		



## 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](http://www.gist.edu.in)

<b>DESIGN PATTERNS</b> (Common to CSE, AI&ML, DS, CS)					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A0530c</b>	<b>3:0:0:0</b>	<b>3</b>	<b>CIE: 30 SEE:70</b>	<b>3 Hours</b>	<b>PEC</b>
<b>Course Objectives:</b>					
<p>This course will enable students to:</p> <ul style="list-style-type: none"> <li>• understand design patterns and their underlying object-oriented concepts.</li> <li>• understand implementation of design patterns and providing solutions to real world software design problems.</li> <li>• To understand patterns with each other and understanding the consequences of combining patterns on the overall quality of a system.</li> </ul>					
<b>Course Outcomes (CO):</b>					
<b>On completion of this course, student will be able to</b>					
<ul style="list-style-type: none"> <li>• Know the underlying object oriented principles of design patterns.</li> <li>• Understand the creational patterns</li> <li>• Understand the structural patterns</li> <li>• Understand the behavioral patterns</li> <li>• Understand the context in which the pattern can be applied.</li> <li>• Understand how the application of a pattern affects the system quality and its tradeoffs.</li> </ul>					
<b>Syllabus</b>				<b>Total Hours:48</b>	
<b>Module-I</b>	<b>Introduction to Design Patterns</b>			<b>10Hrs</b>	
Design Pattern Definition, Design Patterns in Small Talk MVC, Describing Design Patterns, Catalog of Design Patterns, Organizing the Catalog, Solving of Design Problems using Design Patterns, Selection of a Design Pattern, Use of Design Patterns.					
<b>Module-II</b>	<b>Designing A Document Editor</b>			<b>9Hrs</b>	
Design problems, Document structure, Formatting, Embellishing the User Interface, Supporting Multiple Look and Feel standards, Supporting Multiple Window Systems, User Operations, Spelling Checking and Hyphenation.					
Creational Patterns: Abstract Factory, Builder, Factory Method, Prototype, Singleton, Discussion of Creational Patterns.					
<b>Module-III</b>	<b>Structural Patterns</b>			<b>10Hrs</b>	
Structural Patterns-1: Adapter, Bridge, Composite.					
Structural Patterns-2: Decorator, Facade, Flyweight, Proxy, Discuss of Structural Patterns					
<b>Module-IV</b>	<b>Behavioral Patterns</b>			<b>9Hrs</b>	
Behavioral Patterns-1: Chain of Responsibility, Command, Interpreter, Iterator.					
Behavioral Patterns-2: Mediator, Memento, Observer.					

Module-V	Behavioral Patterns	10Hrs
Behavioral Patterns-2(cont'd): State, Strategy, Template Method, Visitor, Discussion of Behavioral Patterns. What to Expect from Design Patterns.		
<b>Text Books:</b> 1. Design Patterns By Erich Gamma, Pearson Education		
<b>Reference Books:</b> 1. Pattern's in JAVA Vol-I By Mark Grand, Wiley DreamTech. 2. Pattern's in JAVA Vol-II By Mark Grand, Wiley DreamTech. 3. JAVA Enterprise Design Patterns Vol-III By Mark Grand, Wiley DreamTech. 4. Head First Design Patterns By Eric Freeman-Oreilly-spd 5. Design Patterns Explained By Alan Shalloway, Pearson Education. 6. Pattern Oriented Software Architecture, F.Buschmann&others, John Wiley & Sons		
<b>Web References:</b> <a href="https://elearn.nptel.ac.in/shop/iit-workshops/completed/cloud-architecture-design-patterns-pc-oncloud/">https://elearn.nptel.ac.in/shop/iit-workshops/completed/cloud-architecture-design-patterns-pc-oncloud/</a> <a href="https://www.youtube.com/watch?v=1xUz1fp23TQ">https://www.youtube.com/watch?v=1xUz1fp23TQ</a>		



## 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](http://www.gist.edu.in)

<b>DEEP LEARNING</b> (Common to CSE,AI&ML,DS,CS)					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A0535c</b>	<b>3:0:0:0</b>	<b>3</b>	<b>CIE:30 SEE:70</b>	<b>3 Hours</b>	<b>PEC</b>
<b>Course Objectives:</b>					
This course will enable students to: <ul style="list-style-type: none"> <li>• Demonstrate the major technology trends driving Deep Learning</li> <li>• Build, train, and apply fully connected deep neural networks</li> <li>• Implement efficient neural networks</li> <li>• Analyze the key parameters and hyper parameters in a neural network's architecture</li> </ul>					
<b>Course Outcomes (CO):</b>					
<b>On completion of this course, student will be able to</b> <ul style="list-style-type: none"> <li>• Apply Mathematical Operations on Neural Network. (L3)</li> <li>• Choose proper Hyperparameters. (L4)</li> <li>• Examine architecture of Deep Neural Network. (L3)</li> <li>• Apply Convolutional Neural Networks in Image Classifications. (L3)</li> <li>• Use RNN and LSTMs in Real time applications. (L3)</li> <li>• Analyze different types of Autoencoders. (L4).</li> </ul>					
<b>Syllabus</b>					<b>Total Hours:48</b>
<b>Module-I</b>	<b>Linear Algebra</b>				<b>10Hrs</b>
Scalars, Vectors, Matrices and Tensors, Matrix operations, types of matrices, Norms, Eigen decomposition, Singular Value Decomposition, Principal Components Analysis.					
<b>Information Theory. Numerical Computation:</b> Overflow and Underflow, Gradient-Based Optimization, Constrained Optimization, Linear Least Squares.					
<b>Module-II</b>	<b>Fundamentals of Neural Networks and Deep Learning</b>				<b>9Hrs</b>
Neural Networks, Training Neural Networks, Activation Functions, Loss Functions, Hyper parameters, Building blocks of Deep Neural Networks.					
<b>Module-III</b>	<b>Convolutional Networks</b>				<b>10Hrs</b>
The Convolution Operation, Pooling, Convolution, Basic Convolution Functions, Structured Outputs, Data Types, Efficient Convolution Algorithms, Random or Unsupervised Features, Basis for Convolutional Networks..					
<b>Module-IV</b>	<b>Recurrent and Recursive Neural Networks</b>				<b>9Hrs</b>

**Recurrent Neural Network:** Modelling Time Dimension, 3D Volumetric Input, General Recursive Neural Network Architecture, LSTM Networks, Applications.

**Recursive Neural Network:** Architecture, Varieties of RNN, Applications of RNN.

**Module-V**

**Autoencoders**

**10Hrs**

Under complete Auto encoders, Regularized Auto encoders, Representational Power, Layer Size and Depth, Stochastic Encoders and Decoders, Denoising Auto encoders.

**Text Book:**

1. Ian Good fellow, Yoshua Bengio, Aaron Courville, “Deep Learning”, MIT Press,2016.
2. Josh Patterson and Adam Gibson, “Deep learning: A practitioner's approach”, O'Reilly Media, First Edition, 2017

**Reference Books:**

1. Fundamentals of Deep Learning, Designing next-generation machine intelligence algorithms, Nikhil Buduma, O'Reilly, Shroff Publishers, 2019.
2. Deep learning Cook Book, Practical recipes to get started Quickly, DouweOsinga, O'Reilly, Shroff Publishers, 2019.

**Web Reference:**

1. <https://keras.io/datasets/>
2. <http://deeplearning.net/tutorial/deeplearning.pdf>
3. <https://arxiv.org/pdf/1404.7828v4.pdf>
4. <https://www.cse.iitm.ac.in/~miteshk/CS7015.html>
5. <https://www.deeplearningbook.org>
6. <https://nptel.ac.in/courses/106105215>



*RG 22 Regulations*

## 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](http://www.gist.edu.in)

<b>Block Chain Technology</b> (Common to CSE, AI&ML, DS, CS)					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0535a	3:0:0:0	3	CIE:30 SEE:70	3 Hours	PEC
<b>Course Objectives:</b>					
<p>This course will enable students to:</p> <ul style="list-style-type: none"> <li>• Illustrate the fundamental concepts of black chain.</li> <li>• Determine the crypto currency primitives.</li> <li>• Compare and contrast the bit coins and Crypto currency</li> <li>• Illustrate the different security features</li> </ul>					
<b>Course Outcomes (CO):</b>					
<b>On completion of this course, student will be able to</b>					
<ul style="list-style-type: none"> <li>• Describe the basic concepts and technology used for block chain.</li> <li>• Describe the primitives of the distributed computing and cryptography related to block chain.</li> <li>• Illustrate the concepts of Bit coin and their usage.</li> <li>• Implement Ethereum block chain contract.</li> <li>• Apply security features in blockchain technologies.</li> <li>• Use smart contract in real world applications.</li> </ul>					
<b>Syllabus</b>				<b>Total Hours:48</b>	
<b>Module-I</b>	<b>Introduction</b>			<b>9Hrs</b>	
Need for Distributed Record Keeping, Modeling faults and adversaries, Byzantine Generals problem, Consensus algorithms and their scalability problems, Nakamoto's concept with Block chain based crypto currency, Technologies Borrowed in Block chain – hash pointers, consensus, byzantine fault- tolerant distributed computing, digital cash etc					
<b>Module-II</b>	<b>Basic Distributed Computing &amp; Crypto primitives:</b>			<b>10Hrs</b>	
Atomic Broadcast, Consensus, Byzantine Models of fault tolerance, Hash functions, Puzzle friendly Hash, Collision resistant hash, digital signatures, public key crypto, verifiable random functions, Zero-knowledge systems					
<b>Module-III</b>	<b>Bitcoin basics</b>			<b>10Hrs</b>	
Bitcoin blockchain, Challenges and solutions, proof of work, Proof of stake, alternatives to Bitcoin consensus, Bitcoin scripting language and their use					
<b>Module-IV</b>	<b>Ethereum basics:</b>			<b>10Hrs</b>	
Ethereum and Smart Contracts, The Turing Completeness of Smart Contract Languages and verification challenges, Using smart contracts to enforce legal contracts, comparing Bitcoin scripting vs. Ethereum Smart Contracts, Writing smart contracts using Solidity & JavaScript					
<b>Module-V</b>	<b>Privacy, Security issues in Block chain:</b>			<b>9Hrs</b>	

Pseudo-anonymity vs. anonymity, Zcash and Zk-SNARKS for anonymity preservation, attacks on Block chains: Sybil attacks, selfish mining, 51% attacks advent of algorand; Sharding based consensus algorithms to prevent these attacks

**Text Books:**

1. Josh Thompson, 'Block chain: The Block chain for Beginnings, Guild to Block chain Technology and Block chain Programming', Create Space Independent Publishing Platform, 2017.
2. Narayanan, Bonneau, Felten, Miller and Gold feder, "Bitcoin and Crypto currency Technologies – A Comprehensive Introduction", Princeton University Press.

**Reference Books:**

1. Imran Bashir, "Mastering Block chain: Distributed ledger technology, decentralization, and smart contracts explained", Packt Publishing.
2. Merunas Grincalaitis, "Mastering Ethereum: Implement Advanced Block chain Applications Using Ethereum-supported Tools, Services, and Protocols", Packet Publishing.

**Web References:**

1. [https://onlinecourses.nptel.ac.in/noc22\\_cs44/preview](https://onlinecourses.nptel.ac.in/noc22_cs44/preview)
2. <https://nptel.ac.in/courses/106104220>



## 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](http://www.gist.edu.in)

<b>SMART GRID</b>					
(Common to CSE, AI&ML, CS, DS, ECE, EEE, ME)					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0241Ta	3:0:0:0	3	CIE:30 SEE:70	3 Hours	OEC
<b>Course Objectives:</b>					
<b>Student will be able to</b>					
<ul style="list-style-type: none"> <li>• Overview of the technologies required for the smart grid</li> <li>• Switching techniques and different means for data communication</li> <li>• Standards for information exchange and smart metering</li> <li>• Methods used for information security on smart grid</li> <li>• Smart metering and protocols for smart metering</li> <li>• Power quality management with upgraded technologies.</li> </ul>					
<b>Course Outcomes (CO):</b>					
<b>On completion of this course, student will be able to</b>					
<ul style="list-style-type: none"> <li>• Understand the concepts and design of Smart grid.</li> <li>• Understand the various communication technologies in smart grid.</li> <li>• Understand the various measurement technologies in smart grid.</li> <li>• Understand the analysis and stability of smart grid.</li> <li>• Learn the renewable energy resources and storages integrated with smart grid.</li> <li>• familiarize the high performance computing for Smart Grid applications</li> </ul>					
<b>Syllabus</b>					<b>Total Hours: 48</b>
<b>Module-I</b>	<b>INTRODUCTION TO SMART GRID</b>				<b>10 Hrs</b>
Evolution of Electric Grid, Concept, Definitions and Need for Smart Grid, Smart grid drivers, functions, opportunities, challenges and benefits, Difference between conventional & Smart Grid, Concept of Resilient & Self-Healing Grid, Present development & International policies in Smart Grid, Diverse perspectives from experts and global Smart Grid initiatives					
<b>Module-II</b>	<b>SMART GRID TECHNOLOGIES</b>				<b>8 Hrs</b>
Technology Drivers, Smart energy resources, Smart substations, Substation Automation, Feeder Automation, Transmission systems: EMS, FACTS and HVDC, Wide area monitoring, Protection and control, Distribution systems: DMS, Volt/VAR control, Fault Detection, Isolation and service restoration, Outage management, High Efficiency Distribution Transformers, Phase Shifting Transformers, Plug in Hybrid Electric Vehicles (PHEV).					
<b>Module-III</b>	<b>SMART METERS</b>				<b>10 Hrs</b>
Introduction to Smart Meters, Advanced Metering infrastructure (AMI) drivers and benefits, AMI protocols, standards and initiatives, AMI needs in the smart grid, Phasor Measurement Unit(PMU),					
Intelligent Electronic Devices(IED) & their application for monitoring & protection.					
<b>Module-IV</b>	<b>POWER QUALITY MANAGEMENT IN SMART GRID</b>				<b>10 Hrs</b>



Power Quality & EMC in Smart Grid, Power Quality issues of Grid connected Renewable Energy Sources, Power Quality Conditioners for Smart Grid, Web based Power Quality monitoring, Power Quality Audit.

**Module–V**

**HIGH PERFORMANCE COMPUTING**

**10 Hrs**

Local Area Network (LAN), House Area Network (HAN), Wide Area Network (WAN), Broad band over Power line (BPL), IP based Protocols, Basics of Web Service and CLOUD Computing to make Smart Grids smarter, Cyber Security for Smart Grid.

**Textbooks:**

1. Smart Grid, Janaka Ekanayake, Liyanage, Wu, Akihiko Yokoyama, Jenkins, Wiley Publications, 2012, Reprint 2015.
2. Smart Grid: Fundamentals of Design and Analysis, James Momoh, Wiley, IEEE Press., 2012, Reprint 2016.

**Reference Books:**

1. The Smart Grid – Enabling Energy efficiency and demand response, Clark W. Gellings, P.E., CRC Press, Taylor & Francis group, First Indian Reprint. 2015.
2. Smart Grid – Applications, Communications, and Security Edited by Lars Torsten Berger, Krzysztof Iniewski, WILEY, 2012, Reprint 2015.
3. Practical Electrical Network Automation and Communication Systems, Cobus Strauss, ELSVIER, 2003

**Web References:**

[https://onlinecourses.nptel.ac.in/noc22\\_ee82/preview](https://onlinecourses.nptel.ac.in/noc22_ee82/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](http://www.gist.edu.in)

<b>BASIC VLSI DESIGN</b>					
(Common to CSE, AI&ML, CS, DS, ECE, EEE, ME)					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A0432T</b>	<b>3:0:0</b>	<b>3</b>	<b>CIE:30 SEE:70</b>	<b>3 Hours</b>	<b>OEC</b>
<b>Course Objectives:</b>					
<ul style="list-style-type: none"> <li>To give exposure to different steps involved in fabrication Process of PMOS &amp; NMOS transistors, CMOS &amp; BICOM Inverters.</li> <li>To provide knowledge on electrical properties of MOS &amp; BICMOS devices to analyze the behaviour of inverters designed with various loads.</li> <li>To provide knowledge on Basic Circuit Concepts of VLSI Design</li> <li>To apply the design Rules and draw layout of a given logic circuit and basic circuit concepts to MOS circuits.</li> <li>To Apply the design for testability methods for combinational &amp; sequential CMOS circuits</li> </ul>					
<b>Course Outcomes:</b>					
After the completion of the course students will able to:					
<ul style="list-style-type: none"> <li>Acquire qualitative knowledge about the fabrication process of integrated circuit using MOS transistors.</li> <li>Understand the concept of Basic Electrical Properties of MOS/Bi-CMOS Devices</li> <li>Apply the basic circuit concepts to MOS circuits.</li> <li>Understand the concept of Scaling of MOS circuits and Limitations of Scaling</li> <li>Apply the design Rules to draw the Stick diagram &amp; layout of a given logic circuit.</li> <li>Interpret the need for testability and testing methods in VLSI.</li> </ul>					
<b>Syllabus</b>					<b>Total Hours: 48</b>
<b>Module-I:</b>	<b>Introduction to Fabrication Process</b>				<b>10Hrs</b>
<p><b>Introduction:</b> Brief Introduction to IC technology, Moore's Law, Different modes MOSFET operation, Fabrication Process of PMOS, NMOS, CMOS &amp; Bi-CMOS devices, Comparison between CMOS and Bi-polar Technologies.</p> <p><b>Fabrication Steps:</b> Wafer Preparation, Oxidation, Photolithography, Etching, Ion Implantations, Metallization, Testing.</p>					
<b>Module- II</b>	<b>Basic Electrical Properties of MOS/BiCMOS devices</b>				<b>10 Hrs</b>
<p><b>Basic Electrical Properties:</b> Ids Vs Vds relationships, MOS transistor Threshold Voltage-VT, figure of merit-<math>\omega_0</math>, Trans-conductance - gm, Output conductance-gds, Pass transistor logic, NMOS Inverter, Pull-up to Pull-down Ratio for NMOS inverter driven by another NMOS inverter, and through one or more pass transistors Various pull ups, CMOS Inverter analysis and design, Bi-CMOS Inverters.</p>					
<b>Module- III</b>	<b>Basic Circuit Concepts</b>				<b>9Hrs</b>
<p><b>Basic Circuit Concepts:</b> Sheet Resistance Rs and concepts to MOS, Area Capacitances calculations, Inverter Delays, Driving large Capacitive Loads, Wiring Capacitances, Fan-in and fan-out</p>					

<b>Module– IV</b>	<b>VLSI Circuit Design Processes</b>	<b>10Hrs</b>
VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rules and Layout, Lambda( $\lambda$ )-based design rules for wires, contacts and Transistors, Layout Diagrams for NMOS and CMOS Inverters Logic Gates and Various MOS Circuits. Scaling of MOS circuits, Limitations of Scaling.		
<b>Module– V</b>	<b>CMOS Testing</b>	<b>9Hrs</b>
CAD Tools for Design and Simulation, Aspects of Design Tools, Design for Testability, Testing Combinational Logic, Testing Sequential Logic, Practical Design for Test (OFT) Guidelines, Scan Design Techniques, Built-In-Self-Test (BIST), Future Trends.		
<p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>1. Kamran Eshraghian, “Essentials of VLSI Circuits and Systems”, Douglas and A. Pucknell and Sholeh Eshraghian, Prentice-Hall of India Private Limited, 2005 Edition.</li> <li>2. Behzad Razavi, “Design of Analog CMOS Integrated Circuits”, McGraw Hill, 2003</li> <li>3. Modern VLSI Design – Wayne Wolf, 3 Ed., 1997, Pearson Education.</li> </ol>		
<p><b>References Books:</b></p> <ol style="list-style-type: none"> <li>1. Jan M. Rabaey, “Digital Integrated Circuits”, Anantha Chandrakasan and Borivoje Nikolic, Prentice-Hall of India Pvt.Ltd, 2nd edition, 2009.</li> <li>2. John P. Uyemura, “Introduction to VLSI Circuits and Systems”, John Wiley &amp; Sons, reprint 2009</li> <li>3. CMOS VLSI Design-A Circuits and Systems Perspective, Neil H.E Weste, David Harris, Ayan Banerjee, 3rd Edn, Pearson, 2009.</li> </ol>		
<p>Web References:</p> <p><a href="https://nptel.ac.in/courses/117106092">https://nptel.ac.in/courses/117106092</a></p> <p><a href="https://www.digimat.in/nptel/courses/video/108107129/L01.html">https://www.digimat.in/nptel/courses/video/108107129/L01.html</a></p>		



## 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](http://www.gist.edu.in)

<b>DISASTER MANAGEMENT</b>					
(Common to CSE, AI&ML, CS, DS, ECE, EEE, ME)					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A0151T</b>	<b>3:0:0:0</b>	<b>3</b>	<b>CIE:30 SEE:70</b>	<b>3 Hours</b>	<b>OEC</b>
<b>Course Objectives:</b>					
<ul style="list-style-type: none"> <li>• Develop an understanding of why and how the modern disaster manager is involved with pre-disaster and post-disaster activities.</li> <li>• Develop an awareness of the chronological phases of natural disaster response and refugee relief operations</li> <li>• Describe the three planning strategies useful in mitigation</li> <li>• Describe public awareness and economic incentive possibilities</li> <li>• Understand the tools of post-disaster management</li> </ul>					
<b>Course Outcomes:</b>					
<b>On completion of this course, student will be able to</b>					
<ul style="list-style-type: none"> <li>• To know about the natural hazards and its management</li> <li>• To know about the fire hazards and solid waste management</li> <li>• To understand about the emerging infectious diseases and aids their management</li> <li>• To know about the regulations of building codes and land use planning related to risk and vulnerability.</li> <li>• To impart the education related to risk reduction in schools and communities</li> </ul>					
<b>Syllabus</b>				<b>Total Hours: 48</b>	
<b>Module-I</b>	<b>NATURAL HAZARDS AND DISASTER MANAGEMENT</b>			<b>9 Hrs</b>	
Introduction of DM – Inter disciplinary -nature of the subject– Disaster Management cycle – Five priorities for action. Case study methods of the following: floods, draughts – Earthquakes – global warming, cyclones & Tsunamis – Post Tsunami hazards along the Indian coast – landslides					
<b>Module-II</b>	<b>MAN MADE DISASTER</b>			<b>9 Hrs</b>	
Fire hazards – transport hazard dynamics – solid waste management – post disaster – bio terrorism - threat in mega cities, rail and air craft’s accidents, and Emerging infectious diseases & Aids and their management.					
<b>Module-III</b>	<b>RISK AND VULNERABILITY</b>			<b>10 Hrs</b>	
Building codes and land use planning – social vulnerability – environmental vulnerability – Macroeconomic management and sustainable development, climate change risk rendition – financial management of disaster – related losses.					

<b>Module –IV</b>	<b>ROLE OF TECHNOLOGY IN DISASTER MANAGERMENTS</b>	<b>10 Hrs</b>
Disaster management for infra structures, taxonomy of infra structure – treatment plants and process facilities-electrical substations roads and bridges- mitigation programme for earth quakes –flowchart, geospatial information in agriculture drought assessment-multimedia technology in disaster risk management and training- transformable indigenous knowledge in disaster reduction.		
<b>Module–V</b>	<b>EDUCATION AND COMMUNITY PREPAREDNESS</b>	<b>10 Hrs</b>
Education in disaster risk reduction-Essentials of school disaster education-Community capacity and disaster resilience-Community based disaster recovery -Community based disaster management and social capital-Designing resilience- building community capacity for action.		
<b>Text Books:</b>		
<ol style="list-style-type: none"> <li>1. Rajib shah &amp; R R Krishnamurthy “Disaster Management” – Global Challenges and Local Solutions’ Universities press. (2009),</li> <li>2. Tushar Bhattacharya, “Disaster Science &amp; Management” Tata McGraw Hill Education Pvt. Ltd., New Delhi</li> </ol>		
<b>Reference Books:</b>		
<ol style="list-style-type: none"> <li>1. Harsh. K. Gupta “Disaster Management edited”, Universities press, 2003.</li> </ol>		
<b>Web Reference:</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://www.youtube.com/watch?v=DExlZTfKZAM&amp;list=PLC4PaTsQiLcbejXqJR7S59Ohk2OK1rgEG">https://www.youtube.com/watch?v=DExlZTfKZAM&amp;list=PLC4PaTsQiLcbejXqJR7S59Ohk2OK1rgEG</a></li> </ol>		



## 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](http://www.gist.edu.in)

<b>MEASUREMENTS AND MECHATRONICS</b> (Common to CSE, AI&ML, CS, DS, ECE, EEE, ME)					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A0327Tc</b>	<b>3:0:0:0</b>	<b>3</b>	<b>CIE:30 SEE:70</b>	<b>3 Hours</b>	<b>OEC</b>
<b>Course Objectives:</b>					
<ul style="list-style-type: none"> <li>• To instruct the principles of interchangeable manufacture.</li> <li>• To introduce basic principles of mechanical measurements.</li> <li>• To impart knowledge on mechatronics systems.</li> </ul>					
<b>Course Outcomes:</b>					
Upon successful completion of the course, the students will be able to <ul style="list-style-type: none"> <li>• design the limit gauges for interchangeable manufacture.</li> <li>• apply the basic principles of mechanical measurements for engineering practice.</li> <li>• illustrate the role of mechatronics systems in manufacturing.</li> <li>• explain principles of mechanical, hydraulic, pneumatic and electrical actuating systems.</li> </ul>					
<b>Syllabus</b>				<b>Total Hours: 48</b>	
<b>Module-I</b>	<b>Limits &amp; Fits</b>			<b>10Hrs</b>	
Introduction, terminology pertaining to limits and fits – unilateral and bilateral tolerance system, hole and shaft basis systems – Interchangeability, deterministic & statistical tolerance, selective assembly. International Standard system of limits and fits  <b>Limit Gauges:</b> Taylor's principle – Classification and design of limit gauges.					
<b>Module-II</b>	<b>Linear and Angular Measurements</b>			<b>10Hrs</b>	
Line and end standards, slip gauges and length bars. bevel protractor – angle slip gauges – spirit levels and auto collimator.  <b>Interferometry Applied to Measurement:</b> NPL flatness interferometer and NPL gauge interferometer.  <b>Surface Roughness Measurement:</b> Differences between surface roughness and surface waviness- Numerical assessment of surface finish – CLA, R.M.S, Rz values, Methods of measurement of surface finish – Profilograph, Talysurf					
<b>Module-III</b>	<b>Mechanical Measurements</b>			<b>10Hrs</b>	
Introduction to measurement: Elements of generalized measurement system Displacement Measurement- Linear Variable Differential Transformer (LVDT), encoders, potentiometers. Temperature Measurement - Pyrometers, Resistance Temperature Detector (RTD) Strain Measurement-Electrical strain gauge – gauge factor – method of usage of resistance strain gauge					

<b>Module-IV</b>	<b>Mechatronics Systems</b>	<b>10 Hrs</b>
<p>Mechatronics systems- Elements of mechatronics system, mechatronics design process, system - measurement systems, control systems, programmable logic controllers, case studies of mechatronic systems</p>		
<b>Module-V</b>	<b>Actuating Systems:</b>	<b>8Hrs</b>
<p>Hydraulic and pneumatic actuating systems - fluid systems, hydraulic systems, and pneumatic systems, components, control valves. mechanical actuating systems and electrical actuating systems – basic principles and elements.</p>		
<p><b>Textbooks:</b></p> <ol style="list-style-type: none"> <li>1. R.K. Jain, “Engineering Metrology”, Khanna Publishers.</li> <li>2. BeckWith, Marangoni, Linehard, “Mechanical Measurements”, 6th edition, PHI / PE.</li> <li>3. W. Bolton , “Mechatronics – Electronic Control Systems in Mechanical and Electrical Engg.”, 4th Edition, Pearson, 2012.</li> </ol>		
<p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. IC Guptha, ”Engineering Metrology “, Danpath Rai Publications.</li> <li>2. Doeblin Earnest. O. Adaptation by Manik and Dhanesh, ”Measurement Systems: Application and Design”, Tata Mc Graw Hill Publications.</li> </ol>		
<p><b>Web Reference:</b>  <a href="https://sist.sathyabama.ac.in/sist_coursematerial/uploads/SPR1304.pdf">https://sist.sathyabama.ac.in/sist_coursematerial/uploads/SPR1304.pdf</a></p>		



## 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](http://www.gist.edu.in)

<b>ELECTRIC VEHICLES</b> (Common to all Except EEE)					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
22A0232Ta	3:0:0:0	3	CIE:30 SEE:70	3 Hours	OEC
<b>Course Objectives:</b>					
<ul style="list-style-type: none"> <li>Understand to Provide good foundation on hybrid and electrical vehicles.</li> <li>Understand To address the underlying concepts and methods behind power transmission in hybrid and electrical vehicles</li> <li>Familiarize energy storage systems for electrical and hybrid transportation</li> <li>Design and develop basic schemes of electric vehicles and hybrid electric vehicles.</li> </ul>					
<b>Course Outcomes (CO):</b>					
<b>On completion of this course, student will be able to</b>					
<ul style="list-style-type: none"> <li>Understand the working of hybrid and electric vehicles</li> <li>Apply a suitable drive scheme for developing an hybrid and electric vehicles depending on resources</li> <li>Develop the electric propulsion unit and its control for application of electric vehicles.</li> <li>Understand the proper energy storage systems for vehicle applications</li> <li>Design and develop basic schemes of electric vehicles and hybrid electric vehicles</li> </ul>					
<b>Syllabus</b>					<b>Total Hours:48</b>
<b>Module-I</b>	<b>Electric Vehicle Propulsion and Energy Sources</b>				<b>10 Hrs</b>
Introduction to electric vehicles, vehicle mechanics - kinetics and dynamics, roadway fundamentals propulsion system design - force velocity characteristics, calculation of tractive power and energy required, electric vehicle power source - battery capacity, state of charge and discharge, specific energy, specific power, Ragone plot. battery modeling - run time battery model, first principle model, battery management system- soc measurement, battery cell balancing. Traction batteries - nickel metalhydride battery, Li-Ion, Lipolymer battery.					
<b>Module-II</b>	<b>Electric Vehicle Power Plant and Drives</b>				<b>10Hrs</b>
Introduction electric vehicle power plants. Induction machines, permanent magnet machines, switch reluctance machines. Power electronic converters-DC/DC converters - buck boost converter, isolated DC/DC converter. Two quadrant chopper and switching modes. AC drives PWM, current control method. Switch reluctance machine drives - voltage control, current control.					
<b>Module-III</b>	<b>Hybrid And Electric Drive Trains</b>				<b>9Hrs</b>
Introduction hybrid electric vehicles, history and social importance, impact of modern drive trains in energy supplies. Hybrid traction and electric traction. Hybrid and electric drive train topologies. Power flow control and energy efficiency analysis, configuration and control of DC motor drives and induction motor drives, permanent magnet motor drives, switch reluctance motor drives, drive system efficiency.					



Module–IV	Electric and Hybrid Vehicles - Case Studies	9 Hrs
<p>Parallel hybrid, series hybrid -charge sustaining, charge depleting. Hybrid vehicle case study – Toyota Prius, Honda Insight, Chevrolet Volt. 42 V system for traction applications. Lightly hybridized vehicles and low voltage systems. Electric vehicle case study - GM EV1, Nissan Leaf, Mitsubishi Miev. Hybrid electric heavy-duty vehicles, fuel cell heavy duty vehicles.</p>		
Module–V	Electric And Hybrid Vehicle Design	10Hrs
<p>Introduction to hybrid vehicle design. Matching the electric machine and the internal combustion engine. Sizing of propulsion motor, power electronics, drive system. Selection of energy storage technology, communications, supporting subsystem. Energy management strategies in hybrid and electric vehicles - energy management strategies- classification, comparison, implementation.</p>		
<p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li data-bbox="185 651 1449 719">1. Iqbal Hussein, “Electric and Hybrid Vehicles: Design Fundamentals”, 2nd edition, CRC Press, 2003.</li> <li data-bbox="185 725 1465 792">2. Amir Khajepour, M. Saber Fallah, Avesta Goodarzi, “Electric and Hybrid Vehicles: Technologies, Modeling and Control - A Mechatronic Approach”, illustrated edition, John Wiley &amp; Sons, 2014.</li> <li data-bbox="185 799 1458 866">3. Mehrdad Ehsani, YimiGao, Sebastian E. Gay, Ali Emadi, “Modern Electric, Hybrid Electric and Fuel Cell Vehicles: Fundamentals, Theory and Design”, CRC Press, 2004.</li> </ol>		
<p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li data-bbox="185 943 1238 976">1. James Larminie, John Lowry, “Electric Vehicle Technology”, Explained, Wiley, 2003.</li> <li data-bbox="185 983 1437 1050">2. John G. Hayes, G. Abas Goodarzi, “Electric Powertrain: Energy Systems, Power Electronics and Drives for Hybrid, Electric and Fuel Cell Vehicles”, 1st edition, WileyBlackwell, 2018.</li> </ol>		
<p>Web References:</p> <p data-bbox="196 1122 874 1155"><a href="https://onlinecourses.nptel.ac.in/noc23_ee01/preview">https://onlinecourses.nptel.ac.in/noc23_ee01/preview</a></p> <p data-bbox="196 1167 874 1200"><a href="https://onlinecourses.nptel.ac.in/noc21_ee112/preview">https://onlinecourses.nptel.ac.in/noc21_ee112/preview</a></p>		



## 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](http://www.gist.edu.in)

<b>INDUSTRIAL ELECTRONICS</b>					
<b>Common to (EEE, CSE, AI&amp;ML, IT, CS, DS)</b>					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A0433T</b>	<b>3:0:0:0</b>	<b>3</b>	<b>CIE:30 SEE:70</b>	<b>3 Hours</b>	<b>OEC</b>
<b>Course Objectives:</b>					
<p>This course will enable students to:</p> <ul style="list-style-type: none"> <li>• Describe semi-conductor devices (such as PN junction diode &amp; Transistor) and their switching characteristics.</li> <li>• Understand the characteristics of AC to DC converters.</li> <li>• Understand about the practical applications Electronics in industries.</li> <li>• Describe the ultrasonic and its application.</li> </ul>					
<b>Course Outcomes (CO):</b>					
<p><b>On completion of this course, student will be able to</b></p> <ul style="list-style-type: none"> <li>• Understand the semi-conductor devices and their switching characteristics.</li> <li>• Apply the Ultrasonic waves with different applications.</li> <li>• Understand the working of Transistor and its different configurations.</li> <li>• Analyze the thermal effects of ultrasonic, soldering and welding by ultrasonic, ultrasonic Drying in the industry; interpret the characteristics of AC to DC converters.</li> <li>• Develop the practical applications Electronics in industries.</li> <li>• Apply the process of Resistance welding, Induction heating and Dielectric heating in the industry.</li> </ul>					
<b>Syllabus</b>					<b>Total Hours:48</b>
<b>Module-I</b>	<b>Scope of industrial Electronics</b>				<b>10Hrs</b>
<p>Scope of industrial Electronics, Semiconductors, Merits of semiconductors, crystalline structure, Intrinsic semiconductors, Extrinsic semiconductors, current flow in semiconductor, Open circuited p-n junction, Diode resistance, Zener diode, Photo conductors and junction photo diodes, Photo voltaic effect, Light emitting diodes(LED).</p>					
<b>Module-II</b>	<b>Junction Transistor</b>				<b>9Hrs</b>
<p>Introduction, The junction transistor, Conventions for polarities of voltages and currents, Open circuited transistor, Transistor biased in the active region, Current components in transistors, Currents in a transistor, Emitter efficiency, Transport factor and transistor-<math>\alpha</math>, Dynamic emitter resistance, Transistor as an amplifier, Transistor construction, Letter symbols for semiconductor Devices, Characteristic curves of junction transistor in common configuration, static characteristic curves of PNP junction transistor in common emitter configuration, The transistor in common collector Configuration.</p>					
<b>Module-III</b>	<b>AC to DC converters</b>				<b>10Hrs</b>
<p><b>AC to DC converters-</b> Introduction, Classification of Rectifiers, Half wave Rectifiers, Full wave Rectifiers, Comparison of Half wave and full wave rectifiers, Bridge Rectifiers, Bridge Rectifier</p>					

meter, Voltage multiplying Rectifier circuits, Capacitor filter, LC Filter, Metal Rectifiers, Regulated Power Supplies, Classification of Voltage Regulators, Short period Accuracy of Regulators, Long period Accuracy of Voltage Regulator, Principle of automatic voltage Regulator, Simple D.C. Voltage stabilizer using Zener diode, D.C. Voltage Regulators, Series Voltage Regulators, Complete series voltage regulator circuit, Simple series voltage regulator.

**Module-IV**

**Resistance welding controls**

**10Hrs**

**Resistance welding controls:** Introduction, Resistance welding process, Basic Circuit for A.C. resistance welding, Types of Resistance welding, electronic welding control used in Resistance welding, Energy storage welding. Induction heating: Principle of induction heating, Theory of Induction heating merits of induction heating, Application of induction heating, High frequency power source of induction heating. Dielectric heating: Principle of dielectric heating, theory of dielectric heating, dielectric properties of typical materials, electrodes used in dielectric heating, method of coupling of electrodes to the R.F. generator, Thermal losses in Dielectric heating, Applications.

**Module-V**

**Ultrasonics**

**9Hrs**

**Ultrasonics:** Introduction, Generation of Ultrasonic waves, Application of Ultrasonic waves, Ultrasonic stroboscope, ultrasonic as means of communication, ultrasonic flaw detection, Optical image on non-homogeneities, ultrasonic study of structure of matter, Dispersive study of structure of matter, Dispersive and colloidal effect of Ultrasonic, Coagulating action of Ultrasonic, separation of mixtures by ultrasonic waves, cutting and machining of hard materials by ultrasonic vibrations, Degassing of liquids by ultrasonic waves, Physio-chemical effects of ultrasonics, chemical effects of ultrasonics, Thermal effects of ultrasonics, soldering and welding by ultrasonics, Ultrasonic Drying

**Text Books:**

1. Fundamentals of Industrial Electronics, Bogdan M Wilamowski, J David irwin, 2<sup>nd</sup> Edition, 2011.
2. Industrial and Power Electronics – G. K. Mithal and Maneesha Gupta, Khanna Publishers, 19th Ed., 2003.
3. Integrated Electronics – J. Millman and C.C Halkias, McGraw Hill, 1972.

**References:**

1. Electronic Devices and circuits – Theodore. H. Bogart, Pearson Education, 6<sup>th</sup> Edn., 2003.
2. Integrated Circuits and Semiconductor Devices – Deboo and Burroughs, ISE

**Web References:**

[https://onlinecourses.nptel.ac.in/noc21\\_ee01/preview](https://onlinecourses.nptel.ac.in/noc21_ee01/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](http://www.gist.edu.in)

<b>CONSTRUCTION MANAGEMENT</b> (ME, CSE, AI&ML, CS, DS, ECE, EEE)					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A0152T</b>	<b>3:0:0:0</b>	<b>3</b>	<b>CIE:30 SEE:70</b>	<b>3 Hours</b>	<b>OEC</b>
<b>Course Objectives:</b>					
<p>This course will enable students to:</p> <ul style="list-style-type: none"> <li>• To make the student familiar with various construction activities, preparing construction schedule and maintaining documents and records of those activities</li> <li>• To teach the students about various terms and technologies involved in earthwork of construction activities</li> <li>• To make the students familiar with concepts involved in project management like bar charts and milestone charts</li> <li>• To teach the students the concepts of time estimates involved in CPM and PERT , float and slack, critical path calculations</li> </ul>					
<b>Course Outcomes (CO):</b>					
<b>On completion of this course, student will be able to</b>					
<ul style="list-style-type: none"> <li>• Identify the various construction activities like preparing construction schedule and maintaining documents and records of those activities</li> <li>• Understand the concepts and techniques involved in earthwork activities</li> <li>• To understand about the emerging infectious diseases and aids their management</li> <li>• Understand the steps involved in developing a project scheduling and management and the application of bar charts and milestone charts.</li> <li>• Understand the various elements of a network diagram like event, activity and dummy.</li> <li>• Understand the concepts of calculation of time estimates of CPM and PERT</li> </ul>					
<b>Syllabus</b>					<b>Total Hours:48</b>
<b>Module-I</b>	<b>FUNDAMENTALS OF CONSTRUCTION TECHNOLOGY</b>				<b>9 Hrs</b>
Definitions and Discussion – Construction Activities –Construction Processes –Construction Works – Construction Estimating – Construction Schedule – Productivity and Mechanized Construction – Construction Documents – Construction Records – Quality – Safety – Codes and Regulations.					
<b>Module-II</b>	<b>EARTHWORK</b>				<b>9 Hrs</b>
Classification of Soils – Project Site – Development – Setting Out - Mechanized Excavation – Groundwater Control – Trenchless (No-dig) Technology – Grading – Dredging. Rock Excavation – Basic Mechanics of Breakage – Blasting Theory – Drillability of Rocks – Kinds of Drilling – Selection of the Drilling Method and Equipment – Explosives – Blasting Patterns and Firing Sequence – Smooth Blasting – Environmental Effect of Blasting					

<b>Module-III</b>	<b>PROJECT MANAGEMENT AND BAR CHARTS AND MILESTONE CHARTS</b>	<b>10 Hrs</b>
Project planning – Scheduling – Controlling – Role of decision in project management – Techniques for analyzing alternatives Operation research – Methods of planning and programming problems – Development of bar chart – Illustrative examples – Shortcomings of bar charts and remedial measures – Milestone charts		
<b>Module-IV</b>	<b>ELEMENTS OF NETWORK AND DEVELOPMENT OF NETWORK</b>	<b>10 Hrs</b>
Introduction – Event – Activity – Dummy – Network rules – Graphical guidelines for network – Common partial situations in network – Numbering the events – Cycles Problems.		
<b>Module-V</b>	<b>PERT AND CPM</b>	<b>10Hrs</b>
Time estimates – Frequency distribution – Mean, variance and standard deviation-Expected time Problems -Earliest expected time – Formulation for TE - Latest allowable occurrence time – Formulation for TL - Combined tabular computations for TE and TL problems Introduction - Slack – Critical path-Illustrative examples Problems.		
<b>Text Books:</b> <ol style="list-style-type: none"> <li>1. Construction project management by Jha ,Pearson publications, New Delhi 2nd Edition 2015</li> <li>2. Construction Technology by SubirK.Sarkar and Subhajit Saraswati – Oxford Higher Education Univ.Press, Delhi 2008 edition</li> <li>3. Project Planning and Controlwith PERT and CPM byDr.B.C.Punmia, K.K.Khandelwal, Lakshmi Publications New Delhi 2022 edition Delhi</li> </ol>		
<b>Reference Books:</b> <ol style="list-style-type: none"> <li>1. Optimal design of water distribution networks P.R.Bhave, Narosa Publishing house 2003.</li> <li>2. Total Project management, the Indian context- by : P.K.JOY- Mac Millan Publishers India Limited.</li> </ol>		
<b>Web Reference:</b> <ol style="list-style-type: none"> <li>1. <a href="https://nptel.ac.in/courses/105104161">https://nptel.ac.in/courses/105104161</a></li> </ol>		



## 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](http://www.gist.edu.in)

<b>Introduction to Robotics</b>					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A0331Tc</b>	<b>3:0:0:0</b>	<b>3</b>	<b>CIE:30 SEE:70</b>	<b>3 Hours</b>	<b>PEC</b>
<b>Course Objectives:</b>					
The objectives of this course are Identify robots and its peripherals for satisfactory operation and control of robots for industrial and non-industrial applications.					
<b>Course Outcomes (CO):</b>					
After the completion of the course students will able to					
<ol style="list-style-type: none"> <li>1. List and explain the basic elements of industrial robots</li> <li>2. Analyze robot kinematics and its control methods.</li> <li>3. Classify the various sensors used in robots for better performance.</li> <li>4. Summarize various industrial and non-industrial applications of robots</li> </ol>					
<b>Syllabus</b>					<b>Total Hours:48</b>
<b>Module-I</b>	<b>ROBOT BASICS</b>				<b>10Hrs</b>
<b>Automation and Robotics:</b> Robot-Basic concepts, Need, Law, History, Anatomy, specifications. Robot configurations-cartesian, cylinder, polar and articulate. Robot wrist mechanism, Precision, accuracy, repeatability, work and volume of robot.					
<b>Module-II</b>	<b>ROBOT ELEMENTS</b>				<b>10Hrs</b>
<b>End effectors-Classification-</b> Types of Mechanical actuation, Gripper design, Robot drive system Types, Position and velocity feedback devices-Robot joints and links-Types, Motion interpolation					
<b>Module-III</b>	<b>ROBOT KINEMATICS AND CONTROL</b>				<b>9Hrs</b>
<b>Robot kinematics</b> – Basics of direct and inverse kinematics, Robot trajectories, 2D and 3D Transformation-Scaling, Rotation, Translation Homogeneous transformation. Control of robot manipulators – Point to point, Continuous Path Control, Robot programming					
<b>Module-IV</b>	<b>ROBOT SENSORS</b>				<b>9Hrs</b>
<b>Sensors in robot</b> – Touch sensors -Tactile sensor – Proximity and range sensors. Force sensor-Light sensors, Pressure sensors, Introduction to Machine Vision and Artificial Intelligence.					

Module-V	ROBOT APPLICATIONS	10Hrs
<p><b>Industrial applications of robots</b>-Medical, Household, Entertainment, Space, Underwater, Defense, Disaster management. Applications, Micro and Nanorobots, Future Applications.</p>		
<p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>1. Mikell P. Groover, Mitchell Weiss, Roger N Nagel, Nicholas G Odrey, “Industrial Robotics Technology, Programming and Applications”, Tata –McGraw Hill Pub. Co., 2008.</li> <li>2. Deb.S.R and Sankha Deb, "Robotics Technology and Flexible Automation", Tata McGraw Hill Publishing Company Limited, 2010.</li> </ol>		
<p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. Klafter.R.D, Chmielewski.T.A, and Noggin’s., “Robot Engineering: An Integrated Approach”, Prentice Hall of India Pvt. Ltd., 1994.</li> <li>2. Fu.K.S, Gonzalez.R.C&amp;Lee.C.S.G, “Robotics control, sensing, vision and intelligence”, Tata-McGraw Hill Pub. Co., 2008</li> <li>3. Yu. “Industrial Robotics”, MIR Publishers Moscow, 1985</li> </ol>		
<p>Web References:</p> <p><a href="https://onlinecourses.nptel.ac.in/noc20_de11/preview">https://onlinecourses.nptel.ac.in/noc20_de11/preview</a></p> <p><a href="https://onlinecourses.nptel.ac.in/noc22_de11/preview">https://onlinecourses.nptel.ac.in/noc22_de11/preview</a></p>		



## 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](http://www.gist.edu.in)

<b>R PROGRAMMING (SKILL)</b> (Common to CSE, AIML, DS, CS)					
Course Code	L:T:P:S	Credits	Exam Marks	Exam Duration	Course Type
<b>22A0525</b>	<b>1:0:2:0</b>	<b>2</b>	<b>CIE:30 SEE:70</b>	<b>3 Hours</b>	<b>SC</b>
<b>Course Objectives:</b>					
This course will enable students to: <ul style="list-style-type: none"> <li>• How to manipulate data within R and to create simple graphs and charts used in introductory statistics.</li> <li>• The given data using different distribution functions in R.</li> <li>• The hypothesis testing and calculate confidence intervals; perform linear regression models for data analysis.</li> <li>• The relevance and importance of the theory in solving practical problems in the real world.</li> </ul>					
<b>Course Outcomes (CO):</b>					
<b>On completion of this course, student will be able to</b> <ul style="list-style-type: none"> <li>• Install and use R for simple programming tasks.</li> <li>• Extend the functionality of R by using add-on packages</li> <li>• Extract data from files and other sources and perform various data manipulation tasks on them.</li> <li>• Explore statistical functions in R.</li> <li>• Use R Graphics and Tables to visualize results of various statistical operations on data.</li> <li>• Apply the knowledge of R gained to data Analytics for real-life applications</li> </ul>					
<b>Syllabus</b>				<b>Total Hours: 48</b>	
<b>LIST of EXPERIMENTS:</b>					
Module-1: Installation of R–studio procedure. <b>Experiment-1</b> Installation of R-Programming Environment.					
Module-2: R basic syntax, Data types, variables and Reserve words. <b>Experiment-2</b> Implementation of Data types, variables and Reserved words.					
Module-3: Operators, R statements, loops and R functions <b>Experiment-3</b> Implementation of operators, statements, Loops and functions.					
Module-4: R–objects: Vector, List, Array. <b>Experiment-4</b> Implementation of objects: Vector, List, Array.					
Module-5: Array and implementation of array Concept. <b>Experiment-5:</b> Write a R program to combine three arrays that the first row of the first array is followed by the first row of the second array and then first row of the third array.					
Module-6: R objects and manipulation on R objects: Data frame, Matrix, Factors. <b>Experiment-6:</b> Implementation of objects: Dataframe, Matrix, Factors.					



Module-7: Dataframeconceptandimplementationofdataframeusingsimpleprograms. **Experiment-7** Write a R program to create a data frame using two given vectors and display the duplicated elements and unique rows.

Module-8: Datasets-introduction and datasets for performing manipulations.

**Experiment-8** Collect the Datasets for Performing Mathematical operations.

Module-9: Learn about the Data Visualization using R: visualization packages in R.

**Experiment-9** Implementation of Data Visualization using R: visualization packages in R, Pie Charts, Bar Charts, Box Plots, Histograms, Line Graphs, Scatter Plots.

Module-10: Dataset and Statistical Analysis.

**Experiment-10** Collect Dataset and Perform Statistical Analysis.

Module-11: Data visualization.

**Experiment-11** Collect Dataset and Perform data visualization.

#### **Text Books:**

1. Beginning R, the statistical programming language by Dr Mark Gardener.

#### **Reference Books:**

1. "R Programming for Beginners: Fast and Easy Learning" by Steven Keller, Kindle Edition.
2. "A Handbook of Statistical Analyses Using R" by Brian Everitt and Torsten Hothorn.
3. "R Graphics Cook book" by Winston Chang.

#### **Web References:**

1. <https://www.rstudio.com/>
2. <https://www.w3schools.com/>
3. <https://www.r-project.org/>



## 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](http://www.gist.edu.in)

Semester-8 (Project)							
Sl. No.	Category	Course Code	Course Title	Hours per week			Credits
				L	T	P	C
1	Major Project	<b>22A3711</b>	Project work/Internship in Industry	0	0	24	12
<b>Total credits</b>							12