I K GUJRAL PUNJAB TECHNICAL UNIVERSITY, MAIN CAMPUS, KAPURTHALA

Department of Electronics and Communication Engineering

Sub: COs for B-Tech Course

CO No.(BTEC-301-18: Electronic Devices)

CO1 Understand physics of semiconductors and behavior of charge carriers within semiconductors
CO2 Understand the working of semiconductor diodes supported with mathematical explanation.
CO3 Understand the working of BJT and MOSFET with their equivalent small signal models.
CO4 Understand the chemical processes used in fabrication of integrated circuits.

CO No . (BTEC-302-18: Digital System Design)

CO1 Have a thorough understanding of the fundamental concepts and techniques used in digital electronics.
CO2 To understand and examine the structure of various number systems and its application in digital design.
CO3 The ability to understand, analyze and design various combinational and sequential circuits.
CO4 Ability to identify basic requirements for a design application and propose a cost effective solution.
CO5 The ability to identify and prevent various hazards and timing problems in a digital design.

CO No.(BTEC-303-18: Electromagnetic Waves)

CO1 Understand characteristics & wave propagation through transmission lines
CO2 Understand Maxwell's equations for electromagnetic waves
CO3 Characterize uniform plane wave
CO4 Calculate reflection and transmission of waves at media interface

CO No. (UC-BTAM-303-18: Engineering Mathematics-III)

CO1 The mathematical tools needed in evaluating multiple integrals and their usage
CO2 The effective mathematical tools for the solutions of differential equations that model physical processes.
CO3 The tools of differentiation and integration of functions of a complex variable that are used in various techniques dealing engineering problems.
CO4 To introduce the solution methodologies for second order Partial Differential Equations with applications in engineering.
CO5 To provide an overview of probability and statistics to engineers

CO No.(BTEC-304-18: Network Theory)

CO1 Analyze linear networks using network theorems
CO2 Use Laplace transform to analyze transient & steady state response of linear networks
CO3 Comprehend network parameters to analyze two port networks.
CO4 Realize one port networks using Foster's and Cauer's methods.

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CO No.(BTEC-311-18: Electronic Devices Laboratory)

CO1 Realization using resistors and diodes in circuits with proper understanding to their working
CO2 Understand characteristics & working of transistor in different configurations.
CO3 Understand characteristics & working of MOSFET in circuits
CO4 Think and design working circuits based on resistors, diodes, transistors and MOSFETs

CO No. (BTEC-312-18: Digital System Design Laboratory)

CO1 Realize combinational circuits using logic gates
CO2 Realize sequential circuits using logic gates
CO3 Write & simulate VHDL programs for combinational & sequential circuits.
CO4 Think and design working projects using digital 74XX Ics

CO No. (HSMC101-18: Devlopment of Societies)

CO1 Understand the Origin of Family, Clan and Society.
CO2 Understand the Forms of Government, like Democracy, Monocracy, Dictatorship and others
CO3 Understand the Basic concepts of Economic, Barter system and Jajmani system : Socialism, Capitalism, and Marxism..
CO4 Know about the Development process before, during and after British Rule in India.

CO No. (BTEC-321-18: 4-Weeks Institutional Training)

CO1 Exposure to Practical Aspects of the Discipline
CO2 Realization of common and simple circuits with proper understanding to their working
CO3 Think and design working circuits based on common Electronic components

CO No.(BTEC-331-18: Mentoring and Professional Development)

CO1 Development of Overall Personality and Aptitutde
CO2 General Awareness both Current affairs & GK
CO3 Development of Communication Skills
CO4 Development of Presentation Skills

CO No.(BTEC-401-18: Analog Circuits)

CO1 Understand the biasing of transistors and analyze BJT/FET amplifiers
CO2 Analyze various rectifier and amplifier circuits
CO3 Analyze sinusoidal and non-sinusoidal oscillators
CO4 Understand various types of Power Amplifiers

CO No. (BTEC-402-18: Microprocessors and Microcontrollers)

CO1 Understand architecture &functionalities of different building block of 8085 microprocessor.
CO2 Understand working of different building blocks of 8051 microcontroller.
CO3 Comprehend and apply programming aspects of 8051 microcontroller.
CO4 Interface & interact with different peripherals and devices.

CO No.(BTEC-403-18: Signals and Systems)

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CO1 Mathematically characterize different types of signals and systems.
CO2 Analyze the behavior of linear-shift invariant systems.
CO3 Apply concepts of Fourier and Laplace Transforms to analyze continuous-time signals and systems.
CO4 Investigate discrete-time signals and systems using Discrete-Time Fourier and Z-Transforms and simple Probability concepts.

CO No.(HSMC-122-18: Universal Human Values-2)

CO1 Understand the core of Universal Human Values.
CO2 Understand the Harmony and Self Exploration.
CO3 Understand the Basic Human Aspiration.
CO4 Know about the Professional Ethics.

CO No.(EVS-101-18:Environmental Sciences)

CO1 Students will enable to understand environmental problems at local and national level through literature and general awareness
CO2 The students will gain practical knowledge by visiting wildlife areas, environmental institutes and various personalities who have done practical work on various environmental Issues
CO3 The students will apply interdisciplinary approach to understand key environmental issues and critically analyze them to explore the possibilities to mitigate these problems
CO4 Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world

CO No.(BTEC-411-18: Analog Circuits Lab)

CO1 Study and verify the characteristics of BJTs in circuits with proper understanding to their working.
CO2 Understand frequency response & working of various types of Oscillators
CO3 Understand characteristics & working of different types of Power amplifiers
CO4 Design working circuits of oscillators,emitter follower circuit and power amplifier

CO No.(BTEC-412-18: Microprocessors and Microcontrollers Lab)

CO1 Understanding the architecture &functionalities of different building blocks of 8085 microprocessor.
CO2 Programming for controlling stepper and DC motors using 8085 Microprocessor(s).
CO3 Programs to generate waveforms and interface ADC and DAC using 8051 Microcontroller.

CO No.(UC-BTEC-501-18: Analog and Digital Communication)

CO1 Analyze and compare different analog modulation schemes for their efficiency and bandwidth
CO2 Analyze the behavior of a communication system in presence of noise.
CO3 Investigate pulsed modulation system and analyze their system performance.
CO4 Analyze different digital modulation schemes and can compute the bit error performance.

CO No.(UC-BTEC-502-18: Digital Signal Processing)

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CO1 Represent signals mathematically in continuous and discrete time and frequency domain
CO2 Get the response of an LSI system to different signals
CO3 Design of different types of digital filters for various applications

CO No.(UC-BTEC-503-18: Linear Integrated Circuits)

CO1 Represent signals mathematically in continuous and discrete time and frequency domain
CO2 Get the response of an LSI system to different signals
CO3 Design of different types of digital filters for various applications

CO No.(UC-BTEC-504-18: Control Systems)

CO1 Characterize a system and find its steady state behaviour
CO2 Investigate stability of a system using different tests
CO3 Design various controllers
CO4 Solve linear, non-linear and optimal control problems

CO No.(UC-BTEC-901A-18: AC & DC Motors)

CO1 Understand the principle of energy conversion
CO2 Explain the working principle, construction and applications of DC motors
CO3 Explain the working principle, construction and applications of AC motors
CO4 Gain knowledge about the fundamentals of Special motors

CO No.(UC-BTEC-901C-18: Satellite Communication)

CO1 Interpret & define basics of Satellite communication, understand the complete link design along with and the interference effects on it
CO2 Understand various fixed and demand assignment multiple access techniques
CO3 Understand the special purpose communication satellites.
CO4 Have knowledge of laser satellite communication and CATV system.

CO No.(UC-BTEC-901F-18: JAVA Programming)

CO1 Apply the concepts and basics of JAVA
CO2 Demonstrate the knowledge of operators and control statements
CO3 Ability to learn about Inheritance, Interface, Applets
CO4 Learn about JAVA database connectivity

CO No.(UC-BTEC-511-18: Analog and Digital Communication Laboratory)

CO1 Study the characteristics and output waveforms of AM, FM, PCM
CO2 Study and compare noise in AM and FM systems
CO3 Investigate the output responses of PAM, PCM, PSK, FSK, MSK and QAM.
CO4 Digital link simulation & error estimation in a digital link using MATLAB (SIMULINK)/

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communication simulation packages.

CO No.(UC-BTEC-512-18: Digital Signal Processing Laboratory)

CO1 Develop a MATLAB program to generate standard sequences and various signals
CO2 Configuring Audio Codec of C6xxx Boards
CO3 Develop programs to verify convolution and design FIR & IIR filters.
CO4 Implementation of Audio Delay Line, Echo and Audio Reverberation

CO No.(UC-BTEC-513-18: Linear Integrated Circuits Laboratory)

CO1 Study the configurations of Differential amplifiers
CO2 Determine the performance parameters of an OP-Amp
CO3 Design various applications using Op-Amps
CO4 Examine the operation of a Phase lock loop

CO No.(UC-BTEC-601-18: Wireless Communication)

CO1 Understand the basic elements of Cellular Radio Systems and its design
CO2 Learn about the concepts Digital communication through fading multipath channels
CO3 Understand various Multiple Access techniques for Wireless communication
CO4 Know about the Wireless standards and systems

CO No.(BTCS-504-18: Computer Networks)

CO1 Explain the functions of the different layer of the OSI Protoco
CO2 Describe the function of each block of wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs)
CO3 Develop the network programming for a given problem related TCP/IP protocol
CO4 Learn about DNS DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls using open source available software and tools.

CO No.(UC-BTEC-602-18: Opticsl Fibres and Communication)

CO1 Recognize and classify the structures of Optical fiber and types.
CO2 Discuss the channel impairments like losses and dispersion and analyze various coupling losses.
CO3 Classify the Optical sources and detectors and to discuss their principle.
CO4 Familiar with Design considerations of fiber optic systems and sources and detectors

CO No.(UC-BTEC-603-18: Microwave and Antenna Engineering)

CO1 Understand the working and operation of various Microwave Tubes and Microwave Solid-state devices.
CO2 Learn about various important Microwave Components and the Microwave measurements that can be carried out

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CO3 Explain the basic concepts and types of Antennas and its regions.
CO4 Describe the important concepts of Antenna Arrays and Antenna Aperture

CO No.(UC-BTEC-902B-18: Power Electronics)

CO1 Attain the ability and to handle the concept of construction and characteristics of Power semiconductor devices and fundamental of thyristors and family
CO2 Demonstrate and build a various single phase AC-DC power converter circuits and understand their applications
CO3 Illustrate the operating principle and construct a various types of DC-DC converters
CO4 Simulate power electronic converters and their control scheme.

CO No.(UC-BTEC-902C-18: Mobile ADHOC NETWORKS)

CO1 Understand the principles of mobile ad hoc networks, and their models.
CO2 Understand and develop information dissemination protocols for mobile adhoc networks
CO3 Analyze the challenges in designing, routing and security in mobile adhoc networks.

CO No.(UC-BTEC-902E-18: Artificial Neural Networks)

CO1 Understand generic machine learning terminology
CO2 Understand the mathematical foundations of neural network models
CO3 Have a broad knowledge in Fuzzy logic principles and will be able to determine different methods of Defuzzification

CO No.(UC-BTEC-611-18: Optical Fibres and Communication Laboratory)

CO1 Simulation of an optical communication system & calculation of its BER and Q factor using simulator.
CO2 Study various types of optical sources and light detectors
CO3 Familiarization with the methods of slicing and connecting techniques of optical fibres
CO4 Study different types of losses in optical fibres.
CO5 Design various applications of optical fiber communication sysytem

CO No.(UC-BTEC-612-18: Microwave and Antenna Engineering Laboratory)

CO1 Learn about general Microwave components and Microwave bench
CO2 Measure common parameters related to Microwave Oscillator(s).
CO3 Determine frequency and wavelength of waveguides.
CO4 Measure and plot radiation patterns of various types of Antennas

CO No.(UC-BTEC-631-18: Project-I)

CO1 Understand the Survey and study of published literature on the assigned topic
CO2 Working out a preliminary Approach to the Problem relating to the assigned topic
CO3 preliminary Analysis/Modelling/Simulation/Experiment/Design/Feasibility

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CO4 Preparing a Written Report on the Study conducted for presentation to the Department

CO No.(BTEC-907A-18: Internet of Things (IOT) & Cloud Computing)

CO1 Understanding concept of cloud computing and analyze trade-off between deploying application on cloud and using local infrastructure
CO2 Identify issues and design challenges in IoT applications.
CO3 Select appropriate hardware and software components for IoT applications
CO4 Conceptual knowledge will help students to build IOT applications

CO No.(BTEC-907C-18: Robotics and Embedded systems)

CO1 Ability to understand basic concept of robotics.
CO2 To analyze Instrumentation systems and their applications to various
CO3 To know about the differential motion, add statics in robotics
CO4 To know about the dynamics and control in robotics industries

CO No.(BTEC-908C-18: VLSI Design)

CO1 Understand the concepts and various processes related to VLSI
CO2 Understand the VLSI Circuit Design processes and Gate level design
CO3 Learn about VHDL Synthesis and the tools involved
CO4 Describe about CMOS Testing techniques

CO No.(BTEC-909C-18: Embedded Systems Design)

CO1 Learn about the basic architecture of 32-bit microcontrollers
CO2 Understand hardware interfacing concepts to connect digital as well as analog sensors while ensuring low power considerations.
CO3 Reviews and implement the protocols used by microcontroller to communicate with external sensors and actuators in real world
CO4 Understand Embedded Networking concepts based upon connected MCUs

CO No.(BTMC-101-18: Indian Constitution)

CO1 Understand the Philosophy of Indian constitution, like Sovereignty, Secular, Republic, Socialist and Democracy.
CO2 Understand the Rights and Duties of Citizens, Fundamental Rights and Human Rights.
CO3 Examine the Forms of government, Parliamentary form of Govt. & Presidential Form of Govt, powers and position of President and Prime Minister .
CO4 The Course will also helpful in preparation of Competitive exams National wide and state level, like IAS, IPS and others.

CO No.CO Statements (BTMC-102-18: Essence of Indian Traditional Knowledge)

CO1 Understand the Philosophy of Indian Knowledge system and and its Basic Structure.
CO2 Understand the Ancient India Culture, Society and Religion.
CO3 Examine the areas of Indian Linguistic Tradition.
CO4 Know the contribution of scientists of different eras.

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CO No.(BTEC-909E-18: Bio Medical Signal Processing)

CO1 Understand the fundamentals of signal processing for various bio-signal analysis
CO2 Learn the Infinite impulse response (IIR) filter and study its applications
CO3 Attain in-depth knowledge about the basic concepts of finite impulse response (FIR) filter and study its applications
CO4 Apply different methods of signal processing techniques in analyzing the various bio-signals such as Electro cardiogram (ECG), Electro myogram (EMG) and Phonocardiogram (PCG

CO No.(BTEC-907B-18: Antenna Radiating Systems)

CO1 To understand the basic concepts of radiation
CO2 To analyse the radiation pattern of antenna arrays.
CO3 To understand the concept of various wave propagation techniques
CO4 To understand the concept of radiating systems on environment

CO No.(BTEC-908B-18: Mobile Communication Networks)

CO1 Understand the working principles of the mobile communication systems
CO2 Understand the relation between the user features and underlying technology
CO3 Analyze mobile communication systems for improved performance

CO No.(BTEC-908A-18: Artificial Intelligence)

CO1 Learn about the basic understanding of Artificial Intelligent system
CO2 Explain about various types of Artificial Neural Networks & their models
CO3 Describe Artificial Neural networks methods, operation and parameters
CO4 Explore Neural Network MATLAB Toolbox

CO No.(BTEC-909D-18: Artificial Intelligence and Machine Learning)

CO1 Understand the concept of information and entropy
CO2 Understand Shannon's theorem for coding
CO3 Calculation of channel capacity
CO4 Apply coding techniques

CO No.(BTEC-909B-18: Information Theory and Coding)

CO1 To learn the difference between optimal reasoning Vs human like reasoning
CO2 To understand the notions of state space representation, exhaustive search, heuristic search along with the time and space complexities
CO3 To learn different knowledge representation techniques
CO4 To understand the applications of AI namely, Game Playing, Theorem Proving, Expert Systems, Machine Learning and Natural Language Processing

CO No.(BTEC-907D-18: Python Programmimg)

CO1 Read and write simple Python programs.
CO2 Develop Python programs with conditionals and loops.
CO3 Define Python functions and to use Python data structures–lists, tuples, dictionaries.

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CO4 Perform input/output operations with files in Python.
CO5 Execute Searching, sorting and merging in Python.

CO No.(BTEC-907E-18: Adaptive Signal Processing)

CO1 Understand the non-linear control and the need and significance of changing the control parameters with respect to real-time situation
CO2 Mathematically represent the 'adaptability requirement'.
CO3 Understand the mathematical treatment for the modeling and design of the signal processing systems.

CO No.(BTEC-908D-18: Soft Computing)

CO1 Understand the concepts of Soft Computing and Algorithms involved there-in
CO2 Understand Genetic Algorithms with its operators and applications
CO3 Learn about the Neural Network models and its applications
CO4 Describe the Fuzzy systems and Swarm Intelligence

CO No.(BTEC-909A-18: Big Data Fundamentals)

CO1 Understand the Evolution and basics of Big Data.
CO2 Understand the Architecture of Hadoop with its file system and its Programming.
CO3 Explain the Advanced analytical theory and methods.
CO4 Describe the challenges in handling streaming data from the real world.

CO No.(BTEC-908E-18: Digital Image and Video Processing)

CO1 Mathematically represent various types of images and analyze them.
CO2 2. Process these images for the enhancement of certain properties or for optimized use of the resources.
CO3 3. Develop algorithms for image compression and coding.

CO No.(BTEC-731-18: Project-II)

CO1 Review and finalization of the Approach to the Problem relating to the assigned topic
CO2 Detailed Analysis/Modeling/Simulation/Design/Problem Solving/Experiment as needed
CO3 Final development of product/process, testing, results, conclusions and future directions;
CO4 Prototyping or Product development/Patent and Video demonstration;
CO5 Preparing a paper for Conference presentation/Publication in Journals;
CO6 Preparing a Dissertation in the standard format for being evaluated by the Department

BoS(Co-ordinator) **HOD(ECE)**

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Department of Electronics and Communication Engineering

Sub: COs for M-Tech Course

MTWC-101-18- Wireless Communication

Course Outcome

CO1: Implement physical models of wireless channels

CO2: Gain knowledge of key concepts of wireless communication

CO3: Measure capacity of AWGN channel, LTI Gaussian channels and various fading channels

CO4: Study uplink and downlink model of AWGN channel, fading channels and multiuser diversity

MTWC-102-18- Information Theory & Coding

Course Outcome

CO1: Understand the fundamentals of information theory.

CO 2: Encode text, audio, speech, image and video signals through

various coding and compression techniques.

CO 3: Detect and correct errors in the received signals through error

detecting and correcting codes

MTWC-PE1-18- Wireless Sensor Networks

Course Outcome

CO1: Gain insights of Wireless Sensor Network(WSN) background, its

challenges, constraints along with its advantages and applications.

CO 2: Know the architecture of WSN and its sub-systems.

CO 3: Explain node structure along with the technologies used in

CO 4: Study various Wireless Propagation Models and discuss the

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various MAC protocols, communication protocols and routing protocols

MTWC-PE1B-18- RF MEMS FOR WIRELESS COMMUNICATION SYSTEM

Course Outcome

CO 1: Understand the key concepts in RF based MEMS wireless communication system.

CO 2: Design RF based circuits through modelling.

CO 3: Understand the usage of RF based circuit elements to reconfigure the circuit design.

CO 4: Study various oscillators and filters.

MTWC-PE1C-18- ADVANCED DIGITAL SIGNAL PROCESSING

Course Outcome

CO1: Apply digital transform techniques on signals.

CO 2: Design digital FIR and IIR filters.

CO 3: Predict and estimate errors in digital signal processing systems.

CO 4: Handle multirate DSP and use adaptive filters.

MTWC-PE1D-18- AUDIO AND VIDEO SIGNAL PROCESSING

Course Outcome

CO1: Learn the audio and video signal processing systems.

CO 2: Code and decode the image, audio and video signals.

CO 3: Modulate and demodulate digital signal processing systems.

MTWC-PE2A-18-ADVANCED COMMUNICATION SYSTEM

Course Outcome

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CO1: Differentiate between analog and digital communication

CO 2: Transmit data through various digital modulation techniques

CO 3: Understand optical and satellite communication systems.

CO 4: Recognize mobile communication systems, access techniques and transmission protocols.

MTWC-PE2B-18-DETECTION AND ESTIMATION THEORY

Course Outcome

CO1: Know the background of the signals, variables and processes.

CO 2: Test the data through statistical tools.

CO 3: Learn the ways to detect non-parametric, random and deterministic signals.

CO 4: Familiarize with the estimation of signal parameters

MTWC-PE2C-18- MOBILE ADHOC NETWORKS

Course Outcome

CO1: Know the features, applications, models and characteristics of adhoc networks.

CO 2:Learn the protocols followed in MAC layer, Network layer, Transport layer, Security layer and Cross layer design.

CO 3: Learn how to integrate adhoc networks with mobile-IP

MTWC-PE2D-18- OPTICAL NETWORK AND PHOTONIC SWITCHING

Course Outcome

CO1: Know the optical transmission and reception

CO 2: Apply the compensation techniques to the lost data/signals.

CO 3:Learn the architecture and protocols of passive optical networks.

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CO 4: Learn the process of wire line techniques.

MTRM-101-18 RESEARCH METHODOLOGY & IPR

Course Outcome

CO1: 1. Understand research, research process, define and redefine research problem through literature survey.

CO 2: Know the primary and secondary sources of data collection and select sample size based on the requirement.

CO 3: Utilize the resources efficiently.

CO 4: Critically analyse the data through various statistical measures, perform experiment, gather data and reach to a conclusion based on some hypothesis.

CO5: Know the intellectual property rights

CO6: Write up the report and research article.

MTAC-AO1-18-English for research paper writing

Course Outcome

CO1: Understand that how to improve your writing skills and level of readability

CO 2: Learn about what to write in each section

CO 3:Understand the skills needed when writing a Title

CO 4: Ensure the good quality of paper at very first-time submission.

MTAC-A02-18-Disaster Management

Course Outcome

CO1: Learn to demonstrate a critical understanding of key concepts in disaster risk reduction and humanitarian response.

CO 2: Critically evaluate disaster risk reduction and humanitarian response policy and practice from multiple perspectives.

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CO 3:Develop an understanding of standards of humanitarian response and practical relevance in specific types of disasters and conflict situations.

CO 4: Critically understand the strengths and weaknesses of disaster management approaches, planning and programming in different countries, particularly their home country or the countries they work in.

MTWC-103-18 Advanced Wireless Communication

Course Outcome

CO1: Review the fundamentals of wireless communication

CO 2: Compare the performance of different digital modulation techniques over wireless channels.

CO 3: Design OFDM system and data transmission through multicarrier modulation.

CO 4: Describe OFDMA system, its operation and applications.

MTWC-104-18- Soft Computing Techniques

Course Outcome

CO1: Study basic concept of soft computing and differentiate between supervised, unsupervised and reinforced learning methods.

CO 2: Learn various artificial neural network techniques, fuzzy sets, fuzzification and defuzzification.

CO 3: Optimize solutions using Genetic Algorithm

CO 4: Use hybrid soft computing techniques.

MTWC-105-18- SIMULATION OF WIRELESS COMM. SYSTEMS

Course Outcome

CO1: Study the role of simulation in communication system and random processes.

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CO 2: Review stochastic processes and parameter estimation

CO 3: Model wireless communication systems through numerical methods.

CO 4: Study communication channel models and perform Monte Carlo Simulation.

MTWC-PE3A-18- Smart Antennas

Course Outcome

CO1: Understand the significance of smart antennas and its historical development.

CO 2: Know the architecture of Smart antennas, types, applications

CO 3: Learn antenna array fundamentals criteria and beam forming basics

CO 4: Explain the Spatial Processing techniques for CDMA Smart Antennas

MTWC-PE3B-18 Wireless Network Planning, Optimization and Management

CO 1: Understand the Radio Network planning and optimization

CO 2: Know the technologies of WCDMA and GSM

CO 3: . Learn the fundamentals of Radio Resource Management

MTWC-PE3C-18 Microwave and RF Design

CO1: Understand the significance of Microwave and RF designs

CO 2: Know the fundamentals behind Microwave Amplifiers/Oscillators designs.

CO 3: Technical know-how of Microwave and RF antennas concepts.

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MTWC-PE3D-18- Multimedia Comunication and Technologies

Course Outcome

CO1: Understand the significance of Microwave and RF designs

CO 2: Know the fundamentals behind Microwave Amplifiers/Oscillators designs.

CO 3: Technical know-how of Microwave and RF antennas concepts.

MTWC-PE3D-18- Multimedia Comunication and Technologies

Course Outcome

CO1: Learn multimedia system design techniques.

CO 2: Implement compression and decompression techniques on

CO 3: Understand the concepts of storage and retrieval technologies.

CO 4: Learn multimedia design application.

MTWC-PE4A-18- Cryptography and Wireless

Course Outcome

CO1: Understand the significance of Cryptography.

CO 2: Know its Integrity, Authentication and Management.

CO 3: Learn the concepts of Security and threats to wireless systems.

MTWC-PE4B-18-Software Defined Radio & Cognitive Radio

Course Outcome

CO1: Understand the fundamental concepts of software defined radio and cognitive radio networks.

CO 2: Develop the cognitive radio, as well as techniques for spectrum holes detection that cognitive radio takes advantages in order to exploit it.

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CO 3: Understand fundamental issues regarding dynamic spectrum access, the radio-resource management and trading, as well as a number of optimisation techniques for better spectrum exploitation.

CO 4: Apply SDR principles to smart antennas.

MTWC-PE4C-18- Wireless and Optical Communication Networks

Course Outcome

CO1: Learn Wireless Communication Network layers/technology.

CO 2: Understand basic network components of Wireless and Optical Networks.

CO 3: Explain their applications

MTWC-PE4D-18- MIMO Systems

Course Outcome

CO1: Understand Basic MIMO communication systems.

CO 2: Explore Space-time block codes & Space-time trellis codes.

CO 3: MIMO systems for frequency-selective (FS) fading channels.

MTWC-PE5A-18- Millimeter Wave Communication Technology

Course Outcome

CO1: Familiarization with the concept of Millimeter wave communication.

CO 2: Calculate the performance parameters in millimeter wave antennas.

CO 3: Model the millimeter wave link budget.

CO 4: Analyze the millimeter wave with multiple antennas.

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MTWC-PE5B-18- Space Time Wireless Communication

Course Outcome

CO1:Understand Space Time Channel Characterization.

CO 2: Explain Capacity of Multiple Antenna Channels.

CO 3: Learn ST OFDM, Spread Spectrum.

MTWC-PE5C-18- Advanced Techniques for Wireless Reception

Course Outcome

CO1: Understand Wireless Signaling Environment.

CO 2: Explain the usage of Multiuser detection.

CO 3: Learn CDMA, OFDM, MIMO systems

MTWC-PE5D-18- Emerging Technologies of Wireless Communication

Course Outcome

CO1: Understand the concept of cellular/wireless communication

CO 2: Explain the Mobile Radio Propagation and Multiuser systems.

CO 3: Learn technologies of GPRS, UMTS, WiFi, WiMAX, Ultra Wideband communications, 4G and beyond 4G.

MTWC-PE5E-18- Microstrip Antennas

Course Outcome

CO1: Understand the basic concept of micro-strip antennas, methods of analysis and configurations.

CO 2: Explain micro-strip antennas arrays.

CO 3: Understand the physical significance of discontinuities

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CO 4: Learn coupled micro-strip line with multiband and broadband behavior

MTOE-301A-18- Cost Management of Engineering Projects

Course Outcome

CO1: Understand the cost calculation for decision-making about an engineering research project

CO 2: Able to define Role of each member in the project team

CO 3:Manage the project by applying Quantitative techniques for cost management

MTWC-111-18-Wireless Communication Lab

Course Outcome

CO1:To design Path-Loss models

CO2:To investigate Fading environments in wireless channels CO3:To develop MATLAB codes for Block codes, Cyclic codes

MTWC-112-18-Information Theory and Coding Lab

Course Outcome

CO1:To understand the programming of Entropies and Mutual In CO2:To learn and practice programming for generation and evaluation CO3:To develop MATLAB codes for Block codes, Cyclic codes

MTWC-105-18- SIMULATION OF WIRELESS COMM. SYSTEMS Laboratory

To understand the programming of OFDM based Transmitter & To learn and practice MATLAB programming for implementing To find the vacant spaces for secondary users in Cognitive Radio

MTWC-MP1-18-Mini Project

CO1: Acquire practical knowledge of the chosen field.

CO2 Identify, analyze, formulate & handle programming projects with systematic approach.

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CO3: Contribute as a team leader in the development of technical projects.

CO4: Develop communication skills for the presentation of project related activities.

MTWC-DS1-18 DISSERTATION PHASE I

Course Outcome

CO1: Critically analyse and evaluate existing knowledge about the chosen problem

CO 2: Find the gaps and motivation through literature survey.

CO 3:Design the framework to optimize the solution for the problem

CO 4: Construct the research proposal.

MTWC-DS2-18- DISSERTATION PHASE II

Course Outcome

CO1: Implement the proposed framework practically or through simulation

CO 2: Gather the results and publish in the research articles.

CO 3: Write-up the proposed work, results with conclusion and future work in the form of thesis

CO4: Present the research work before a committee.

BoS(Co-ordinator)

HOD(ECE)

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Department of Electronics and Communication Engineering

Sub: COs for B-Tech(AIML) Course

BTCS301-18:Data Structure & Algorithms

Course Outcomes:

CO1. For a given algorithm student will able to analyze the algorithms to determine the time and computation complexity and justify the correctness.
CO2. Student will be able to handle operation like searching, insertion, deletion, traversing on various Data Structures and determine time and computational complexity.
CO3. Student will able to write an algorithm Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of Space and Time complexity.
CO4. Students will be able to choose appropriate Data Structure as applied to specific problem definition.
CO5. Demonstrate the reusability of Data Structures for implementing complex iterative problems.

BTCS302-18: Object Oriented Programming

Course Outcomes:

CO1. Identify classes, objects, members of a class and the relationships among them needed to solve a specific problem.
CO2. Demonstrate the concept of constructors and destructors. And create new definitions for some of the operators.
CO3. Create function templates, overload function templates.
CO4. Understand and demonstrate the concept of data encapsulation, inheritance, polymorphism with virtual functions.
CO5. Demonstrate the concept of file operations, streams in C++ and various I/O manipulators.

BTCS303-18: Data Structure & Algorithms Lab

Course Outcomes:

CO1. Improve practical skills in designing and implementing basic linear data structure Algorithms.
CO2. Improve practical skills in designing and implementing Non-linear data structure Algorithms.
CO3. Use Linear and Non-Linear data structures to solve relevant problems.
CO4. Choose appropriate Data Structure as applied to specific problem definition.
CO5. Implement Various searching algorithms and become familiar with their design

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methods

BTCS304-18: Object Oriented Programming Lab

Couse Outcomes:

CO1. Develop classes incorporating object-oriented techniques.
CO2. Design and implement object-oriented concepts of inheritance and polymorphism.
CO3. Illustrate and implement STL class of containers and need for exceptions to handle errors for object oriented programs.
CO4. Design and implement any real world based problem involving GUI interface using object-oriented concepts.

BTAM304-18 Mathematics Paper-III (Calculus and Ordinary Differential Equations)

Course Outcomes:

CO1.Understand the functions of several variables that are essential in most branches of engineering.
CO2. Apply multiple integrals to deal with areas and volumes of various structures which are quite significant in real world.
CO3. Formulate and solve engineering problems related to convergence, infinite series, power series and Taylor series.
CO4. Create, select and utilize the learnt techniques of first degree ordinary differential equations to model real world problems.
CO5. Be acquainted with the knowledge required to solve higher order ordinary differential equations.

BTES301-18 : Digital Electronics

Course Outcomes:

CO1. Demonstrate the operation of simple digital gates, identify the symbols, develop the truth table for those gates; combine simple gates into more complex circuits; change binary, hexadecimal, octal numbers to their decimal equivalent an vice versa.
CO2. Demonstrate the operation of a flip-flop. Design counters and clear the concept of shift registers.
CO3. Study different types of memories and their applications.Convert digital signal into analog and vice versa.

BTES302-18: Digital Electronics Lab

Course Outcomes:

CO1. Realize combinational circuits using logic gates.
CO2. Realize sequential circuits using logic gates.
CO3. Realize various types of Flip-flops and counters

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BTES401-18:Computer Organization & Architecture

Course Outcomes:

CO1. Understand functional block diagram of microprocessor.
CO2. Apply instruction set for Writing assembly language programs.
CO3. Design a memory module and analyze its operation by interfacing with the CPU.
CO4. Classify hardwired and microprogrammed control units.
CO5. Understand the concept of pipelining and its performance metric

BTCS402-18 : Operating Systems

Course Outcomes:

CO1. Explain basic operating system concepts such as overall architecture, system calls, user mode and kernel mode.
CO2. Distinguish concepts related to processes, threads, process scheduling, race conditions and critical sections.
CO3. Analyze and apply CPU scheduling algorithms, deadlock detection and prevention algorithms.
CO4. Examine and categorize various memory management techniques like caching, paging, segmentation, virtual memory, and thrashing
CO5. Design and implement file management system.
CO6. Appraise high-level operating systems concepts such as file systems, disk-scheduling algorithms and various file systems.

BTCS403-18: Design and Analysis of Algorithms

Course Outcomes:

CO1. For a given algorithms analyze worst-case running times of algorithms based on asymptotic analysis and justify the correctness of algorithms.
CO2. Explain when an algorithmic design situation calls for which design paradigm (greedy/ divide and conquer/backtrack etc.).
CO3. Explain model for a given engineering problem, using tree or graph, and writethe corresponding algorithm to solve the problems.
CO4. Demonstrate the ways to analyze approximation/randomized algorithms (expected \ running time, probability of error).
CO5. Examine the necessity for NP class based problems and explain the use of heuristic techniques.

BTES402-18 Course Title: Computer Organization & Architecture Lab

Course Outcomes:

CO1. Assemble personal computer.
CO2. Implement the various assembly language programs for basic arithmetic and logical Operations.
CO3.Demonstrate the functioning of microprocessor/microcontroller based systems with I/O interface.

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BTCS404-18: Operating Systems Lab

Course Outcomes:

CO1. Understand and implement basic services and functionalities of the operating system.
CO2. Analyze and simulate CPU Scheduling Algorithms like FCFS, Round Robin, SJF, and Priority.
CO3. Implement commands for files and directories.
CO4. Understand and implement the concepts of shell programming.
CO5. Simulate file allocation and organization techniques.
CO6. Understand the concepts of deadlock in operating systems and implement them in multiprogramming system.

BTCS405-18: Design and Analysis of Algorithms Lab

Course Outcomes:

CO1. Improve practical skills in designing and implementing complex problems with different techniques;
CO2. Understand comparative performance of strategies and hence choose appropriate, to apply to specific problem definition;
CO3. Implement Various tree and graph based algorithms and become familiar with their design methods;
CO4. Design and Implement heuristics for real world problems.

HSMC122-18: Universal Human Values 2: Understanding Harmony

Course Outcomes:

CO1 Students are expected to become more aware of themselves, and their surroundings (family, society, nature); they would become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
CO2.They would have better critical ability. They would also become sensitive to their commitment towards what they have understood (human values, human relationship and human society).
CO3.It is hoped that they would be able to apply what they have learnt to their own self in different day-to-day settings in real life, at least a beginning would be made in this direction.

HSMC102- 18: PHILOSOPHY

Course Outcomes:

CO1.Students will develop strong natural familiarity with humanities along with right understanding enabling them to eliminate conflict and strife in the individual and society.
CO2.Students shall be able to relate philosophy to literature, culture, society and lived experience can be considered.

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BTCS401-18 Discrete Mathematics

Course Outcomes

CO1. To be able to express logical sentence in terms of predicates, quantifiers, and logical connectives.
CO2. To derive the solution for a given problem using deductive logic and prove the solution based on logical inference.
CO3. For a given a mathematical problem, classify its algebraic structure.
CO4. To evaluate Boolean functions and simplify expressions using the properties of Boolean algebra.
CO5. To develop the given problem as graph networks and solve with techniques of graph theory.

BTES 501-20 : Statistical Computing Techniques using R

Course Outcomes:

CO1. To use a fundamental tool for computing in the practice of quantitative analytical methods (the 'paper-and-pencil' tool of the 21st century), that can work for the small jobs (like a pocket calculator) as well as for the big jobs (complex statistical data analysis).
CO2: Programming, data handling, transformations, subsetting, exploratory data analysis, probability distributions and simulations, regression and linear models, summarising data, how to handle large data sets, effective graphics.
CO3. Modern concepts of statistics based on simulations and writing a report of a quantitative analysis.

BTES 502-20: Statistical Computing Techniques using R lab

Course Outcomes:

CO1. Data manipulation, plot the graphs and charts with the help of computing features in R Programming.
CO2. The given data Interpretation with different distribution functions.
CO3. The relevance and importance of the theory in solving practical problems in the real world.

BTCS501-18: Database Management Systems

Course Outcomes

CO1: Write relational algebra expressions for a query and optimize the Developed expressions
CO2. Design the databases using ER method and normalization.
CO3. Construct the SQL queries for Open source and Commercial DBMS-MYSQL,

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ORACLE, and DB2.
CO4. Determine the transaction atomicity, consistency, isolation, and durability.
CO5.Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling.

BTCS505-18: Database Management System Lab

Course Outcomes:

CO1.This practical will enable students to retrieve data from relational databases using SQL.
CO2.Students will be able to implement generation of tables using datatypes
CO3. Students will be able to design and execute the various data manipulation queries.
CO4. Students will also learn to execute triggers, cursors, stored procedures etc.

BTCS502-18: Formal Language & Automata Theory

Course Outcomes:

CO1. Write a formal notation for strings, languages and machines.
CO2. Design finite automata to accept a set of strings of a language.
CO3. Design context free grammars to generate strings of context free language.
CO4. Determine equivalence of languages accepted by Push Down Automata and languages generated by context free grammars.
CO5. Distinguish between computability and non-computability and Decidability and undecidability.

BTAIML 502-20 : Artificial Intelligence

Course Outcomes:
CO 1. Understand different types of AI agents.
CO 2. Develop different types of various AI search algorithms.
CO 3. Construct simple knowledge-based systems and to apply knowledge representation.
CO 4. Convert intermediate representation in contest to understand learning.
CO 5. Apply for various techniques for Expert Systems.

BTAIML504-20 Artificial Intelligence Lab

Course Outcomes:

CO1. Explain artificial intelligence, its characteristics and its application areas.
CO2. Formulate real-world problems as state space problems, optimization problems or constraint satisfaction problems.
CO3. Select and apply appropriate algorithms and AI techniques to solve complex problems.
CO4. Design and develop an expert system by using appropriate tools and techniques.

BTAIML501- 20: Programming in Python

Course Outcomes:

CO1. Examine Python syntax and semantics and be fluent in the use of Python flow control

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and functions.
CO2. Demonstrate proficiency in handling Strings, Exceptions, and File Systems.
CO3. Create, run and manipulate Python Programs using core data structures like Lists, Dictionaries.
CO4. Interpret the concepts of Object-Oriented Programming as used in Python.
CO5. Implement exemplary applications using date and time, generators, iterators, and collections in Python.

BTAIML 505-20 :Data Visualization Using Tableau

Course Outcomes:

CO1. Infer the representation of tableau and its fields.
CO2. Explore charts that are present in tableau.
CO3. Apply the various charts used for data visualization
CO4.Apply visualization tips in charts
CO5. Learn to connect the Database to tableau and forecast the predictions

BTAIML 509-20 Java Programming

Course Outcomes:

CO1.Analyze the necessity for Object Oriented Programming paradigm over structured programming and become familiar with the fundamental concepts in OOP like encapsulation, Inheritance and Polymorphism
CO2. Design and develop java programs, analyze, and interpret object oriented data and report results.
CO3. Design an object oriented system, AWT components and multithreaded processes as per needs and specifications.
CO4. Understand the database connectivity and design web based applications on client server model
CO5. Participate and succeed in competitive examinations like GATE, Engineering services, recruitment interviews etc.

BTAIML 510-20: Java Programming Lab

Course Outcomes:

CO1. Use Java compiler and eclipse platform to write and execute java program.
CO2.Understand and Apply Object oriented features and Java concepts.
CO3. Apply the concept of multithreading and implement exception handling.
CO4. Access data from a Database with java program.
CO5. Develop applications using Console I/O and File I/O, GUI application.

BTCS 504-18: Computer Network

Course Outcomes:

CO1.Explain the functions of the different layer of the OSI Protocol.
CO2. Describe the function of each block of wide-area networks (WANs), local area

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networks (LANs) and Wireless LANs (WLANs).
CO3. Develop the network programming for a given problem related TCP/IP protocol.
CO4. Configure DNS DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls using open source available software and tools.

BTCS 619-18: Machine Learning

Course Outcomes:

CO1. Analyse methods and theories in the field of machine learning.
CO2. Analyse and extract features of complex datasets.
CO3. Deploy techniques to comment for the Regression.
CO4. Comprehend and apply different classification and clustering techniques.
CO5. Understand the concept of Neural Networks and Genetic Algorithm.

BTCS 507-18 : Computer Networks Lab

Course Outcomes:

CO1.Know about the various networking devices, tools and also understand the implementation of network topologies.
CO2. Create various networking cables and know how to test these cables.
CO3. Create and configure networks in packet tracer tool using various network devices and topologies;
CO4. Understand IP addressing and configure networks using the subnet in
CO5. Configure routers using various router configuration commands.

BTAIML609-20: Data Mining and Data Warehousing lab

Course Outcomes:

CO1. Understand the various kinds of tools.
CO2. Demonstrate the classification, clustering and etc. in large data sets.
CO3. Ability to add mining algorithms as a component to the exiting tools.
CO4. Ability to apply mining techniques for realistic data.

BTAIML601-20: Graph Theory

Course Outcomes:

CO1.Know some important classes of graph theoretic problems.
CO2.Be able to formulate and prove central theorems about trees, matching, connectivity, colouring and planar graphs.
CO3.Be able to describe and apply some basic algorithms for graphs.
CO4.Be able to use graph theory as a modelling tool.

BTAIML602-20: Graph Theory Lab

Lab Outcomes:

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CO1. Develop classes incorporating object-oriented techniques.
CO2. Design and implement object-oriented concepts of inheritance and polymorphism.
CO3. Illustrate and implement STL class of containers and need for exceptions to handle errors for object oriented programs.
CO4. Design and implement any real world based problem involving GUI interface using Object oriented concepts.

BTDS 603-20 : Big Data Analytics

Course Outcomes

CO1. Describe Big Data and its importance with its applications
CO2. Differentiate various big data technologies like Hadoop MapReduce, Pig, Hive, Hbase and No-SQL.
CO3. Apply tools and techniques to analyze Big Data.
CO4. Design a solution for a given problem using suitable Big Data Technique

BTDS 604-20: Big Data Analytics Lab

Course Outcomes:

CO1. Perform data gathering of large data from a range of data sources.
CO2. Critically analyse existing Big Data datasets and implementations, taking practicality, and usefulness metrics into consideration.
CO3. Select and apply suitable statistical measures and analyses techniques for data of various structure and content and present summary statistics.
CO4. Employ advanced statistical analytical skills to test assumptions, and to generate and present new information and insights from large datasets.

BTAIML 603- 20: Neural Networks

Course Outcomes:

CO1. Understand the learning and generalisation issue in neural computation.
CO2. Understand the basic ideas behind most common learning algorithms for multilayer perceptrons, radial-basis function networks, and Kohonen self-organising maps.
CO3. Implement common learning algorithms using an existing package.
CO4. Apply neural networks to classification and recognition problems.

BTAIML605-20: Recommender System

Course Outcomes:

CO1. Understand the basic concepts of recommender systems.
CO2. Solve mathematical optimization problems pertaing to recommender systems.
CO3. Carry out performance evaluation of recommender systems based on various metrics.
CO4. Implement machine-learning and data-mining algorithms in recommender systems data sets.
CO5. Design and implement a simple recommender system.

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BTAIML607-20: Advance Computing and Network Technologies
Course Outcomes:

CO1. Understand the core concepts of the cloud computing paradigm. Analyze various cloud computing service and deployment models and apply them to solve problems on the cloud.
CO2. Understand advanced architectures of Cloud and their applications in FOG and Edge computing
CO3. Understand wireless network trends and build foundations for latest wireless and mobile networks
CO4. Explains the applications of ad hoc and wireless sensor networks and apply the knowledge to identify appropriate physical and MAC layer protocols.

BTCS601-18: Compiler Design

Course Outcomes:

CO1. Build concepts on lexical analysis.
CO2. Understand strategies of syntax analysis.
CO3. Learn techniques of Intermediate code generation.
CO4. Understand code design issues and design code generator.
CO5.Design and develop optimized codes.

BTAIML701-20 : Computer Vision

Course Outcomes:

CO1. Design and implement spatial domain filters.
CO2. Implement smoothing and sharpening operators.
CO3.High pass and low pass filters for smoothing and sharpening of images.
CO4. Learn multi view and motion structure

BTAIML 703- 20 :Natural Language Processing and Information Retrieval

Course Outcomes:

CO1. Describe the fundamental concepts and techniques of natural language processing.
CO2. Distinguish among the various techniques, taking into account the assumptions, strengths, and weaknesses of each.
CO3. Use appropriate descriptions, visualizations, and statistics to communicate the problems and their solution
CO4.Analyze large volume text data generated from a range of real-world applications like IR.

BTAIML707- 20: Robotics and Intelligent systems

Course Outcomes:

CO1. Gain knowledge about different types of robots
CO2. Understand the concepts of various kinds of sensors and their utilities.

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CO3. Recognize different modules for understanding the concepts of optimization.
CO4. Understand the concepts and Machine learning.

BTCS 704-18 : Deep Learning

Course Outcomes:

CO1. Comprehend the advancements in learning techniques
CO2. Compare and explain various deep learning architectures and algorithms.
CO3. Demonstrate the applications of Convolution Networks
CO4. Apply Recurrent Network for Sequence Modelling
CO5: Deploy the Deep Generative Models.

BTAIML709-20: Applied Intelligence

Course Outcomes:

CO1. Explain fundamental meaning and discuss applicability of machine learning algorithms for industrial applications.
CO 2.Test the commonly used AI algorithms and describe their applications.
CO3. Implement AI algorithms, estimate their performance in a simulation environment and assess their performance for a realistic case study.
CO4. Judge AI implementation platforms and create deep learning applications for specific problems.
CO5. Assess the outcomes of the statistical learning

BTAIML710-20: Applied Intelligence lab

Lab Outcomes:

CO1. Apply various pre-processing techniques on different datasets.
CO2. Construct Machine learning programs for Supervised, Unsupervised and Semi supervised learning models.
CO3. Develop Deep learning programs for Supervised & Unsupervised learning models.
CO4. Identify and Apply Applied Intelligence concepts to solve real world problems.

BTAIML711-20 :Augmented and Virtual reality
Course Outcomes:

CO1. Learn the fundamentals concepts of virtual reality and its applications, technical concepts of virtual reality systems, including hardware and software components.
CO2. Design and develop virtual reality applications using industry-standard tools and techniques.
CO3. Evaluate the limitations and strengths of various virtual reality systems and technologies.
CO4. Apply virtual reality technology to solve real-world problems in various fields, including education, entertainment, and engineering

(BoS Co-ordinator)

(Chairman)BoS

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CO3. Recognize different modules for understanding the concepts of optimization.
CO4. Understand the concepts and Machine learning.

BTCS 704-18 : Deep Learning

Course Outcomes:

CO1. Comprehend the advancements in learning techniques
CO2. Compare and explain various deep learning architectures and algorithms.
CO3. Demonstrate the applications of Convolution Networks
CO4. Apply Recurrent Network for Sequence Modelling
CO5: Deploy the Deep Generative Models.

BTAIML709-20: Applied Intelligence

Course Outcomes:

CO1. Explain fundamental meaning and discuss applicability of machine learning algorithms for industrial applications.
CO 2.Test the commonly used AI algorithms and describe their applications.
CO3. Implement AI algorithms, estimate their performance in a simulation environment and assess their performance for a realistic case study.
CO4. Judge AI implementation platforms and create deep learning applications for specific problems.
CO5. Assess the outcomes of the statistical learning

BTAIML710-20: Applied Intelligence lab

Lab Outcomes:

CO1. Apply various pre-processing techniques on different datasets.
CO2. Construct Machine learning programs for Supervised, Unsupervised and Semi supervised learning models.
CO3. Develop Deep learning programs for Supervised & Unsupervised learning models.
CO4. Identify and Apply Applied Intelligence concepts to solve real world problems.

BTAIML711-20 :Augmented and Virtual reality
Course Outcomes:

CO1. Learn the fundamentals concepts of virtual reality and its applications, technical concepts of virtual reality systems, including hardware and software components.
CO2. Design and develop virtual reality applications using industry-standard tools and techniques.
CO3. Evaluate the limitations and strengths of various virtual reality systems and technologies.
CO4. Apply virtual reality technology to solve real-world problems in various fields, including education, entertainment, and engineering

(BoS Co-ordinator-ECE)

HoD,ECE

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