

Year-3 Term-2

Sl.#	Course Code	Course Title	Credit	Credit Hours
1	CSTE 3201	Computer Networking	3	3
2	CSTE 3202	Computer Networking Lab	1	2
3	CSTE 3203	Microwave and Satellite Communication	2	3
4	CSTE 3204	Microwave and Satellite Communication Lab	1	2
5	CSTE 3206	Web Engineering Lab	1.5	2
6	CSTE 3207	Optical Fiber Communication	3	3
7	CSTE 3208	Optical Fiber Communication Lab	1	2
8	CSTE 3209	Software Engineering and Information System Design	3	3
9	CSTE 3210	Software Engineering and Information System Design Lab	1.5	3
10	CSTE 3211	Artificial Intelligence and Neural Networks	3	3
11	CSTE 3212	Artificial Intelligence and Neural Networks Lab	1	2
12	CSTE 3226	Viva Voce	1	0
		Total	22	31

COURSE TITLE: COMPUTER NETWORKING

Week	Course Contents	CLOs	Teaching Learning Strategy (activities directed to achieve outcomes)	Assessment Strategy (How they are developed)
1	Introduction: The Use of Computer Network – Network Hardware, LANs, WANs, Wireless network, Internetworks, Network software Protocol Hierarchies, Design issues for Layers, Interfaces and services, CO & CL services, service primitives, relationship of services to protocol,	CLO1	Lecture and discussion with detailed information about network devices, types of networks.	Answer basic questions, quizzes, Homework, exams.
2	OSI reference model, TCP/IP reference model, Example networks – Novell NetWare, Internet, X.25.	CLO2	Lecture and discussion with characteristics OSI model and protocols in several network types- LAN, MAN, WAN	Questions about comparison, quizzes, Homework, exams.
3	The Physical Layer: The theoretical basis of data communication-Fourier Analysis, Bandwidth-limited signals. The maximum data rate of a channel. Transmission Media - twisted pair, Baseband Coaxial Cable, Broadband coaxial cable, fiber optics. The line of Sight transmission, Communication satellites. Analog Transmission, tree Telephone system, Modems, RS – 232 & RS – 449.	CLO1, CLO3	Lecture and discussion with problems.	Design, development, explanation, quizzes, Homework, exams.
4	The medium Access Sublayer: Local and Metropolitan Area's Networks Static Channel allocation in LAN's and MAN's Dynamic channel allocation in LAN's and MAN's Network Protocols-persistent and Non-Persistent CSMA, CSMA with collision detection, BRAP-broadcast recognition with alternating priorities. MLMA-the multilevel multi-access Multi-access protocol, binary countdown. Limited Contention Protocol – The adaptive tree walk protocol. IEEE standard 802 for local area network – IEEE standard 802.3 and Ethernet, IEEE standard 802.5 token buses, IEEE standard 802.5 token, ring, comparison of local area networks, FDDI, Wireless LAN – 802.11.	CLO2	Lecture and discussion with problems in multiple access control.	Exercise with various problems in media access.
5	The Data Link Layer: data link layer issues-services provided to the network Layer, Framing Error Control, Flow control, Link Management, error detection and Correction-Error-Correcting Codes, error-detecting codes.	CLO2, CLO3	Lecture and discussion on various types of link management	Class Test 1(topics of the week's 1-4)
6	Elementary data link protocols – An Unrestricted simplex, Protocol, A simple	CLO2, CLO3	Lecture and discussion with problems in error control,	Performance analysis of flow

	Stop and wait for protocol, A simplex protocol for a noisy channel, sliding window protocols – A one-bit sliding window protocol, A protocol using Go back N, A protocol using selective repeat Protocol performance – performance of the stop and wait for protocol. The performance of the sliding window protocol. An example of the data link layer – the data layer in public networks – the data link layer on the Internet.		flow control	control protocols, quizzes, Homework, exams.
7	The Network layer: Network Layer design issues – services provided to the transport layer, an Internal organization of the network layer,	CLO3	Lecture on design and applications of IP addresses. IP distribution, address block, sub-netting, super-netting, subnet mask, Broadcast and network addresses.	Assignment on IP distribution of an ISP
8	Routing, Congestion, Internetworking, Routing Algorithms,	CLO3	Lecture on performance of router	Presentations, quizzes, Homework, exams
9	Congestion – Control algorithms, Pre-allocation of buffers. Packet discarding, Congestion Control, flow control, Choke packets, deadlocks. Examples of the network layer – the network layer in public networks, the network layer on Internet (IP).	CLO3	Lecture and discussion about congestion control	Class Test 2 (topics of the weeks5-8)
10	The Transport Layer: Transport layer design issues-services provided to the session layer, quality of services, the OSI transport service primitives, transport protocol, elements of transport protocols,	CLO3	Lecture on services of transport layer	Explanation, quizzes, Homework, exams.
11	addressing, establishing a connection, releasing connection flow control & buffering, multiplexing, crash recovery, examples of the transport layer, Transmission Control Protocol TCP).	CLO3	Lecture on Transmission Control Protocol TCP, User Datagram Protocol	Explanation, quizzes, Homework, exams.
12	The presentation Layer: Presentation layer design issues-Data representation, Text Compression, Network security and privacy. The OSI presentation, Service primitives, Substitution Ciphers, Transposition Ciphers, Public key Encryption, Secrecy and Digital Signature with Public Key encryption.	CLO1	Lecture on security issues and applications of them.	Class Test 3 (topics of the weeks9-12)
13	Review topics and Final exam preparation.		Lecture and discussion on miscellaneous topics.	Exercise the answering methods in final exam.

Recommended Books:

1. Data Communications and Networking by Behrouz A. Forouzan, McGraw-Hill.
2. Computer Networks by Andrew S. Tanenbaum, Prentice Hall.
3. TCP/IP Protocol Suite by Behrouz A. Forouzan, McGraw-Hill.

ASSESSMENT PATTERN				
Attendance- 05				
CIE-Continuous Interval Evolution (25) (Average of best 2 out of 3 will be counted)				SEE-Semester End Examination (70 marks)
Bloom's Category	Test-1 (25)	Test-2 (25)	Assignment (25)	
Remember				
Understand	15	5		
Apply	5	10	10	
Analyze	5	5	10	
Evaluate		5	5	
Create				

COURSE TITLE: COMPUTER NETWORKING LAB

Course Code: CSTE 3202	Attendance: 10
Credit Hours: 1	Viva: 20
Exam Hours: 03	SEE Marks: 70

Course Objectives:

- Make the students familiarize with the internal structure of Networking layers, Protocols, Application of Protocols, Topologies, device selection depending on the medium.
- Introduce debugging and testing techniques to locate and resolve errors and to determine the effectiveness of a network.
- Explain the use of protocol applications, troubleshooting, and network management.
- Introduce DNS, FTP, NFS, email server, web server setup and maintenance, VMware ESXi, Docker, Container setup and evaluation.

Resources Used: Multimedia, Whiteboard, Marker, Handouts, pdf books, e-Tutorials, Hand books-manual, Previous questions, LAN, Internet.

Course Learning Outcomes (CLO)	CLOs	Description (At the end of the course, students will be able to)										
	CLO1	understand the internal structure of Networking layers, Protocol applications, etc.										
	CLO2	analyze error detection and correction for the effectiveness of the network.										
	CLO3	apply protocols for troubleshooting and network management.										
	CLO4	evaluate and analyze real-world problems and finding solutions.										

Mapping of CLO to PLO (Program Learning Outcome)	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
	√											
		√										
	√											
							√					√

Lesson Plan (as per week):

Week	Course Contents	CLOs	Teaching Learning Strategy (activities directed to achieve outcomes)	Assessment Strategy (How they are developed)
1	The Use of Computer Network – Network Hardware, OSI model.	CLO1	Discussion with Hands on manual	Answer basic questions, quizzes.
2	Installation of a virtual machine	CLO2, CLO3, CLO4	Demonstration with RHEL6.iso and bootable pen drive with rhel6	Do.
3	Network setup with appropriate IP of real host and guest machine. ping, traceroute,	CLO3	Ensure and testing communication between	Do.

	arp, learning remote login using telnet session, ssh. Study of Network IP, TTL, ICMP		computers.	
4	FTP, vsftpd configuration, NFS	CLO3, CLO4	Demonstration with FTP	Do.
5	IP forwarding, dig, nslookup	CLO3, CLO4		Class Test 1 (topics of the week's 1-4)
6	Web server in Redhat OS, httpd configuration	CLO3	Hands on instruction	Answer basic questions, quizzes.
7	Email server setup in Redhat OS.	CLO3, CLO4	Hands on instruction	Do.
8	User add, user delete, recreate user name	CLO3, CLO4	Hands on instruction	Do.
9	Manual using for instruction, yum server installation	CLO3, CLO4	Demonstration	Class Test 2 (topics of the weeks 5-8)
10	DNS	CLO3, CLO4	Hands on instruction	Answer basic questions, quizzes.
11	DHCP server	CLO3, CLO4	Hands on instruction	Do.
12	Virtualization, Docker, Container	CLO4	Demonstration	Class Test 3 (topics of the week's 9-11)
13	Final Lab Exam (Lab and Viva voce)			

ASSESSMENT PATTERN

Attendance- 10

Viva- 20

SEE-Semester End Examination (70 marks)

Bloom's Category	Test
Remember	
Understand	10
Apply	30
Analyze	30
Evaluate	
Create	

COURSE TITLE:MICROWAVE AND SATELLITE COMMUNICATION

Course Code: CSTE 3203 Credit Hours: 03 Exam Hours: 04	Attendance: 05 CIE Marks: 25 SEE Marks: 70
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Course Objectives:

- Impart Radio communication in general and also the special aspects that relate to microwave and satellite communications.
- Discuss the use of microwave radio systems in communications highlighting the design, deployment and operational challenges of microwave radio communications
- Provide an in-depth understanding of different concepts used in a satellite communication system.
- To give a thorough understanding of satellite systems including topics of orbits and constellations, satellite space segment, and propagation and satellite links; baseband communications techniques for satellites including modulation, coding, multiple access, and on-board processing as well as the applications of various satellite communications systems.

Resources Used: Multimedia, Whiteboard, Marker, Handouts, pdf books, e-Tutorials, Device manual, Question bank, Previous questions.

Course	CLOs	Description (At the end of the course, students will be able to)
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Learning Outcomes (CLO)	CLO1	understand the concept of basic RF/ Microwaves, Microwave devices, applications, satellite communication, and their multiple access techniques
	CLO2	identify the use of microwave components and devices in microwave applications.
	CLO3	analyze the link budget of satellite/terrestrial signal for proper communication and different types of the subsystem.
Mapping of CLO to PLO (Program Learning Outcome)	PLO1	<input checked="" type="checkbox"/>
	PLO2	<input type="checkbox"/>
	PLO3	<input type="checkbox"/>
	PLO4	<input type="checkbox"/>
	PLO5	<input type="checkbox"/>
	PLO6	<input type="checkbox"/>
	PLO7	<input type="checkbox"/>
	PLO8	<input type="checkbox"/>
	PLO9	<input type="checkbox"/>
	PLO10	<input type="checkbox"/>
	PLO11	<input type="checkbox"/>
	PLO12	<input type="checkbox"/>

Lesson Plan (as per week):

Week	Course Contents	CLOs	Teaching Learning Strategy (activities directed to achieve outcomes)	Assessment Strategy (How they are developed)
1	Microwave Communication: CCIR recommendation on frequency assignment; comparison with radio communication in another frequency band.	CLO1	Lecture and discussion with detailed information about the course, including the objectives, course outcomes, examinations, topic wise lecture delivery.	Answer basic questions, quizzes, Homework, exams.
2	Microwave Link: Microwave link and its advantage, Frequency assignment, modulation methods, Transmitting and receiving equipment, Baseband repeater, IF repeater, Microwave carrier supply, Auxiliary channels	CLO3	Lecture and discussion with details concept of microwave transmission	Answer basic questions, quizzes, Homework, exams.
3	Microwave Antenna: Hertzian and half wave dipoles. Monopole, horn, rhombic and parabolic reflector, array, and Yagi-Uda antenna.	CLO2	Lecture and discussion on brief outline and choosing of microwave antenna for long haul and short haul.	Answer basic questions, quizzes, Homework, exams.
4	Microwave transmission lines: Introduction to transmission lines, waveguides, strip-lines, microstrip lines, fin-lines, inverted-striplines. Reflection coefficient, Transmission coefficient, VSWR, Impedance transformation in RF lossless lines. Impedance measurement.	CLO2	Lecture and discussion on how the microwave signal reach it exactly by find out the components of transmission line.	Exercise with various mathematical problems.
5	Microwave Components: Microwave hybrid circuits, scattering parameters, Waveguide Tees, Directional couplers, Circulators and Isolators, Phase shifter and attenuator.	CLO1, CLO2	Lecture and discussion on various type of microwave components.	Class Test 1 (topics of the week's 1-4)
6	Microwave Devices: Microwave transistors; varacter diode, IMPATT diode, Gunn Diode, Schottky Barrier diode; a backward diode; point contact diode.	CLO1, CLO2	Lecture and discussion on how the microwave devices work properly and why need these devices.	Answer basic questions, quizzes, Homework, exams.
7	Microwave Devices: Klystron; Reflex Klystron, TWT, Backward Wave Oscillator (BWO), Microwave filters, planer microwave elements (directional coupler, circulators) and Magnetron.	CLO1, CLO2	Lecture and discussion on how the microwave devices work properly and why need these devices.	Answer basic questions, quizzes, Homework exams.

8	Applications of Microwave: Radar systems - Pulsed radar, MTI, Tracking radars, Altimeter- Principles of operation, applications.	CLO1	Lecture and discussion with various types of radar and its applications.	Answer basic questions, quizzes, Homework, exams.
9	Satellite Communication: Introduction: Origin of Satellite communication. The current state of Satellite Communication. An orbital aspect of satellite communication: Orbital mechanism, the equation of orbit, locating satellite in orbit, orbital elements, orbital perturbation.	CLO1	Lecture and discussion with fundamental concepts of satellite communication.	Class Test 2(topics of the week's 5-8)
10	Space craft subsystem: -Altitude and orbit control system, Telemetry tracking and command power system, communication subsystem. Satellite link design: System noise temperature and G/T ratio, downlink design, domestic satellite system, uplink design, the design of satellite link for specified (C/N).	CLO1, CLO3	Lecture and discussion on the design of satellite link budget and different types of subsystem which is very important for controlling.	Answer basic questions, quizzes, Homework, exams.
11	Fundamentals of Software Defined Radio: Baseband Technology, Emergence of Software Defined Radio, Evolution of Software Defined Radio, Baseband requirements.	CLO1	Lecture and discussion on the importance of software defined radio	Quizzes, Homework, exams.
12	Multiple access techniques: - FDMA, FDM/FM/FDMA, effects of intermodulation, commanded FDM/FM/FDMA. TDMA, TDMA frame structure and design, TDMA synchronization and timing, code division multiple access, SS transmission and reception applicability of CDMA to a commercial system, multiple access onboard processing, SCPS system, digital speech interpolation system, DAMA.	CLO1	Lecture and discussion on satellite Multiple Access (MA) techniques which is interconnect ground stations through multiple satellite transponders with the goal of optimizing several system attributes.	Class Test 3(topics of the week's 9-12)
13	Review topics and Final exam preparation.		Lecture and discussion on miscellaneous topics.	Exercise the answering methods in final exam.

Recommended Books:

1. Advanced Electronic Communication Systems by Wayne Tomasi, Prentice Hall.
2. Foundations for Microwave Engineering by R. E. Collin, McGraw Hill.
3. Satellite Communications by Dennis Roddy, McGraw Hill.
4. Microwave devices and Circuits by S. Y. Lao, Prentice Hall.

ASSESSMENT PATTERN

Attendance- 05

CIE-Continuous Interval Evolution (25) (Average of best 2 out of 3 will be counted)				SEE-Semester End Examination (70 marks)	
Bloom's Category	Test-1 (25)	Test-2 (25)	Assignment (25)	Bloom's Category	Test
Remember				Remember	
Understand	15	10		Understand	20

Apply	5	10	10	Apply	20
Analyze	5	5	15	Analyze	20
Evaluate				Evaluate	10
Create				Create	

COURSE TITLE: MICROWAVE AND SATELLITE COMMUNICATION LAB

Course Code: CSTE 3204 Credit Hours: 01 Exam Hours: 03	Attendance: 10 Viva: 20 SEE Marks: 70
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Course Objectives:

- Provide hands-on experience to the students so that they can put theoretical concepts to practice.
- Emphasize teamwork skills for working effectively in groups.
- Develop technical writing skills for effective communication.
- Familiarize with basic microwave measurements.
- Characterize microwave and microwave components/devices by measuring parameters.
- Motivate students toward space by providing “real world” satellite design, fabrication, test, launch, and operational experience.

Resources Used: Multimedia, Whiteboard, Marker, Handouts, pdf books, e-Tutorials, Device manual, Question bank, Previous questions.

Course Learning Outcomes (CLO)	CLOs Description (At the end of the course, students will be able to)													
	CLO1		summarize the significant experience with microwave and satellite communication equipment.											
	CLO2		apply modern microwave design and measurement techniques, software, and instrumentation to design, simulate, fabricate and verify the operation of a passive microstrip microwave circuit and real-world satellite design.											
Mapping of CLO to PLO (Program Learning Outcome)	PLO1	√	PLO2		PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
	CLO1	√												
	CLO2		√											

Lesson Plan (as per week):

Week	Course Contents	CLOs	Teaching Learning Strategy (activities directed to achieve outcomes)	Assessment Strategy (How they are developed)
1	To familiar with different equipment related to microwave and satellite communication.	CLO1	Lecture and discussion with detailed information about the lab course, including the objectives, course outcomes, lab examinations and evaluation method.	Answer basic questions about different types of instruments.
2-6	<ul style="list-style-type: none"> • Study of the characteristics of Klystron Tube and to determine its electronic tuning range. • To determine the frequency & wavelength in a rectangular wave-guide working on TE_{10} mode. • To determine the Standing Wave-Ratio and Reflection Coefficient. • To measure an unknown 	CLO1, CLO2	Through lecture, Laboratory, and out-of-class assignments.	Neatness, organization, completeness and individually written lab reports are due at the beginning of the lab period. Respected Teacher will be evaluated in lab period.

	<ul style="list-style-type: none"> Impedance with Smith chart. To study the substitution method for attenuation measurement & determine the attenuation due to a component under test. Study the voice communication by using microwave test bench. Study of PC to PC communication using microwave test bench. Study of PC to PC communication using microwave transceiver communication kit. Study of Magic Tee, Circulator/Isolator, Attenuator (Fixed and Variable type), and Resonant Cavity. 			Hands on experience in simulation environment
7-10	<ul style="list-style-type: none"> Establishing a direct communication link between Uplink Transmitter and Downlink Receiver using tone signal. To implement Matlab code for uplink and downlink budget calculation. To implement Matlab code to determine look angle (azimuth and elevation) of satellite. Transmitting and receiving three separate signals (Audio, Video, Tone) simultaneously through satellite link. Study the delay between Uplink Transmitter and Downlink Receiver during data transmission. Study the global positioning system and GPS receiver. Calculate the carrier to noise ratio/signal to noise ratio of established satellite link. Transmitting and receiving PC data through satellite link. 	CLO2	Through lecture, laboratory, and out-of-class assignments.	
11-12	Followings are implemented by the simulation software. <ul style="list-style-type: none"> Design of a 100 MHz Chebyshev Low pass Filter (series inductor and parallel capacitor version). Impedance Matching using a 1 / 4 -Microstrip-Line (on an FR4-board). Impedance Matching using a 1 / 4 - Line (= Grounded Coplanar 	CLO2	Through lecture, and problem design in simulation environment.	

	Waveguide). • Analyzing a 1 GHz – Microstrip-LPF. Complete Design of a 1575 MHz – Microstrip edge coupled Bandpass Filter.																	
13	Final Lab Exam (Job, Quiz and Viva)																	
ASSESSMENT PATTERN																		
Attendance- 10 Viva- 20																		
SEE-Semester End Examination (70 marks)																		
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Bloom's Category	Test																	
Remember																		
Understand	10																	
Apply	30																	
Analyze	30																	
Evaluate																		
Create																		

COURSE TITLE:WEB ENGINEERING LAB

Course Code: CSTE 3206 Credit Hours: 1.5 Exam Hours: 03	Attendance: 10 CIE Marks: 15 Project: 30 Viva: 20 SEE Marks: 25
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Course Objectives:
➤ Impart the concept of Web Application Development and its Architecture.
➤ Explain web page designing techniques.
➤ Deliver the knowledge of embedded dynamic scripting on client-side Internet Programming.

Course Learning Outcomes (CLO)	CLOs	Description (At the end of the course, students will be able to)											
	CLO1	understand the Essentials of Web Application Development;											
	CLO2	analyze requirements of a web application;											
	CLO3	evaluate a web application with desired requirements;											
	CLO4	develop a dynamic webpage.											
	CLO5	to carry out tasks in a team environment.											

Mapping of CLO to PLO (Program Learning Outcome)		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
	CLO1	√											
	CLO2		√										
	CLO3		√										
	CLO4						√						√
	CLO5										√		

Lesson Plan (as per week):

Week	Course Contents	CLOs	Teaching Learning Strategy (activities directed to achieve outcomes)	Assessment Strategy (How they are developed)
1	UI DESIGN	CLO1	Discussion and practice	-Home task

	<ul style="list-style-type: none"> • Introduction to HTML and HTML5 • TML Tags, • Formatting and Fonts, Commenting • Code, Anchors, Backgrounds, Images, • Hyperlinks, Lists, Tables, Frames, HTML Forms. 			-Quiz				
2-3	Cascading Style Sheet <ul style="list-style-type: none"> • Basic syntax and structure , • Inline Styles, Embedding Style Sheets • Linking External, Sty le • Backgrounds, Manipulating Text, Margins • and Padding Positioning using CSS	CLO1, CLO2, CLO4	First lecture and then Practice	Answer basic questions, quizzes, Homework, exams.				
4-5	Introduction to JavaScript <ul style="list-style-type: none"> • Develop Client side and server side apps by different scripting languages 	CLO4	Lecture and discussion with problems.	Quiz 1 (Topic of the 1-3 weeks)				
6-7	JDBC (JavaDatabaseConnectivity) <ul style="list-style-type: none"> • SQL, My SQL, PostgreSQL • Connection Overview, Transactions, • Driver Manager Overview • Statement Overview • Result Set Overview • Prepared Statement Overview 	CLO4	Practice with a real life problem. CRUD Project.	Homework				
8-10	Java Server Pages Technology <ul style="list-style-type: none"> • Creating Dynamic Content • Using Objects within JSP Pages • JSP Programming • Java Applets • Java Servlets 	CLO4	Practice with a real life problem. Apply JSP on CRUD Project.	Quiz 2 (Topic of the 4-7 weeks)				
11	.NetArchitectureand C# <ul style="list-style-type: none"> • Introduction to Dot Net. • Dot Net framework and its architecture • CLR ,What is Assembly , • Components of Assembly , • DLL hell and Assembly Versioning. Overview to C#. <ul style="list-style-type: none"> • Introduction to ASP.net Asp.net Programming 	CLO2, CLO4	Practice with a real life problem or project. Make CRUD Project using MVC framework.	Answer basic questions, Homework Quiz 3 (Topic of the 8-13 weeks)				
12	Project	CLO5						
13	Final Lab Exam (Job and Viva)							
Recommended Books: 1.								
ASSESSMENT PATTERN								
Attendance- 10								
Viva- 20								

Project-30				SEE-Semester End Examination (25 marks)	
Bloom's Category	Test-1 (15)	Test-2 (15)	Test-3 (15)	Bloom's Category	Test
Remember				Remember	
Understand	10	5		Understand	10
Apply	5	10	15	Apply	10
Analyze				Analyze	10
Evaluate				Evaluate	
Create				Create	

COURSE TITLE:OPTICAL FIBER COMMUNICATION

Course Code: CSTE 3207 Credit Hours: 03 Exam Hours: 04	Attendance: 05 CIE Marks: 25 SEE Marks: 70																																																				
Course Objectives:																																																					
<ul style="list-style-type: none"> ➤ Introduce the history of optical fiber communication and its application in optical communication networks. ➤ Provide students with an understanding of the functionality of each of the components that comprises a fiber-optic communication system: optical source, transmitter, fiber, amplifier, an optical detector, and receiver, etc. ➤ Impart the link budget calculation of optical fiber communication networks. 																																																					
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Lesson Plan (as per week):

Week	Course Contents	CLOs	Teaching Learning Strategy (activities directed to achieve outcomes)	Assessment Strategy (How they are developed)
1	History: History of optical fiber communications, Overview of the SEA-ME-WE-4 project. Introduction: General communication system and optical fiber communication system, The need for fiber-optic communication systems, Satellite systems versus optical fiber networks.	CLO1	Discussion on detailed information about the course, including the objectives, course outcomes, examinations. Discussion on the history of optical fiber communication with its need comparing	Answering basic questions, quizzes, Homework etc.

			with other networks.	
2	The advantage of optical fiber communication, Property of light, Skew ray and meridional ray, Phase and group velocity, Energy level concepts of radiating material, pumping and radiation, Electrical bandwidth and optical bandwidth.	CLO2	Lecture and discussion on the fundamentals of light property and some other related topics. Exercise on some basic topics.	Answering basic questions, quizzes, Homework etc.
3	Optical fiber waveguide: Basics, Refractive index, Step index fiber, Graded-index fiber, Multimode step-index fiber, Multimode graded index fiber, Total internal reflection.	CLO2	Discussion on the basics of optical fiber waveguide and the characteristics of different fiber types. Exercise on refractive index and some other basic topics.	Answering basic questions, quizzes, Homework etc.
4	Optical fiber waveguide: Critical propagation angle, Incident angle, Acceptance angle, Numerical aperture, Attenuation, Absorption, Dispersion, Bit rate and Bandwidth.	CLO2	Lecture and discussion in detail on optical fiber waveguide, attenuation, absorption, dispersion etc. Exercise on NA, attenuation, dispersion etc.	Answering basic questions, quizzes, Homework etc.
5	Preparation of optical fibers: Liquid phase (melting) technique, Vapor phase deposition technique.	CLO2	Demonstration on optical fiber preparation techniques.	CT-1 (topics of the week's 1-4)
6	Optical sources and transmitter: Light emitting diode, Principle of action and characteristics, Properties of spontaneous and stimulated radiation, Homostructure and heterostructure LED, SLED, ELED.	CLO2	Lecture and discussion on the basics of a light source and working principles of different types of LED. Exercise on related topics.	Answering basic questions, quizzes, Homework etc.
7	Optical sources and transmitter: a Laser diode (LD), Principle of action and characteristics, Fabry-Perot laser diode, Lifetime, rise/fall time and bandwidth, a Functional block diagram of an optical transmitter.	CLO2	Lecture and discussion on working principles of different types of LD. Exercise on related topics.	Answering basic questions, quizzes, Homework etc.
8	Optical detectors and receiver: p-n photodiode, p-i-n photodiode, Avalanche photodiode (APD) with working procedure, Responsibility of a photodiode, Phototransistors, Functional block diagram of an optical receiver.	CLO2	Lecture and discussion on the basics of an optical detector and working principles of different types of optical detector. Exercise on related topics.	Answering basic questions, quizzes, Homework etc.
9	Optical fiber connection: Joints and couplers, Fiber splices, Fiber connectors.	CLO2	Lecture and discussion on fiber joint and couplers. Exercise on joint and coupling loss calculations.	CT-2 (topics of the week's 5-8)
10	Optical amplifiers: Types of an optical amplifier, Semiconductor optical amplifier (SOA), Types of SOA, Erbium-doped fiber amplifier (EDFA). Optical link connections in electronic networks: FDDI, Ethernet, fiber channel, ESCON, and intersystem coupling.	CLO2	Lecture and discussion on the basics of an optical amplifier and working principles of different types of the optical amplifier and some electronic networks using an optical link. Exercise on related topics.	Answering basic questions, quizzes, Homework etc.

11	Optical link connections in electronic networks: Opticonnect, SONET and SDH, ATM, WDM, building photonic networks, components for WDM, add-drop multiplexers, optical space division switches, optical switching nodes, wavelength converters, standards for WDM, lightwave networks.	CLO2	Lecture and discussion on some other electronic networks using an optical link and some optical devices like multiplexers, switches, wavelength converters etc used in practical applications.	Answering basic questions, quizzes, Homework etc.
12	Optical fiber applications. Optical link budget.	CLO3	Discussion on optical fiber applications. Exercise on optical link budget calculations.	Assignment-1
13	Review topics and Final exam preparation.	CLO1, CLO2, CLO3	Students will be asked to answer the questions orally on previous lectures and review the contents of the course. Discussion on the better answering methods for the final examinations.	Exercise the answering methods in final exam.

Recommended Books:

1. Fiber-Optic Communications Technology by Djafar K. Mynbaev, Addison-Wesley
2. Optical Fiber Communications by John M. Senior, Prentice-Hall.
3. Fiber-Optic Communication Systems by G P. Agrawal, G P. Agrawal, Wiley.

ASSESSMENT PATTERN

Attendance- 05

CIE-Continuous Interval Evolution (25) (Average of best 2 out of 3 will be counted)				SEE-Semester End Examination (70 marks)	
Bloom's Category	Test-1 (25)	Test-2 (25)	Assignment (25)	Bloom's Category	Test
Remember	10	10		Remember	10
Understand	10	10		Understand	30
Apply	5	5	10	Apply	10
Analyze			15	Analyze	10
Evaluate				Evaluate	
Create				Create	10

COURSE TITLE:OPTICAL FIBER COMMUNICATION LAB

Course Code: CSTE 3208 Credit Hours: 01 Exam Hours: 03	Attendance: 10 Viva: 20 SEE Marks: 70		
Course Objectives:			
<ul style="list-style-type: none"> ➤ Enable students to relate what they have learned in the classroom to practical, hands-on experiments that will be performed in a fiber optic communication laboratory. ➤ Explain the principles of digital transmission systems. ➤ Develop optical fiber communication system. ➤ Develop teamwork skills for working effectively in groups. 			
Course Learning	CLOs	Description (At the end of the course, students will be able to)	
	CLO1	understand different data communication equipment.	

Outcomes (CLO)	CLO2	implement and analyze different modulation and multiplexing techniques for optical fiber communication systems.											
	CLO3	Develop optical fiber communication system.											
Mapping of CLO to PLO (Program Learning Outcome)		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
	CLO1	√											
	CLO2		√										
	CLO3	√											

Lesson Plan (as per week):

Week	Course Contents	CLOs	Teaching Learning Strategy (activities directed to achieve outcomes)	Assessment Strategy (How they are developed)
1-2	Study the basic structure and types of the optical fiber. Examine the operational characteristics and parameters of optical sources and detectors. Examine the characteristics of optical connectors.	CLO1, CLO3	Lecture and discussion with practical implementation.	Answer basic questions. Neatness, organization, completeness and individually written lab reports are due at the beginning of the lab period. Respected Teacher will be evaluated in lab period.
3	Carry out measurements on the optical communication system.	CLO1	Discussion and practice.	
4-5	Construct a digital transmission system applying Manchester and Bi-phase data codes. Construct a data transmission system with personal Computer.	CLO2	Discussion with practical implementation and testing.	
6-7	Construct a communication system consisting of : ⇒ 8-channel Multiplexer/ Demultiplexer ⇒ Manchester or Bi-Phase coder/decoder. ⇒ Transceiver of optical fiber.	CLO2	Lecture and discussion with practical implementation.	
8	Carry out a communication system consisting of FM modulator and demodulator, transmitter and receiver on optical fiber.	CLO2	Discussion and practice.	
9	Carry out an optical multiplexing of audio signal with the video signal through a frequency translation. Carry out how the multiplexed audio signal can be separated from the video signal.	CLO2	Discussion and practice.	
10	Perform Intensity modulation (linear modulation) of an optical source.	CLO2	Discussion and practice.	
11-12	Construct an audio+video communication system consisting of audio and video	CLO2, CLO3	Discussion with practical implementation and testing.	

	source, audio/video multiplexer and de-multiplexer; analog transmitter and receiver on optical fiber and loudspeaker. Perform other experiments relevant to this course.	Demonstration with e-Tutorials.														
13	Final Lab Exam (Job, Quiz and Viva)															
ASSESSMENT PATTERN																
Attendance- 10																
Viva- 20																
SEE-Semester End Examination (70 marks)																
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Bloom's Category	Test															
Remember																
Understand	20															
Apply	20															
Analyze	30															
Evaluate																
Create																

COURSE TITLE: SOFTWARE ENGINEERING AND INFORMATION SYSTEM DESIGN

Course Code: CSTE 3209	Attendance: 05
Credit Hours: 03	CIE Marks: 25
Exam Hours: 04	SEE Marks: 70
Course Objectives:	
<ul style="list-style-type: none"> <li data-bbox="296 1134 1375 1190">➤ Explain the use of software engineering practice over the entire system lifecycle, includes requirements engineering, analysis, prototyping, design, implementation, testing, maintenance activities, and management of risks involved in software and embedded systems. <li data-bbox="296 1190 1375 1248">➤ Emphasize software developers with a comprehensive set of skills appropriate to the needs of the dynamic global computing-based society. <li data-bbox="296 1248 1375 1307">➤ Develop team and organizational leadership in computing project settings, and have a broad understanding of the ethical application of computing-based solutions to societal and organizational problems. <li data-bbox="296 1307 1375 1365">➤ Impart the role and impact of software engineering in contemporary business, global, economic, environmental, and societal context. <li data-bbox="296 1365 1375 1423">➤ Focus knowledge, techniques, skills, and modern tools necessary for software engineering practice. 	

Resources Used: Multimedia, Whiteboard, Marker, Handouts, pdf books, e-Tutorials, Previous questions

	CLO4				√						
Lesson Plan (as per week):											
Week	Course Contents	CLOs	Teaching Learning Strategy (activities directed to achieve outcomes)		Assessment Strategy (How they are developed)						
1	Basic of Software Engineering Overview of Software Industry, Introduction to Software Engineering, Software Development Process and Various Life Cycle Models.	CLO1	Lecture and discussion with detailed information about the course, including the objectives, course outcomes, examinations. Topic wise lecture delivery.		Answer basic questions, quizzes.						
2	Requirement Engineering and Modeling. Communication Techniques, Analysis Principles, Software Prototyping, Requirement Specification.	CLO1, CLO2	Lecture and discussion with requirement analysis tasks. Discuss Inception, Elicitation, Elaboration, Negotiation, Specification, validation, and requirement management and software prototype.		Answer basic questions, quizzes, Homework, exams.						
3	Working in Teams, Characteristics of Successful Team, understanding Group Dynamics, Team Roles and Temperament, democratic Team and Chief Programmer Team Approach.	CLO1	Lecture and discussion with problems related to teamwork.		Homework, exams.						
4	Feasibility Study Steps of system analysis, Feasibility study, Economic and technical analysis, System specification, the elements of analysis model.	CLO1, CLO2	Lecture and discussion on different types of feasibility study and feasibility study process. Discussion with problems and its solution.		Exercise with various scenario.						
5	Data modeling, Functional modeling and information flow, Behavioral modeling, Mechanics of structured analysis, Data Dictionary.	CLO2	Lecture and discussion on elements of different types of models. Discussion with problems.		Class Test 1 (topics of the weeks 1-4)						
6	Software Design Design principles, Design Concepts, effective modular design, design heuristics, Data Design, Architectural Design process,	CLO3, CLO4	Lecture and discussion with problems and its solution.		Answer basic questions, quizzes, Exercise with various scenario, exams.						
7	Transformation mapping, Transaction mapping, interface design, human computer interface design, procedural design.	CLO3, CLO4	Lecture and discussion with problems and its solution.		Exercise with various problem scenario.						
8	Software Testing Testing fundamentals, test case design, white-box testing, black-box testing, testing GUIs, Unit testing, Integration testing, validation testing, system testing, debugging.	CLO1	Lecture on design different test cases and perform different types of software testing based on scenarios.		Answer basic questions, exams.						
9	Maintenance. Major maintenance activities, estimating maintenance cost and productivity.	CLO1	Lecture on corrective, adaptive, perfective maintenance and		Class Test 2 (topics of the weeks5-8)						

			maintenance cost estimation.	
10	Software Cost Management. Project estimation, estimation techniques, project scheduling, critical path analysis.	CLO4	Lecture and discussion with problems.	Answer basic questions, exams.
11	Object Oriented Software Engineering. O-O concepts, O-O analysis, Domain analysis, O-O analysis process, Object relational model. O-O design: system design process, object design process, O-O programming.	CLO4	Lecture and discussion with problems.	Quizzes, Homework, exams.
12	O-O Testing: Testing strategies, test case design. Introduction to CASE Tools: What is CASE, the taxonomy of CASE tools, iCASE environment, CASE repository, Example CASE tools.	CLO1	Lecture and discussion with problems. Component and scope of CASE tools.	Class Test 3 (topics of the weeks9-12)
13	Intellectual Properties Trade Marks, Copy Rights, Trade Secrets, Patents, Software Engineering Ethics.	CLO1	Lecture and discussion with examples.	Exercise the answering methods in final exam.

Recommended Books:

1. Software Engineering, A Practitioner's approach by Roger S. Pressman, 4th Edition, McGraw Hill
2. Software Engineering by I. Sommerville, 6th Edition, Pearson Education
3. Software Engineering Concepts by Richard Fairley, 1st Edition, McGraw Hill
4. Software Quality Assurance from Theory to Implementation by D. Galin, 1st Edition, Addison Wesley
5. Software Engineering for Internet Applications by Eve Andersson, et. al.
6. UML Process by Sharam Hekmat

ASSESSMENT PATTERN

Attendance- 05

CIE-Continuous Interval Evolution (25) (Average of best 2 out of 3 will be counted)				SEE-Semester End Examination (70 marks)	
Bloom's Category	Test-1 (25)	Test-2 (25)	Assignment (25)	Bloom's Category	Test
Remember				Remember	
Understand	15	15	10	Understand	30
Apply	10	10	10	Apply	25
Analyze			5	Analyze	15
Evaluate				Evaluate	
Create				Create	

COURSE TITLE:SOFTWARE ENGINEERING AND INFORMATION SYSTEM DESIGN LAB

Course Code: CSTE 3210 Credit Hours: 1.5 Exam Hours: 03	Attendance: 10 Viva: 20 SEE Marks: 70
Course Objectives: <ul style="list-style-type: none"> ➤ Focus on software engineering practice over the entire system lifecycle, includes requirements engineering, analysis, prototyping, design, implementation, testing, maintenance activities, and management of risks involved in software and embedded systems. ➤ Develop software at the application level by the knowledge of previous knowledge such as database system, software engineering, data structure, etc. 	

- Explain the procedure of software such as the collection of user requirements by visiting different organizations/institutions or companies.
- Impart the role and impact of software engineering in contemporary business, global, economic, environmental, and societal context.
- Focus on knowledge, techniques, skills, and modern tools necessary for software engineering practice.

Resources Used: Multimedia, Whiteboard, Marker, Handouts, pdf books, e-Tutorials, Previous questions.

Course Learning Outcomes (CLO)	CLOs	Description (At the end of the course, students will be able to)											
	CLO1	understand the processes, concepts, and standards related to the discipline of software engineering.											
	CLO2	use modern engineering tools necessary for engineering practice.											
	CLO3	analyze and design a software development strategy and select appropriate software development for any given software project.											
	CLO4	apply project management tools to develop a software project.											
	CLO5	coordinate with team members and work effectively in groups.											
Mapping of CLO to PLO (Program Learning Outcome)		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
	CLO1	√											
	CLO2					√							
	CLO3		√										√
	CLO4										√	√	
	CLO5												

Lesson Plan (as per week):

Week	Course Contents	CLOs	Teaching Learning Strategy (activities directed to achieve outcomes)	Assessment Strategy (How they are developed)
1-3	House hold accounting- for budgeting of a particular family.	CLO1, CLO2	Discussion, practice and case study	Answer basic questions, Homework.
4-5	Library management system to run a library.	CLO3, CLO4.	Discussion, practice and case study	quizzes, Homework, Quiz 1 (Topic of the 1-3 weeks)
6-7	Payroll system.	CLO1, CLO2	Discussion, practice and case study	Answer basic questions, Homework.
8-9	Lubricating oil management system.	CLO1, CLO2	Discussion, practice and case study	Answer basic questions, Homework. Quiz 2 (Topic of the 4-7 weeks)
10-11	Super shop management system.	CLO1, CLO2, CLO4		Answer basic questions, Homework.
12	To perform other experiments relevant to this course, Submit project work	CLO3, CLO5.	Discussion, practice and case study	Answer basic questions, quizzes, Homework, exams. Quiz 3 (Topic of the

			8-11 weeks)														
13		Final Lab Exam (Job and Viva)															
ASSESSMENT PATTERN																	
Attendance- 10																	
Viva- 20																	
SEE-Semester End Examination (70 marks)																	
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Bloom's Category	Test																
Remember																	
Understand	10																
Apply	40																
Analyze	20																
Evaluate																	
Create																	

COURSE TITLE:ARTIFICIAL INTELLIGENCE AND NEURAL NETWORKS

Course Code: CSTE 3211 Credit Hours: 03 Exam Hours: 04	Attendance: 05 CIE Marks: 25 SEE Marks: 70
Course Objectives: <ul style="list-style-type: none"> ➤ Introduce the basic concepts of Artificial Intelligence. ➤ Familiarize search problems and implement search algorithms using admissible heuristics. ➤ Describe games as adversarial search problems and implement optimal and efficient solutions. ➤ Explain natural language processing and learn how to apply basic algorithms in this field. ➤ Introduce the applications of Fuzzy set theory and design Fuzzy controllers. ➤ Discuss the machine learning problems and algorithms including Naive Bayes, Neural Networks, and Support Vector Machine. 	

Resources Used: Multimedia, Whiteboard, Marker, Handouts, pdf books, e-Tutorials, Device manual, Question bank, Previous questions.

Course Learning Outcomes (CLO)	CLOs	Description (At the end of the course, students will be able to)											
	CLO1	understand the role of decision-making strategies in simulating intelligence.											
	CLO2	analyze reasoning strategies for inference in the presence of incomplete information.											
	CLO3	apply knowledge representation, reasoning, and machine learning techniques to real-world problems.											
Mapping of CLO to PLO (Program Learning Outcome)	PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12	
	✓												
		✓											

Lesson Plan (as per week):

Week	Course Contents	CLOs	Teaching Learning Strategy (activities directed to achieve outcomes)	Assessment Strategy (How they are developed)
1	Introduction to AI: History of AI, Views of AI, Turing Test, Intelligent Agents		Lecture and discussion with detailed information about the course, including the objectives, course	Answer basic questions, quizzes, Homework, exams.

			outcomes, examinations. Topic wise lecture delivery.	
2	Search: State Space Search, Uninformed search algorithms	CLO1	Lecture and discussion with detailed information about the course, including the objectives, course outcomes, examinations. Topic wise lecture delivery.	Answer basic questions, quizzes, Homework, exams.
3	Informed search techniques: A* and Greedy Best First Search, Designing Heuristics, Hill Climbing Search, Simulated Annealing, Constraint Satisfaction Problems, Planning problems	CLO1	Lecture and discussion, showing programming solutions of simple problems to reinforce the theoretical understandings.	Answer basic questions, quizzes, Homework, exams.
4	Game playing: Two player zero sum games, Minimaxing Algorithm, Alpha-beta pruning	CLO1	Lecture and discussion, showing programming solutions of simple problems to reinforce the theoretical understandings.	Answer basic questions, quizzes, Homework, exams.
5	Knowledge Representation: KR Frameworks, Semantic Nets, Introduction to Logical reasoning	CLO2	Lecture and discussion, Visual simulation, showing programming solutions of related problems to reinforce the theoretical understandings.	Answer basic questions, quizzes, Homework, exams.
6	Logic: Propositional and Predicate Logic, First Order Predicate Logic, Prolog	CLO1, CLO2	Lecture and discussion, demonstrating related problems	Answer basic questions, quizzes, Homework, exams.
7	Natural Language Processing: Introduction, history of NLP, Natural language understanding: semantic representation, inference and knowledge representations. HMM and Speech Recognition: Speech Recognition Architecture, Overview of HMM, A* decoding	CLO3	Lecture and discussion, showing programming solutions of related problems to reinforce the theoretical understandings.	Answer basic questions, quizzes, Homework, exams.
8	Uncertainty: Reasoning under uncertainty, Bayes' Rule, Bayesian Net, Dempster-Shafer Theory	CLO2	Lecture and discussion, showing programming solutions of simple problems to reinforce the theoretical understandings.	Answer basic questions, quizzes, Homework, exams.
9	Fuzzy Logic: Crisp vs Fuzzy Set Theory, Fuzzy controller, Fuzzification, Inference rules and Defuzzification techniques	CLO3	Lecture and discussion, Visual simulation, showing solutions of related problems to reinforce the theoretical understandings.	Answer basic questions, quizzes, Homework, exams.
10	Markov decision process: Definition, MDP Problem Definition, value iteration, policy iteration, linear programming methods, and applications Hidden Markov Models	CLO3	Lecture and discussion, Visual simulation, showing solutions of related problems to reinforce the theoretical understandings.	Answer basic questions, quizzes, Homework, exams.

11	Introduction to Neural Networks: History and concepts of Artificial Neural Networks (ANN), Models of ANN, Learning algorithms	CLO3	Lecture and discussion, Visual simulation, showing programming solutions of related problems to reinforce the theoretical understandings.	Answer basic questions, quizzes, Homework, exams.
12	Support Vector Machine (SVM): classification and regression using SVM, SVM classifier, SVM kernel	CLO3	Lecture and discussion, Visual simulation, showing programming solutions of related problems to reinforce the theoretical understandings.	Answer basic questions, quizzes, Homework, exams.
13	Review topics and Final exam preparation.		Lecture and discussion on miscellaneous topics.	Exercise the answering methods in final exam.

Recommended Books:

1. Artificial Intelligence: A Modern Approach by Stuart J. Russel and Peter Norvig, Pearson.
2. Introduction to Artificial Intelligence and Expert System by D. W. Patterson, Prentice-Hall.
3. Prolog Programming for Artificial Intelligence by Bratko, Addison-Wesley.

ASSESSMENT PATTERN

Attendance- 05

CIE-Continuous Interval Evolution (25) (Average of best 2 out of 3 will be counted)				SEE-Semester End Examination (70 marks)	
Bloom's Category	Test-1 (25)	Test-2 (25)	Assignment (25)	Bloom's Category	Test
Remember				Remember	
Understand	15	10		Understand	20
Apply	5	10	10	Apply	20
Analyze	5	5	15	Analyze	30
Evaluate				Evaluate	
Create				Create	

COURSE TITLE:ARTIFICIAL INTELLIGENCE AND NEURAL NETWORKS LAB

Course Code: CSTE 3212 Credit Hours: 1 Exam Hours: 03	Attendance: 10 Viva: 20 SEE Marks: 70
Course Objectives:	
<ul style="list-style-type: none"> ➤ Reinforce the concept of various AI concepts learned in theory lectures. ➤ Get acquainted with different AI tools like programming languages and frameworks. ➤ Get firsthand experience on how to implement learning algorithms in suitable programming languages. ➤ Explain search, planning, reasoning, assertion, prediction, classification, and regression problems using appropriate AI tools; ➤ Focus on design, train, and use machine learning systems. 	
Resources Used: Multimedia, Whiteboard, Marker, Handouts, pdf books, e-Tutorials, Hand books-manual, Previous questions, LAN, Internet.	

Course	CLOs	Description (At the end of the course, students will be able to)
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Learning Outcomes (CLO)	CLO1	understand the concepts of search and Minimaxing algorithms.										
	CLO2	implement the reasoning, deduction and assertion problems using Prolog.										
	CLO3	apply the Bayesian network and Neural network.										

Mapping of CLO to PLO (Program Learning Outcome)		PLO1	PLO2	PLO3	PLO4	PLO5	PLO6	PLO7	PLO8	PLO9	PLO10	PLO11	PLO12
	CLO1	√											
	CLO2	√											
	CLO3						√						

Lesson Plan (as per week):

Week	CourseContents	CLOs	Teaching Learning Strategy (activities directed to achieve outcomes)	Assessment Strategy (How they are developed)
1-2	State Space Search: Uninformed search: Implementing BFS, DFS, DLS, IDS, and Bidirectional search for solving - <ul style="list-style-type: none">• Water-jug problem• 8-puzzle problem,Missionaries and Cannibals problem	CLO1	Discussion, Demonstration of sample programing codes to guide students	Home assignments, task, Lab exam
3	Informed search: Rewrite 8 puzzle problem solution using heuristics and implementing - <ul style="list-style-type: none">• Greedy best first search• A* heuristic search Use heuristic search for path finding problems	CLO1	Discussion, Demonstration of sample programing codes to guide students	Home assignments, task, Lab exam
4	Constraint satisfaction and Local search problems: Solve local search problems (i.e. n-queens problem) using: <ul style="list-style-type: none">• Hill-climbing,• Simulated annealing,• Local beam search,Genetic algorithm	CLO1	Discussion, Demonstration of sample programing codes to guide students	Home assignments, task, Lab exam
5	Minimaxing algorithm: Write a two player zero sum games AI program (i.e. Tic-Tac-Toe/ Chess) using - <ul style="list-style-type: none">• Minimaxing algorithmMinimaxing with alpha-beta pruning	CLO1	Discussion, Demonstration of sample programing codes to guide students	Home assignments, task, Lab exam
6-8	Prolog: Solve reasoning, deduction and assertion problems using Prolog (SWI-Prolog IDE): <ul style="list-style-type: none">• Express family tree and relationships,• Solve Mark Twain's puzzle,• List manipulation,	CLO2	Discussion, Demonstration of sample programing codes to guide students	Home assignments, task, Lab exam

	Solve Einstein's puzzle			
9	Bayesian network: Implement Bayesian Network to design a reasoning/ prediction system (i.e. Disease-Symptom Checker) using MATLAB/C++	CLO3	Discussion, Video tutorial, Demonstration of sample programing codes to guide students	Home assignments, Lab exam
10-13	Neural Network: Learn about Neural Network frameworks: Tensorflow, CNTK, Keras, Theano; Setting up and using Tensorflow and Keras on Python environment for learning basic systems: <ul style="list-style-type: none">• AND/OR gate using SLP,• NOR gate using MLP and Backpropagation learning, Designing and training a CNN for English alphabet OCR;	CLO3	Discussion, Video tutorial, Demonstration of sample programing codes to guide students	Home assignments, Lab exam
13	Final Lab Exam (Lab and Viva voce)			

ASSESSMENT PATTERN

Attendance- 10

SEE-Semester End Examination (70 marks)

Bloom's Category	Test
Remember	
Understand	10
Apply	40
Analyze	20
Evaluate	
Create	

COURSE TITLE: VIVA VOCE

Course Code: CSTE 3226 Credit Hours: 01		Total Marks: 100
Course Objectives:		
➤ Prepare the students to face interviews both in the academic and the industrial sector.		
Course Learning Outcomes (CLO)	CLOs	Description (At the end of the course, students will be able to)
	CLO1	analyze the various application of Computer Science & Telecommunication Engineering in real-life problem-solving.
	CLO2	evaluate overall technical knowledge and industry readiness
Mapping of CLO to PLO (Program Learning Outcome)	PLO1	√
	CLO1	
	CLO2	√
	CLO3	
		√

COURSE CONTENTS	OUTCOME (Student should be able to)
VIVA VOCE (Viva based on major/minor courses of Year-3)	CLO1, CLO2, CLO3

ASSESSMENT PATTERN

Category	Marks (100)
Eye contact	10
Body gesture	10
Communication skill	20
English pronunciation skill	10
Remember	10
Understand	10
Analyzing	20
Evaluating	10