



Shri Shankaracharya Technical Campus, Bhilai

(An Autonomous Institute Affiliated to CSVTU Bhilai)

Scheme of Teaching & Examination (Effective from 2020-2021 Batch)

SCHEME OF EXAMINATION

B. Tech- 3rd Year

Semester: 5th

Branch: Computer Science and Engineering

S.N.	Subject Name	Subject Code	Periods per week			Scheme of Exam			Total Marks	Credit L+(T+P)/2
			L	T	P	Theory/Practical				
						ESE	CT	TA		
1	Theory of Computation	CS102501	2	1	-	100	20	30	150	3
2	Computer Network	CS102502	3	0	-	100	20	30	150	3
3	Introduction To Data Science	CS113503	2	1	-	100	20	30	150	3
4	Internet of Things	CS115504	3	0	-	100	20	30	150	3
5	Professional Elective -1	Refer Table -1	3	0	-	100	20	30	150	3
6	Computer Network Lab	CS102591	-	-	2	25	-	25	50	1
7	Data Science Lab	CS113592	-	--	2	25	-	25	50	1
8	Internet of Things Lab	CS115593	-	-	2	25	-	25	50	1
9	Minor Project – I	CS102597	-	-	2	25	-	25	50	1
10	Internship Assessment	CS102598	-	-	2	-	-	25	25	1
11	Constitution of India	CS100596	-	-	-	-	-	25	25	-
Total			13	2	10	600	100	300	1000	20

Professional Elective -1

Sr. No.	Subject Code	Name of Subject
1.	CS102521	Computer Graphics and Animation
2.	CS102522	Cryptography and Network Security
3.	CS115523	IoT Architecture & Security
4.	CS111524	Bigdata Analytics Essentials
5.	CS109525	Artificial Neural Network
6.	CS113526	Statistical Foundation for Data Science
7.	CS102527	Biometrics
8.	CS102528	Object Oriented Modeling and Design

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Subject Code CS102501	Theory Of Computation	L = 3	T = 0	P = 0	Credits = 3
Examination Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours
	Minimum number of class tests to be conducted=02			Minimum Assignments=02	

Course Objectives	Course Outcomes
<p>Formal languages and automata theory deals with the concepts of automata, formal languages, Grammar, computability and decidability. The reasons to study Formal Languages and Automata Theory are Automata Theory provides a simple, elegant view of the complex machine that we call a computer .More precisely, the objectives are:</p> <ul style="list-style-type: none"> To give an overview of the theoretical foundations of computer science from the perspective of formal languages. To illustrate finite state machines to solve problems in computing. To explain the hierarchy of problems arising in the computer sciences. To familiarize Regular grammars, context free grammar. To solve various problems of applying normal form techniques, push down automata and Turing Machines 	<p>On successful completion of the course, the student will be able to:</p> <p>CO1.Design finite automata to accept a set of strings of a language.</p> <p>CO2.Determine whether the given language is regular or not.</p> <p>CO3.Design context free grammars to generate strings of context free language.</p> <p>CO4.Design push down automata and the equivalent context free grammars and Design Turing machine.</p> <p>CO5.Distinguish between computability and non-computability, Decidability and un-decidability.</p>
<p>UNIT – I: The Theory Of Automata CO1</p> <p>Introduction to automata theory, Examples of automata machine, Finite automata as a language acceptor and translator, Deterministic finite automata. Non-deterministic finite automata, finite automata with output (Mealy Machine. Moore machine), Finite automata with Epsilon moves, Minimizing number of states of a DFA, My hill Nerode theorem, Properties and limitation of FSM, Application of finite automata. [8Hrs.]</p> <p>UNIT – II: Regular Expressions CO2</p> <p>Alphabet, String and Languages, Regular expression, Properties of Regular Expression, Finite automata and Regular expressions, Arden's Theorem, Regular Expression to DFA conversion & vice versa. Pumping lemma for regular sets, Application of pumping lemma, Regular sets and Regular grammar, Closure properties of regular sets. Decision algorithm for regular sets and regular grammar. [7Hrs.]</p>	

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**UNIT – III: Grammars****CO3**

Definition and types of grammar, Chomsky hierarchy of grammar, Relation between types of grammars, Context free grammar, Left most & right most derivation trees, Ambiguity in grammar, Simplification of context free grammar, Chomsky Normal Form, Greibach Normal Form, properties of context free language, Pumping lemma for context free language, Decision algorithm for context free language. [7Hrs.]

UNIT – IV: Push Down Automata And Turing Machine**CO4**

Basic definitions, Deterministic push down automata and non-deterministic push down automata, Acceptance of push down automata, Push down automata and context free language, Turing machine model, Representation of Turing Machine, Construction of Turing Machine for simple problem's, Universal Turing machine and other modifications .Church's Hypothesis, , Halting problem of Turing Machine. [7Hrs.]

UNIT – V: Computability**CO5**

Introduction and Basic concepts, Recursive function, Partial recursive function, Initial functions, Composition of functions, Ackerman's function, Recursively Enumerable and Recursive languages, Decidable and undecidable problem, Post correspondence problem, Space and time complexity [7Hrs.]

Text Books:

S. No.	Title	Author(s)	Publisher
1	Theory of Computer Science (Automata Language & Computation)	K.L.P. Mishra and N. Chandrasekran	PHI
2	Introduction to Automata theory. Language and Computation	John E. Hopcroft & Jeffery D. Ullman	Narosa, Publishing House

Reference Books:

S. No.	Title	Author(s)	Publisher
1	Introduction to Languages and the Theory of Computation	John Martin,	Tata McGraw Hill.
2	Introduction to Formal Languages Automata Theory and Computation	Kamala Krithivasan, Rama R	2nd Edition, Pearson Education.

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Subject Code CS102502	Computer Network	L = 3	T =	P = 0	Credits = 3
Examination Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours
	Minimum number of class tests to be conducted=02			Minimum Assignments=02	

Course Objectives	Course Outcomes
<p>To Provide students with an enhanced knowledge in Computer Networking.</p> <ul style="list-style-type: none"> Understanding concept of local area networks, their topologies, protocols and applications. Understanding the different protocols, and network architectures. To make students understand the basic model of data communication and various concepts of networking. 	<p>On completion of this course the student will be able to:</p> <p>CO1: Describe the basis and structure of an abstract layered Network protocol model.</p> <p>CO2: understand the working of network protocols.</p> <p>CO3: Students will have deep understanding of various protocols used at Data Link Layer and will be able to analyze the advantages and disadvantages of various available protocols for flow and error control.</p> <p>CO4: Students will be able to analyze various Ethernet standards and will be able to choose an appropriate standard according to requirement of LAN.</p> <p>CO5: Students will be able to use various network based applications.</p>
<p>UNIT – I: Introduction: History of Computer Network, Examples of Networks: Novell Networks, Arpanet, Internet, Network Topologies WAN, LAN, MAN, PAN,. Applications, networks architecture requirements, ISO-OSI, TCP/IP, XNS, IPX/SPX,</p> <p>Physical Layer: Transmission media, signal and encoding, asynchronous communications; Narrow band, broad band ISDN and ATM, Packet Switching and Circuit Switching.</p> <p>UNIT – II: Data link layer : Design issues, framing, error detection and correction techniques with numerical, CRC, Elementary Protocol : Stop and Wait, Sliding Window, Slip, Data link layer in HDLC, ATM. Multiple Access Protocols, Link Layer Addressing, ARP, DHCP, Ethernet devices – Hubs, Bridges, and Switches.</p> <p>Medium Access sub layer: ALOHA, MAC addresses, CSMA, CSMA/CD. IEEE 802.X Standard Ethernet, wireless LAN.</p> <p>UNIT – III: Network Layer : Forwarding and Routing, Network Service Models, Virtual Circuit and Datagram Networks, Router, Routing Table, Internet Protocol (IP) – IPv4 and IPv6 , ICMP, Link State Routing , Distance Vector Routing, Hierarchical Routing , RIP, OSPF, BGP, Broadcast and Multicast Routing , MPLS, Mobile IP, IP sec. IPv4 : Classes, Classless, Subnetting, Supernetting and its numerical</p> <p>UNIT – IV: Transport Layer: Transport Layer Services – Multiplexing and Demultiplexing, UDP</p>	

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–Go Back-N and Selective Repeat. **Connection-Oriented Transport:** TCP, Segment Structure, RTT estimation, Flow Control, Connection Management, Congestion Control, TCP Delay Modeling, SSL and TLS. QoS architecture models: IntServ vs DiffServ

UNIT – V: Presentation Layer protocols: AFP, ICA, LPP, NCP, NDR, Telnet

Session Layer protocols: PAP, PPTP, RPC, SCP

Application Layer: Principles of Network Applications , The Web and HTTP, HTTPS, FTP, Electronic Mail, SMTP, IRC, Video Conferencing, MIME, DNS, Socket Programming with TCP and UDP.

Network Security: Principles of Cryptography, Firewalls, Application Gateway, Attacks and Countermeasures.

Text Books:

S.No.	Title	Author(s)	Publisher
1	Data Communications and Networking	Behrouz A. Forouzan	Third Edition TMH
2	Computer Networking: A Top-Down Approach Featuring the Internet	James F. Kurose and Keith W. Ross	Pearson Education, Third edition, 2006

Reference Books:

S. No.	Title	Author(s)	Publisher
1	Computer Networks	Andrew S Tanenbaum	4th Edition. Pearson Education/PHI
2	An Engineering Approach to Computer Networks	S. Keshav	2nd Edition, Pearson Education

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Subject Code CS113503	Introduction to Data Science	L = 2	T = 1	P = 0	Credits = 3
Examination Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours
	Minimum number of class tests to be conducted=02			Minimum Assignments=02	

Course Objectives	Course Outcomes
The objective of the course is aimed to Provide knowledge, insight into methods and tools for Preparation and Visualization of the data generated by modern information systems and also to impart necessary knowledge of the mathematical foundations needed for data science and develop programming skills required to build data science applications.	On successful completion of the course, the student will be able to: CO1 Basic Concepts of Data Science CO2 Understanding of reading data and manipulation CO3 understand data cleaning , dimensionality reduction CO4 understand and analyze data CO5 use visualization of data to capture data insight and build model

UNIT-1: Introduction Introduction to data science, Evolution of Data science, Stages in Data science project, Facets of data, Data Science Project's Lifecycle, Web APIs, Open Data sources, Data APIs, Web Scrapping, Relational Databases access to process/access data.

UNIT-2 Introduction to Programming : Basic programming in python: list, string, dictionary, array and tuples. Indexing, slicing, iterating and other basic operations. Data Science Toolkits using Python: Matplotlib, NumPy, Scikit-learn, NLTK **Numpy:** creating arrays, arrays manipulation, reshape, dimension, broadcasting, reading and writing array data on files. **Pandas:** Series and Data frames. Reading files(.xlsx,.csv,.txt) in data frame. Row and index objects, function by elements, function by rows and columns, statistical functions, sorting and ranking, correlation and covariance

UNIT-3: Data cleaning and preprocessing Data Collection strategies: web scrapping tools, handling missing values; Data imputation techniques, data transformation techniques: Data Smoothing, Attribution Construction, Data Generalization ,Data Aggregation, Data Discretization, Data Normalization. Data Reduction techniques: Dimensionality reduction, Numerosity reduction, data cube aggregation, data compression, discretization operation

UNIT-4: Exploratory data analysis Exploratory Analysis: Introduction to statistics used in data science, Central tendencies and distributions, Variance Descriptive-Mean, Standard Deviation, Skewness and Kurtosis, statistical summary of categorical and numerical data, data dispersion: range , interquartile range ,variance, standard deviation, coefficient of variation. data distribution: Continuous and Normal distributions. Frequency table: two-way table with joint, conditional and marginal probability. Pearson correlation.

UNIT-5 Data Visualization and model building: Introduction, Types of data visualization, A Simple

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Interactive Chart, Set the Properties of the Plot, matplotlib, Bar chart, scatter chart histogram, pie chart Working with Multiple Figures and Axes, Adding Text, adding a Grid, adding a Legend, Saving the Charts. Seaborn library: Box and Whiskers plot for numerical and categorical variables, grouped plotting. Pairwise plot. Overview of Machine learning concepts – Over fitting and train/test splits, Types of Machine learning – Supervised, Unsupervised, Reinforced learning. Building a basic model with supervised machine learning algorithm: linear regression, logistic regression, support vector. (7Hrs)

Text Books:

S.No.	Title	Author(s)	Publisher
1	Deep Learning	Ian Goodfellow, Yoshua Bengio and Aaron Courville	MIT Press
2	Data Science from Scratch: First Principles with Python	Joel Grus	O'Reilly Media
3	Doing Data Science, Straight Talk From The Frontline	Cathy O' Neil and Rachel Schutt	O'Reilly
4	Mining of Massive Datasets	Jure Leskovek, Anand Rajaraman and Jeffrey Ullman	Cambridge University Press

Reference Books:

S. No.	Title	Author(s)	Publisher
1	Machine Learning	Jeeva Jose	Khanna Publishers
2	Data Sciences	Jain V.K	Khanna Publishers
3	Big Data and Hadoop	Jain V.K	Khanna Publishers
4	Machine Learning	Chopra Rajiv	Khanna Publishers
5	Practical Statistics for Data Scientists	Peter Bruce, Andrew Bruce, Peter Gedeck	O'Reilly

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Subject Code CS115504	Internet of Things	L = 3	T = 0	P = 2	Credits = 3
Examination Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours
	Minimum number of class tests to be conducted = 02			Minimum Assignments = 02	

Course Objectives	Course Outcomes
<p>The objective of this course is</p> <ul style="list-style-type: none"> To understand Concepts, design and characteristics of IoT. To understand Architecture of IoT. To understand basic protocols of IoTs. To understand challenges and applications of IoTs. To develop IoT applications using Tools. 	<p>On successful completion of the course, the student will be able to:</p> <p>CO1. Students will familiar with the concepts of Internet of Things.</p> <p>CO2. Students will familiar with IoT Architecture</p> <p>CO3. Students will ready to Analyze basic protocols in wireless sensor network</p> <p>CO4. Students will be capable to design IoT applications in different domain and be able to analyze their performance</p> <p>CO5. Capable to implement basic IoT applications on embedded platform</p>
<p>Unit 1: Introduction to Internet of Things: Origin of Terminology IoT, Applications of IoT, Characteristics, Implementation Issues, IoT Architecture, IoT Levels, Connectivity Layers, Interoperability in IoT, associated technologies with IoT (M2M, Telemedicine, Big Data, Cloud, Smart Grid, IoV, MANET, VANET, CPS, SDN, 3G/4G/5G), Challenges in IoT, IoT vs WoT, IoT vs M2M, IoT Network Configurations.</p> <p>Unit 2: Connectivity: IoT Network Configurations , Gateway Prefix Allotment, Gateways , Multi-homing , IPv4, IPv6, IPv4 versus IPv6, RPL Data Protocol: MQTT, CoAP, AMQP, DDS, XMPP.</p> <p>Communication Protocols: IEEE Standards 802.3, 802.11 and 802.15 and their versions, Z Wave, Bluetooth, ZigBee, 6LowPAN, HART and Wireless HART, NFC, RFID, Software-Defined Networking</p> <p>Unit 3: Sensors: Definition, Property of Sensors, Types of sensors:- Transducers, Temperature Sensors, Humidity Sensors. Pressure Sensors. Proximity Sensors. Level Sensors. Accelerometers. Gyroscope. Gas Sensors. etc., Sensors Classes</p> <p>Actuation: Actuator, Actuator Types :- Hydraulic Pneumatic, Electrical, Thermal/ Magnetic, Mechanical, Soft Actuators, Shape memory polymer (SMP)</p> <p>Types of Motor Actuators and their working- Servo motor, Stepper motor, Hydraulic motor, Solenoid Relay, AC motor</p> <p>Unit 4: Introduction to Arduino Programming – : Operators in Arduino, Control</p>	

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Statement, Loops, Arrays, String, Math Library, Random Number, Interrupts, Integration and calibration of Sensors and Actuators with Arduino:

Implementation of IoT: Introduction to Arduino and NodeMCU (ESP8266) board, Programming NodeMCU using Arduino, Connectivity of Sensors and Actuators with NodeMCU, Introduction to Python programming, Introduction to Raspberry PI.

Unit 5: Cloud Computing Fundamentals: Recent Trends in Computing, Evolution of Cloud Computing, Evolution of Cloud Computing, Business Advantages, Components

Service Models: Software-as-a-Service(SaaS), Platform-as-a-Service (PaaS), Infrastructure-as-a-Service (IaaS), Multi-cloud, Inter-cloud, Cloud Computing Service Management and Security,

Case studies: Open stack, Microsoft Azure, Amazon Elastic Compute Cloud (EC2)

Text Books:

S. No.	Title	Author(s)	Publisher
1	Internet of Things: A Hands-On Approach	Vijay Madiseti, Arshdeep Bahga	Orient Blackswan Private Limited - New Delhi
2	Fundamentals of Wireless Sensor Networks: Theory and Practice	Waltenegus Dargie, Christian Poellabauer	Wiley Publication
3	Internet of Things with Arduino Cookbook	Macro Schwar	Packet Publishing Ltd

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Subject Code CS102591	Computer Network	L =	T =	P = 2	Credits = 1
Examination Scheme	ESE	CT	TA	Total	ESE Duration
	25		25	50	

Course Objectives	Course Outcomes
To Provide students the basic knowledge of Computer Networking, tools used, their purpose and their connectivity based on requirements.	<p>On completion of this course the student will be able to</p> <ul style="list-style-type: none"> ➤ setup and configure various networking hardware and software. ➤ They will also be able to identify the basic faults and can resolve. ➤ They can identify and use various cables and connectors with devices. ➤ Can setup and manage Servers. ➤ They Can write Simple networking programs in various language like Java.
<p>List of experiments to be conducted in Computer Network Lab.</p> <p>Prerequisite</p> <ol style="list-style-type: none"> 1. Introduction to cables, connectors and topologies. 2. Demonstration of Switch, Hub, Router and their uses and types. 3. Installation of UTP, Co-axial cable, Cross cable, parallel cable. 4. Case Study of Ethernet (10base5, 10base2, 10 base T) 5. Case Study of various Wireless technologies available. <p>Experiments</p> <ol style="list-style-type: none"> 1. Basic network command and Network configuration commands like ping, netstat, hostname, nslookup, route, arp, tracert, ipconfig, ARP etc. 2. To enable secured / unsecured file sharing, device sharing over network. 3. Installation and working of Remote Desktop and other third party related software's. 4. To setup IP and other values avoiding DHCP. 5. Use of Subnet mask to create two or more different logical network in same lab. 6. Installation and working with IIS Server. 7. Basic Configuration of Home Router/Modem 8. Introduction to Server administration. 9. Basic Chat Program in Java using TCP. 10. Basic Chat Program in Java using UDP. 	

Text Books:

S.No.	Title	Author(s)	Publisher
1	Data Communications and Networking	Behrouz A. Forouzan	Third Edition TMH
2	Computer Networking: A Top-Down Approach Featuring the Internet	James F. Kurose and Keith W. Ross	Pearson Education, Third edition, 2006

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Subject Code CS113592	DATA SCIENCE LAB	L =	T =	P = 2	Credits = 1
Examination Scheme	ESE	CT	TA	Total	ESE Duration
	25		25	50	

Course Objectives	Course Outcomes
<p>The objective of this course is to impart necessary knowledge of the mathematical foundations needed for data science and develop programming skills required to build data science applications.</p>	<p>On successful completion of the course, the student will be able to:</p> <p>CO1 Basic Concepts of Data Science</p> <p>CO2 Demonstrate understanding of the mathematical foundations needed for data science.</p> <p>CO3 Collect, explore, clean, munge and manipulate data.</p> <p>CO4 Implement models such as k-nearest Neighbors, Naive Bayes, linear and logistic regression, decision trees, neural networks and clustering.</p> <p>CO5 Build data science applications using Python based toolkits.</p>
<p>List of Experiments</p> <ol style="list-style-type: none"> 1. Write a program in Python to predict the class of the flower based on available attributes. 2. Write a program in Python to predict if a loan will get approved or not. 3. Write a program in Python to predict the traffic on a new mode of transport. 4. Write a program in Python to predict the class of user. 5. Write a program in Python to indentify the tweets which are hate tweets and which are not. 6. Write a program in Python to predict the age of the actors. 7. Mini project to predict the time taken to solve a problem given the current status of the user 8 . Write programs to understand the use of Numpy's Shape Manipulation, Array Manipulation, vectorization. 9. Write programs to understand the use of Numpy's Structured Arrays, Reading and Writing Array Data on Files. 10. Write programs to understand the use of Matplotlib for Simple Interactive Chart, Set the Properties of the Plot, matplotlib and NumPy. 11. Write programs to understand the use of Matplotlib for Working with Multiple Figures and Axes, Adding Text, Adding a Grid, Adding a Legend, Saving the Charts. 12. Write programs to understand the use of Matplotlib for Working with Line Chart, Histogram, Bar Chart, Pie Charts. 	

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S.No.	Title	Author(s)	Publisher
1	Python Crash Course: A Hands-On, Project-Based Introduction to Programming	Eric Matthes	William Pollock
2	Data Science from Scratch: First Principles with Python	Joel Grus	O'Reilly Media

Reference Books:

S. No.	Title	Author(s)	Publisher
1	Machine Learning	Jeeva Jose	Khanna Publishers
2	Data Sciences	Jain V.K	Khanna Publishers
3	Fluent Python	Luciano Ramalho	O'Reilly Media
4	Machine Learning	Chopra Rajiv	Khanna Publishers

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Subject Code CS115593	Internet of Things Lab	L =	T =	P =	Credits =
EvaluationScheme	ESE	CT	TA	-	ESE Duration
	25	-	25	-	3 Hours
	Minimum number of class tests to be conducted =			Minimum Assignments =	

Course Objectives	Course Outcomes
<p>The objective of this course is</p> <ul style="list-style-type: none"> To understand Concepts, design and characteristics of IoT. To understand Architecture of IoT. To understand basic protocols of IoTs. To understand challenges and applications of IoTs. To develop IoT applications using Tools. 	<p>On successful completion of the course, the student will be able to:</p> <p>CO1. Students will familiar with the concepts of Internet of Things.</p> <p>CO2. Students will familiar with IoT Architecture</p> <p>CO3. Students will ready to Analyze basic protocols in wireless sensor network</p> <p>CO4. Students will be capable to design IoT applications in different domain and be able to analyze their performance</p> <p>CO5. Capable to implement basic IoT applications on embedded platform</p>

Note: Students need to perform at least 10 experiments. Use of sensors and actuators are not restricted as provided. Student may use any other components also.

- Introduction to various sensors and actuators.
 - PIR Motion Sensor.
 - Rain Drop Sensor.
 - Moisture Sensor.
 - Temperature Sensor.
 - Touch Sensor.
 - Infrared Sensor.
 - RFID Sensor.
 - Ultrasonic Sensor.
 - Bluetooth Module.
 - Wi-Fi Module.
 - LED/OLED
 - Servo Motor.
- Acquaintance with NodeMCU and perform essential programming establishment.
- Connect LED/Buzzer with NodeMCU and compose a program to turn ON LED for 1 sec later at regular intervals.
- Perform Experiment to use NodeMCU ESP8266 as HTTP Server using WiFi Access Point (AP) mode .

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5. Perform Experiment for Controlling LED through an HTTP page Using NodeMCU Station Mode (STA).
6. Interact with DHT11 sensor with NodeMCU and compose a program to print temperature and humidity readings on screen.
7. Communicate OLED with NodeMCU and compose a program to print temperature and moisture readings on it.
8. Communicate Bluetooth with Arduino/ NodeMCU and compose a program to send sensor information to cell phone utilizing Bluetooth.
9. Connect Bluetooth with Arduino/ NodeMCU and compose a program to turn LED ON/OFF when '1'/'0' is sent from cell phone utilizing Bluetooth.
10. Compose a program on NodeMCU to transfer temperature and stickiness information to thingspeak, Blynk or any other free cloud.
11. Compose a program on NodeMCU to fetch temperature and moistness information from thingspeak cloud and display it using OLED.
12. Creating a webpage and display the values received from sensors through NodeMCU.
13. Study of other IoT Boards and components available. (Student Activity).

Text Books:

S. No.	Title	Author(s)	Publisher
1	Internet of Things: A Hands-On Approach	Vijay Madiseti, Arshdeep Bahga	Orient Blackswan Private Limited - Delhi
2	Fundamentals of Wireless Sensor Networks: Theory and Practice	Waltenegus Dargie, Christian Poellabauer	Willey Publication
3	Internet of Things with Arduino Cookbook	Macro Schwar	Packet Publishing Ltd

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Subject Code CS102597	Minor Project-I	L = 0	T = 0	P = 2	Credits = 1
Evaluation Scheme	ESE	CT	TA	-	ESE Duration
	25	-	25	-	3 Hours

Course Objectives	Course Outcomes
<p>The objectives of this lab are: The objective of this course is to improve student's ability to analyze, design and solve complex engineering problems through pedagogies (Project Based Learning) that support them in developing these skills. The goal here is not to passively absorb and reiterate information; but rather to actively engage with the content, work through it with others, relate to it through an analysis, use modern tools and effectively solve problems with the corresponding knowledge gained.</p>	<p>On successful completion of the course, the student will be able to: CO1: Identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach. CO2: Reproduce, improve and refine technical aspects of engineering projects applying appropriate techniques, resources, and modern engineering and IT tools. CO3: Work as an individual and as a member or leader in teams in development of technical projects. CO4: Follow management principle and value health, safety and ethical practices during project. CO5: Communicate and report effectively project related activities and findings.</p>
<p>The Process Followed to Maintain the Quality of Student Projects are: [12 Hrs.] (a) Allotment of Projects: (i) Students form their team (max four students) and submit their areas in which they would like to pursue their projects. (ii) Through meeting and deliberations students are allotted guide depending on their preference and maximum number of groups under a faculty is limited to three. (b) Identification of projects: Students are asked to formulate problem statement and state objectives of their project in consultation with the project guide c) Continuous Monitoring (i) Progress is continuously monitored by guide and instructions are given how to proceed further during their project periods as per time table. (ii) Students submit weekly progress report to the project in-charge after consultation with their project guide. (d) Evaluation (i) In order to evaluate projects two project seminars (assessment) are taken in which student 's team present their project through presentations and demonstrate their work. (ii) Students are assessed on the basis of their technical skill implementation, use of modern tools, communication skill, team work, health, safety and ethical practices and relevance of the project. (iii) At the end of the semesters a report is submitted by the students and student 's projects are finally evaluated by external examiner in end semester practical examination based</p>	

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Reference Books:

S. No.	Title	Authors	Publisher
1	Basics Of Project Management	IES Master Team	IES Master Publication
2	Modern Systems Analysis and Design	Jeffrey A. Hoffer, Joey F. George, Joseph S. Valakati	Pearson Education; Third Edition; 2002.

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Subject Code CS100596	Constitution of India	L = 0	T = 0	P = 0	Credits = -
Evaluation Scheme	ESE	CT	TA	-	ESE Duration
	-	-	25	-	-

Course Objectives	Course Outcomes
The objective of this course is to introduce Students to the Constitution of India	<p>On successful completion of the course, the student will be able to:</p> <p>CO1: Display understanding about the history and philosophy of Indian Constitution.</p> <p>CO2: Demonstrate clarity about the premise informing the twin themes of liberty and freedom from civil rights perspective. CO3: Display understanding about powers and functions of Indian government.</p> <p>CO4: Exhibit understanding about emergency rule CO5: Demonstrate understanding about structure and functions of local administration.</p>
<p>UNIT-I [CO1] Introduction: Historical Perspective of Constitution of India ; Philosophy of Indian Constitution; Meaning of the constitution law and constitutionalism; Salient features and Preamble.</p> <p>UNIT- II [CO2] Contours of Constitutional Rights and Duties: Fundamental rights; Scheme of the Fundamental Duties and its legal status.</p> <p>UNIT -III [CO3] Organs of Governance: Parliamentary Form of Government in India; The constitutional powers and status of the President of India; Judiciary- Powers and Functions; Local Self Government –Constitutional Scheme in India.</p> <p>UNIT-IV [CO4] Emergency Provisions: National Emergency; President Rule; Financial Emergency.</p> <p>UNIT-V [CO5] Local Administration: Federal structure and distribution of legislative and financial powers between the Union and the States; The Directive Principles of State Policy – Its importance and implementation</p>	

Text Books:

S. No.	Title	Author(s)	Publisher
1.	Introduction to the Constitution Of India	Basu D D	Lexis Nexis
2.	Principles of Public Administration	Dr S N Myneni	Allahabad Law Agency
1.	Dr. B.R. Ambedkar Framing of Indian Constitution	Busi S N	Ava Publishers
2.	Theory and Practices of Modern Government	M G Gupta	Central Book Depot

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Professional Elective-I

Subject Code CS102521	Computer Graphics and Animation	L = 3	T = 0	P = 0	Credits = 3
Examination Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

Course Objectives	Course Outcomes
<p>The objective of this course is to</p> <ol style="list-style-type: none"> 1. Have an understanding of critical and aesthetic issues in computer graphics and Animation. 2. Introduce students with fundamental concepts and theory of Computer Graphics 	<p>On successful completion of the course, the student will be able to:</p> <p>CO1 Discuss various algorithms for scan conversion, Extract scene with different clipping methods and filling of basic objects</p> <p>CO2 Use of geometric transformations on graphics objects and their application in composite form also exploring projections</p> <p>CO3 Render projected objects to naturalize the scene in 2D view and use of illumination models for this.</p> <p>CO4 Visible surface detection techniques for display of 3D scene on 2D screen.</p> <p>CO5 Design simple applications using principles of virtual reality.</p>
<p>UNIT – I : Display Algorithms [CO1]</p> <p>Overview of Computer Graphics, Computer Graphics Application, Display Technologies: Raster Refresh (Raster-Scan) Graphics Displays, Random-Scan Display Processor, LCD displays.</p> <p>Scan conversion: Bresenham's Line drawing algorithm. Bresenham's method of Circle drawing, Midpoint Circle Algorithm</p> <p>Clipping Lines algorithms–Cohen-Sutherland, Liang-Barsky and Cyrus-Beck</p> <p>Filling Algorithms: Flood Fill and Boundary Fill Algorithm [8 Hrs]</p>	
<p>UNIT – II: Transformations [CO2]</p> <p>Two-Dimensional Transformations: 2D Transformations, Homogeneous Coordinates and Matrix Representation of 2D Transformations, Rotation, Reflection, Scaling, Combined Transformation, The Window-to-Viewport Transformations.</p> <p>Three-Dimensional Transformations: Three-Dimensional Scaling, Three-Dimensional Shearing, Three- Dimensional Rotation, Three-Dimensional Reflection, Three- Dimensional Translation, Rotation about an Arbitrary Axis in Space, Reflection through an Arbitrary Plane, Matrix Representation of 3D Transformations, Composition of 3D Transformations</p> <p>Affine and Perspective Geometry: Perspective Transformations, Vanishing Points, Orthographic Projections, Axonometric Projections, Oblique Projections [7Hrs]</p>	
<p>UNIT – III: Viewing and Appearance [CO3]</p> <p>Viewing in 3D: Stages in 3D viewing, Canonical View Volume (CVV), Specifying an Arbitrary 3D View, Mathematics of Planar Geometric Projections, Combined transformation matrices for projections and</p>	

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viewing, Coordinate Systems and matrices, camera model and viewing pyramid.

Light: Radiometry, Transport, Equation, Photometry

Color: Colorimetry, Color Spaces, Chromatic Adaptation, Color Appearance

[7Hrs]

UNIT – IV: Curves and Surfaces

[CO4]

Visible-Surface Determination: Techniques for efficient Visible-Surface Algorithms, Categories of algorithms, Back face removal, The z-Buffer Algorithm, Scan-line method, Painter's algorithms (depth sorting)

Plane Curves and Surfaces: Curve Representation, Nonparametric Curves, Parametric Curves, Cubic Splines, Bezier Curves, B-spline Curves, Quadric Surfaces, Bezier Surfaces.

[7Hrs.]

UNIT – V : Animation

[CO5]

Computer Animation: Fundamentals of computer animation, Animation Techniques, Principles of Animation, Animation and Flash Overview, Using Layer and Creating Animation, Key framing, Deformations, Character Animation, Physics-Based Animation, Procedural Techniques, Groups of Objects.

[7Hrs]

Text Books:

S.No.	Title	Author(s)	Publisher
1	Computer Graphics	Donald Hearn and M.Pauline Baker	PHI
2	Computer Graphics- A practical Approach,	Rishabh Anand,	Khanna Publishing House
3	Procedural Elements for Computer Graphics	David F. Rogers	T.M.H

Reference Books:

S. No.	Title	Author(s)	Publisher
1	Computer graphics, Multimedia and Animation	Malay. K. Pakhir	PHI
2	Graphics, GUI, Games & Multimedia Projects in C	Pilania & Mahendra	Standard Publ.
3	Fundamentals of 3Dimensional Computer Graphics by, 1999,	Alan Watt	Addision Wesley.
4	Principles of Interactive Computer Graphics	W.M. Newman & R. F. Sproull, Peterson,	TMH.

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Scheme of Teaching & Examination (Effective from 2020-2021 Batch)

Subject Code CS102522	Cryptography & Network Security	L = 2	T = 1	P = 0	Credits = 3
Examination Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours
	Minimum number of class tests to be conducted=02			Minimum Assignments=02	

Course Objectives	Course Outcomes
<ul style="list-style-type: none"> ➤ Explain the objectives of information security, importance and application of each of confidentiality, integrity, authentication and availability. ➤ Understand various cryptographic algorithms. ➤ Understand the basic categories of threats to computers and networks. ➤ Describe public-key cryptosystem and enhancements made to IPv4 by IPSec. ➤ Understand Intrusions and intrusion detection. ➤ Discuss the fundamental ideas of public-key cryptography and Web security and Firewalls. ➤ Generate and distribute a PGP key pair and use the PGP package to send an encrypted email message. 	<p>On successful completion of the course, the student will be able to:</p> <ul style="list-style-type: none"> ➤ Student will be able to understand basic cryptographic algorithms, message. ➤ Student will be able to understand web authentication and security issues. ➤ Ability to identify information system requirements for both of them such as client and server. ➤ Ability to understand the current legal issues towards information security.

UNIT – I Security Concepts: Introduction, The need for security, Security approaches, Principles of security, Types of Security attacks, Security services, Security Mechanisms.

Cryptography Concepts and Techniques: Introduction, plain text and cipher text, substitution techniques, transposition techniques, encryption and decryption, symmetric and asymmetric key cryptography, possible types of attacks.

UNIT – II Symmetric key Ciphers: Block Cipher principles, DES, AES, Blowfish, RC5, IDEA, Block cipher operation, Stream ciphers, RC4.

Asymmetric key Ciphers: Principles of public key cryptosystems, RSA algorithm, Diffie-Hellman Key Exchange, Knapsack Algorithm.

UNIT – III Cryptographic Hash Functions: Message Authentication, Secure Hash Algorithm (SHA-512).

Message authentication codes: Authentication requirements, HMAC, CMAC, Digital signatures.

Key Management and Distribution: Symmetric Key Distribution Using Symmetric & Asymmetric Encryption, Distribution of Public Keys, Kerberos, Public – Key Infrastructure.

UNIT – IV Transport-level Security: Web security considerations, Secure Socket Layer and Transport Layer Security, HTTPS, Secure Shell (SSH).

Wireless Network Security: Wireless Security, Mobile Device Security, IEEE 802.11 Wireless LAN,

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IEEE 802.11i Wireless LAN Security.

UNIT – V E-Mail Security: Pretty Good Privacy, S/MIME, MIME

IP Security: IP Security overview, IP Security architecture, Authentication Header, combining security associations, Internet Key Exchange

Web Security: TLS, SSL etc. , Secure Electronic Set (SET), Firewalls & its Types, Introduction to IDPS; Risk Management; Security Planning.

Text Books:

S.No.	Title	Author(s)	Publisher
1	Cryptography and Network Security - Principles and Practice	William Stallings	Pearson Education, 6th Edition
2	Cryptography and Network Security	Atul Kahate	Mc Graw Hill, 3rd Edition

Reference Books:

S. No.	Title	Author(s)	Publisher
1	Cryptography and Network Security	C K Shyamala, N Harini, Dr T R Padmanabhan	Wiley India, 1st Edition.
2	Cryptography and Network Security	Forouzan Mukhopadhyay	Mc Graw Hill, 3rd Edition
3	Information Security Principles, and Practice	Mark Stamp	Wiley India
4	Principles of Computer Security	WM. Arthur Conklin, Greg White	
5	Introduction to Network Security	Neal Krawetz	CENGAGE Learning
6	Network Security and Cryptography	Bernard Menezes	CENGAGE Learning

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Scheme of Teaching & Examination (Effective from 2020-2021 Batch)

Subject Code CS115523	IoT Architecture and Security	L = 3	T = 0	P = 0	Credits = 3
Examination Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

Course Objectives	Course Outcomes
The objective of this course is to make students know the IoT ecosystem, to provide an understanding of the technologies and the standards relating to the Internet of Things, to develop skills on IoT technical planning	On successful completion of the course, the student will be able to: CO1 Basic Concepts of Internet of Things CO2 To understand the technology and standards relating to IoTs. . CO3 To understand the critical ecosystem required to mainstream IoTs . CO4 understand the IOT Applications for value creations. CO5. To Acquire skills on developing their own national and enterprise level technical strategies.

UNIT – I : IoT & Web Technology

[CO1]

The Internet of Things Today, Time for Convergence, Towards the IoT Universe, Internet of Things Vision, IoT Strategic Research and Innovation Directions, IoT Applications, Future Internet Technologies, Infrastructure, Networks and Communication, Processes, Data Management, Security, Privacy & Trust, Device Level Energy Issues, IoT Related Standardization, Recommendations on Research Topics . [6 Hrs]

UNIT – II: M2M to IoT

[CO2]

A Basic Perspective– Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, an emerging industrial structure for IoT, the international driven global value chain and global information monopolies. M2M to IoT-An Architectural Overview– Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations [6Hrs.]

UNIT – III: IoT Architecture

[CO3]

State of the Art – Introduction, State of the art, Architecture Reference Model- Introduction, Reference Model and architecture, IoT reference Model, IoT Reference Architecture- Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views. [10 Hrs]

UNIT – IV: IoT Applications

[CO4]

for Value Creations Introduction, IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications, Four Aspects in your Business to Master IoT, Value Creation from Big Data and Serialization, IoT for Retailing Industry, IoT for Oil and Gas Industry, Opinions on IoT Application and Value for Industry, Home Management, eHealth [10 Hrs.]

UNIT – V Internet of Things Privacy, Security and Governance

[CO5]

Introduction, Overview of Governance, Privacy and Security Issues, Contribution from FP7 Projects, Security, Privacy and Trust in IoT-Data-Platforms for Smart Cities, First Steps Towards a Secure Platform, Smart Approach. Data Aggregation for the IoT in Smart Cities, Security . [6 Hrs]

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Text Books:

S.No.	Title	Author(s)	Publisher
1	Abusing the Internet of Things	Nitesh Dhanjani	Shroff Publisher/O'Reilly Publisher
2	Internet of Things	RMD Sundaram Shriram K Vasudevan, Abhishek S Nagarajan	John Wiley and Sons
3	Getting Started with the Internet of Things	Cuno Pfister	Shroff Publisher/Maker Media

Reference Books:

S. No.	Title	Author(s)	Publisher
1	Rethinking the Internet of Things: A Scalable Approach to Connecting Everything 1 st Edition	Francis daCosta	Apress Publications
2	Make: Getting Started with the Arduino	Massimo Banzi, Michael Shiloh	Shroff Publisher/Maker Media Publishers.

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Scheme of Teaching & Examination (Effective from 2020-2021 Batch)

Subject Code CS111524	Bigdata Analytics Essentials	L = 3	T = 0	P = 0	Credits = 3
Examination Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

Course Objectives	Course Outcomes
Student will get answers of questions like What is Big Data? How do we tackle Big Data? Why are we interested in it? How does Big Data add value to businesses? Etc. Students will also understand how to process big data on platforms that can handle the volume, velocity, variety and veracity of Big Data. Student will get to know why Hadoop is a great Big Data solution and why it's not the only Big Data solution. Student will also find out the truth about what Data Science is and various tools available for Data Science.	After completion of this course, student will be able to CO1. Understand fundamentals of Big Data. CO2. Understand Architecture and working of platforms like Hadoop and Spark. CO3. Apply Data Science methodologies in learning Data Science tools. CO4. Understand how data analytics and data science rules current IT industries CO5. Create the model for the dataset

UNIT – I : Basics of Big Data

[CO1]

What is Big Data?, Characteristics of Big Data, What are the V's of Big Data?, The Impact of Big Data, Big Data Examples, Sources of Big Data, Big Data Adoption, The Big Data Platform, Big Data and Data Science, Skills for Data Scientists, the Data Science Process, Eco systems of Big Data.

[8 Hrs]

UNIT – II: Hadoop Introduction

[CO2]

What is Hadoop, how Big Data solutions can work on the Cloud, other open source software related to Hadoop, Hadoop components, how HDFS works, data access patterns for which HDFS is designed, how data is stored in an HDFS cluster, Add and remove nodes from a cluster, Verify the health of a cluster Start and stop a clusters components, Modify Hadoop configuration parameters, Setup a rack topology, Describe the Map Reduce philosophy, Explain how Pig and Hive can be used in a Hadoop environment, Describe how Flume and Sqoop can be used to move data into Hadoop, Describe how Oozie is used to schedule and control Hadoop job execution.

[7Hrs]

UNIT – III: Spark Fundamentals

[CO3]

What is Spark and what is its purpose?, Components of the Spark unified stack, Resilient Distributed Dataset (RDD), Downloading and installing Spark standalone, Scala and Python overview, Launching and using Spark's Scala and Python shell, Resilient Distributed Dataset and Data Frames, Spark application programming, Spark libraries, Spark configuration, monitoring and tuning.

[7Hrs]

UNIT – IV: Data Science Introduction

[CO4]

Defining Data Science, Role of Data Science people, Data Science in Business, Use Cases for Data Science.

Data Science Tools : Introducing Skills Network Labs, Introducing Jupyter Notebooks, Introducing Zeppelin Notebooks, Introducing RStudio IDE.

[7Hrs]

UNIT – V Data Science Methodology

[CO5]

From Problem to Approach, From Requirements to Collection, From Understanding to Preparation, From Modeling to Evaluation, From Deployment to Feedback.

[7Hrs]

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Text Books:

S.No.	Title	Author(s)	Publisher
1	Big Data Analytics	Seema Acharya, Subhasini Chellappan	Wiley
2	BIG Data and Analytics	Subhashini Chellappan	Wiley
3	BIG Data and Analytics	Venkat Ankam	PACKT
4	BIG Data and Analytics	Raj Kamal, Preeti Saxena	Mc Graw Hill Education

Reference Books:

S. No.	Title	Author(s)	Publisher
1	HADOOP : The definitive Guide	Tom White	OReilly
2	Learning Spark: Lightning-Fast Big Data Analysis	Holden Karau , Andy Konwinski, Patrick Wendell Matei Zaharia	OReilly

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Subject Code CS109525	Artificial Neural Network	L = 3	T = 0	P = 0	Credits = 3
Examination Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours

Course Objectives	Course Outcomes
Define what is Neural Network and model a Neuron and Express both Artificial Intelligence and Neural Network . Analyze ANN learning, Error correction learning, Memory-based learning, Hebbian learning, Competitive learning. Implement Simple perception, Perception learning algorithm, Modified Perception learning algorithm, and Adaptive linear combiner, Continuous perception, learning in continuous perception. Analyze the limitation of Single layer Perceptron and Develop MLP with 2 hidden layers, Develop Delta learning rule of the output layer and Multilayer feed forward neural network with continuous perceptions.	On successful completion of the course, the student will be able to: CO1: Model Neuron and Neural Network, and to analyze ANN learning, and its applications. CO2: Perform learning and training. CO3: Know the working of various neural network model. CO4: Identify application areas of Neural Network. CO5 : Model neural network and fuzzy systems.
Unit I :Introduction to Artificial Neural Networks [CO1] Elementary Neurophysiology, Models of a Neuron, Neural Networks viewed as directed graphs, Feedback, from neurons to ANN, Artificial Intelligence and Neural Networks; Network Architectures, Single-layered Feed forward Networks, Multi-layered Feed forward Networks, Recurrent Networks, Topologies. [7 Hrs]	
Unit II: Learning and Training [CO2] Activation and Synaptic Dynamics, Hebbian, Memory based, Competitive, Error-Correction Learning, Credit Assignment Problem: Supervised and Unsupervised learning, Memory models, Stability and Convergence, Recall and Adaptation. [7 Hrs]	
Unit III :A Survey of Neural Network Models [CO3] Single-layered Perceptron – least mean square algorithm, Multi-layered Perceptrons – Back propagation Algorithm, XOR – Problem, The generalized Delta rule, BPN Applications, Adalines and Madalines – Algorithm and applications. [7 Hrs]	
Unit IV: Applications [CO4] Talking Network and Phonetic typewriter : Speech Generation and Speech recognition, Neocognitron – Character Recognition and Handwritten Digit recognition, Pattern Recognition Applications. [7 Hrs]	
Unit V: Neural Fuzzy Systems [CO5] Introduction to fuzzy set, Operations, Relations, Example of fuzzy logic, Defuzzification, nonlinear regression, Multiclass discrimination, Deep Learning overview and importance over machine Learning [8 Hrs]	

Text Books:

S. No.	Title	Author(s)	Publisher
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1	Artificial Neural Networks	B. Yagna Narayan	PHI
2	Neural Networks Fuzzy Logic & Genetic Algorithms	Rajshekaran & Pai	Prentice Hall

Reference Books:

S. No.	Title	Author(s)	Publisher
1	Neural Networks	James A. Freeman and David M. Strapetuns,	Prentice Hall
2	Neural Network & Fuzzy System	Bart Kosko	PHI.
3	Neural Network Design	Hagan Demuth Deale	Vikas Publication House

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Subject Code CS113526	Statistical Foundation for Data Science	L = 3	T =	P = 0	Credits = 2
Examination Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours
	Minimum number of class tests to be conducted=02			Minimum Assignments=02	

Course Objectives	Course Outcomes
<p>The objective of the course is aimed learn the probability distributions and density estimations to perform analysis of various kinds of data. Also to explore the statistical analysis techniques using Python and R programming languages.</p>	<p>On successful completion of the course, the student will be able to:</p> <p>CO1: Implement statistical analysis techniques for solving practical problems.</p> <p>CO2: Apply statistical analysis on variety of data.</p> <p>CO3: Perform multi-dimensional scaling.</p> <p>CO4: Perform appropriate statistical tests using R.</p> <p>CO5: Analyze data using python</p>
<p>UNIT 1 Probability Theory: Sample Spaces-Events-Axioms-Counting-Conditional Probability and Bayes' Theorem, The Binomial Theorem – Random variable and distributions: Mean and Variance of a Random variable, Binomial-Poisson-Exponential and Normal distributions. Curve Fitting and Principles of Least Squares Regression and correlation. (7Hrs) CO1</p>	
<p>UNIT 2 Sampling Distributions & Descriptive Statistics: The Central Limit Theorem, distributions of the sample mean and the sample variance for a normal population, Sampling distributions (Chi Square, t, F,z).Test of Hypothesis-Testing for Attributes. (7Hr) CO2</p>	
<p>UNIT 3 Mean of Normal Population – One-tailed and two-tailed tests, F-test and Chi-square test Analysis of variance ANOVA – One way and two way classifications. Tabular data Power and the computation of sample size- Advanced data handling-Multiple regression Linear models- Logistic regression-Rates and Poisson regression-Nonlinear curve fitting. (7Hrs)CO3</p>	
<p>UNIT 4 Linear Algebra: Vector space, subspaces, linear dependence and independence of vectors, matrices, projection matrix, orthogonal matrix, idempotent matrix, partition matrix and their properties, quadratic forms, systems of linear equations and solutions; Gaussian elimination, eigen values and eigen vectors, determinant, rank, nullity, projections, LU decomposition, singular value decomposition. CO4 7 Hrs</p>	
<p>UNIT 5 Calculus and Optimization: Functions of a single variable, limit, continuity and differentiability, Taylor series, maxima and minima, optimization involving a single variable. (8Hrs) CO5</p>	

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Text Books:

S.No.	Title	Author(s)	Publisher
1	Introduction to Probability and Statistics for Engineers and Scientists	Sheldon M. Ross	Academic Press
2	Introductory statistics with R	Dalgaard, Peter	Springer Media Science & Business
3	A Handbook of Statistical Analysis Using R	Brain S.Everitt	Apple Academic Press
4	Mathematical Statistics	J.K.Goyal	Krishna Prakashan

Reference Books:

S. No.	Title	Author(s)	Publisher
1	R Cook book	Paul Teetor	O'Reilly

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Scheme of Teaching & Examination (Effective from 2020-2021 Batch)

Subject Code CS102527	Biometrics	L = 3	T =	P = 0	Credits = 2
Examination Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours
	Minimum number of class tests to be conducted=02			Minimum Assignments=02	

Course Objectives	Course Outcomes
<p>The basic objective in offering this course is to study the state-of-the-art in biometrics technology can explore the way to improve the current technology. The students can learn and implement various biometrics technologies using advanced algorithm.</p>	<p>On successful completion of the course, the student will be able to:</p> <ol style="list-style-type: none"> 1. Understand the basic definition of 'Biometric Recognition' and the distinctive of this form of biometrics. 2. Be able to state precisely what functions these systems perform. 3. Be able to draw a system-level diagram for any biometric system and discuss its components. 4. Be able to solve verification, identification, and synthesis problems for a variety of biometrics such as fingerprint, face, iris, hand gestures and cryptography. 5. Be able to use the biometrics ingredients of existing system to obtain a given security goal. 6. Judge the appropriateness of proposal in research papers for a given applications. 7. Be able to design a biometric solution for a given application.
<p>Unit I: Introduction of Biometrics Biometrics: definition, history, basic working architecture, types; Performance measures of biometrics; applications and benefits of biometrics; design of biometrics; biometric identification versus verification.</p> <p>Unit II: Face and Iris Biometrics Background of face and iris recognition; Face recognition methods: Eigen face methods, contractive transformation method; Challenges of face biometrics; Design of iris biometrics: image segmentation, image preprocessing, determination of iris region; Advantages and disadvantages of face and iris biometrics.</p> <p>Unit III: Fingerprint and Sign Language Biometrics Fingerprint matching: image acquisition, image enhancement and segmentation, image binarization, minutiae extraction and matching; Sign language biometrics: Indian sign language (ISL) biometrics, SIFT algorithm, advantages and disadvantages of ISL and fingerprint biometrics.</p> <p>Unit IV: Biometric Cryptography and Privacy Enhancement Introduction to biometric cryptography; general purpose cryptosystems; Cryptographic algorithms: DES and RSA; Privacy concerns and issues related to biometrics; biometrics with privacy enhancement; soft biometrics; comparison of various biometrics; Identity and privacy.</p>	

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Shri Shankaracharya Technical Campus, Bhilai

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Scheme of Teaching & Examination (Effective from 2020-2021 Batch)

Unit V: Scope of Biometrics and Biometric Standards Multimodal biometrics: basic architecture and fusion scheme, application, example of AADHAAR; scope and future market of biometrics; role of biometrics in enterprise and border security; DNA biometrics; biometric standards; biometric APIs.

Text Books:

S.No.	Title	Author(s)	Publisher
1	Biometrics: concepts and applications	Dr G R Sinha and Sandeep B. Patil	Wiley India Publications
2	Introduction to biometrics	Anil K Jain, Arun Ross and Karthik Nandakumar	Springer
3	Biometrics Identity verification in a networked world	Samir nanawati, Michael Thieme and Raj Nanawati	US edition of Wiley India

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Scheme of Teaching & Examination (Effective from 2020-2021 Batch)

Subject Code CS102528	Object Oriented Modeling and Design	L = 3	T =	P = 0	Credits = 2
Examination Scheme	ESE	CT	TA	Total	ESE Duration
	100	20	30	150	3 Hours
	Minimum number of class tests to be conducted=02			Minimum Assignments=02	

Course Objectives	Course Outcomes
<p>The basic objective in offering this course is to study the state-of-the-art technology that can explore the way to improve the current technology. The students can learn and implement concept of object oriented techniques.</p>	<p>On successful completion of the course, the student will be able to:</p> <ol style="list-style-type: none"> 1. Describe the concepts involved in Object-Oriented modeling and their benefits 2. Demonstrate concept of use-case model, sequence model and state chart model for a given problem. 3. Explain the facets of the unified process approach to design and build a Software system. 4. Translate the requirements into implementation for Object Oriented design. 5. Choose an appropriate design pattern to facilitate development procedure.

UNIT- I Introduction: Modelling Concepts and Class Modelling: What is Object orientation? What is OO development? OO Themes; Evidence for usefulness of OO development; OO modelling history. Modelling as Design technique: Modelling; abstraction; The Three models. Class Modelling: Object and Class Concept; Link and associations concepts; Generalization and Inheritance; A sample class model; Navigation of class models; Advanced Class Modelling, Advanced object and class concepts; Association ends; N-ary associations; Aggregation; Abstract classes; Multiple inheritance; Metadata; Reification; Constraints; Derived Data; Packages.

UNIT-II UseCase Modelling and Detailed Requirements: Overview; Detailed object oriented Requirements definitions; System Processes-A use case/Scenario view; Identifying Input and outputs-The System sequence diagram; Identifying Object Behaviour-The state chart Diagram; Integrated Object-oriented Models.

UNIT- III Process Overview: System Conception and Domain Analysis: Process Overview: Development stages; Development life Cycle; System Conception: Devising a system concept; elaborating a concept; preparing a problem statement. Domain Analysis: Overview of analysis; Domain Class model: Domain state model; Domain interaction model; Iterating the analysis.

UNIT-IV System design and Class Design: System design: Overview of System Design, Estimating Performance, Making a Reuse Plan, Breaking a System into Subsystems, Identifying

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Scheme of Teaching & Examination (Effective from 2020-2021 Batch)

Concurrency, Allocating Subsystems, Management of Data Storage, Handling Global Resources, Choosing Software Control Implementation, Handling Boundary Conditions, Setting Trade-off Priorities, Common Architectural Styles, Architecture of the ATM System. Class design: Overview of Object Design, Bridging the gap, Realizing Use Cases, Designing Algorithms, Recursing Downward, Refactoring, Design Optimization, Reification of Behavior, Adjustment of Inheritance, Organizing a Class Design, ATM Example.

UNIT-V Design Patterns: Introduction; what is a design pattern?, Describing design patterns, the catalogue of design patterns, Organizing the catalogue, How design patterns solve design problems, how to select a design patterns, how to use a design pattern; Creational patterns.

Text Books:

S.No.	Title	Author(s)	Publisher
1	Object – Oriented Modeling and Design with UML	Michael R Blaha and James R Rumbaugh	Pearson Education, India
2	Object oriented systems development	Ali Bahrami	McGraw-Hill Higher Education
3	Object Oriented Analysis & Design	Atul Kahate	Tata McGraw-Hill Education
4.	Object-Oriented Analysis and Design with Applications	Grady Booch, Robert A. Maksimchuk Michael W. Engle	

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