Khalsa College of Engineering &
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Department of Electronics & Communication Engineering

Course Outcomes

Sl.No.	Name of the Subject	Subject Code	Course Outcomes
1	Electronic Devices	BTEC-301-18	1. Understand physics of semiconductors and behavior of charge carriers within semiconductors
			2. Understand the working of semiconductor diodes supported with mathematical explanation.
			3. Understand the working of BJT and MOSFET with their equivalent small signal models.
			4. Understand the chemical processes used in fabrication of integrated circuits.
2	Digital System Design	BTEC-302-18	1. Apply concepts of Boolean algebra for handling logical expressions.
			2. Understand working and realization of combinational circuits.
			3. Understand working flip-flops and use them in designing of sequential circuits.
			4. Understand fundamental concepts of logic families and architectural of programmable devices.
			5. Use HDL programming tool for simulation of combinational & sequential circuits
3	Electromagnetic Waves	BTEC-303-18	1. Understand characteristics & wave propagation through transmission lines
			2. Understand Maxwell's equations for electromagnetic waves
			3. Characterize uniform plane wave
			4. Calculate reflection and transmission of waves at media interface
4	Network Theory	BTEC-304-18	1. Analyze linear networks using network theorems.
			2. Use Laplace transform to analyze transient & steady state response of linear networks.
			3. Comprehend network parameters to analyze two port networks.
			4. Realize one port networks using Foster's and Cauer's methods.
5	Mathematics III	BTAM-303-18	1. The mathematical tools needed in evaluating multiple integrals and their usage.

			2. The effective mathematical tools for the solutions of differential equations that model physical processes.
			3. The tools of differentiation and integration of functions of a complex variable that are used in various techniques dealing engineering problems.
			4. To introduce the solution methodologies for second order Partial Differential Equations with applications in engineering
			5. To provide an overview of probability and statistics to engineers
6	Electronic Devices Lab	BTEC-311-18	1. Realize use of diodes in circuits with proper understanding to their working.
			2. Understand characteristics & working of BJT in different configurations.
			3. Understand characteristics & working of MOSFET in circuits.
			4. Think and design working circuits based on diodes, BJTs and MOSFETs.
7	Digital System Design Lab	BTEC-311-18	1. Realize combinational circuits using logic gates.
			2. Realize sequential circuits using logic gates.
			3. Write & simulate VHDL programs for combinational & sequential circuits.
			4. Think and design working projects using digital 74XX ICs.
8	4-Week Institutional Training	BTEI-321-18	1. To implement the basic understanding of engineering concepts using Hardware and Software.
			2. To learn a domain oriented skillset.
9	Analog Circuits	BTEC-401-18	1. Understand the biasing of transistors and analyze BJT/FET amplifiers
			2. Analyze various rectifier and amplifier circuits
			3. Analyze sinusoidal and non-sinusoidal oscillators
			4. Understand the functioning of OP-AMP and design OP-AMP based circuits
			5. Explain the design of ADC and DAC.
10	Microprocessors and Microcontrollers	BTEC-402-18	1. Understand architecture &functionalities of different building block of 8085 microprocessor.

			2. Understand working of different building blocks of 8051 microcontroller.
			3. Comprehend and apply programming aspects of 8051 microcontroller.
			4. Interface & interact with different peripherals and devices
11	Data Structures and Algorithms	BTCS-301-18	1. Understand operations like searching, insertion, deletion, traversing on linear Data Structures and to determine their computational complexities.
			2. Understand operations like searching, insertion, deletion, traversing on various non linear Data Structures and to determine their computational complexities.
			3. Write algorithms for Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort and Heap Sort and compare their performance in term of Space and Time complexity.
			4. Apply appropriate Data Structure as per specific problem definition
12	Signals & Systems	BTEC-403-18	1. Mathematically characterize different types of signals and systems.
			2. Analyze the behavior of linear-shift invariant systems.
			3. Apply concepts of Fourier and Laplace Transforms to analyze continuous-time signals and systems.
			4. Investigate discrete-time signals and systems using Discrete-Time Fourier and Z-Transforms and simple Probability concepts.
13	Universal Human Values-2	HSMC 122-18	1. To acquire basic human values to live with harmony.
			2. To understand the need of respecting others.
			3. To know the importance of culture and society.
14	Environmental Sciences	EVS-101-18	1. Students will enable to understand environmental problems at local and national level through literature and general awareness.
			2. The students will gain practical knowledge by visiting wildlife areas, environmental institutes and various personalities who have done practical work on various environmental Issues.
			3. The students will apply interdisciplinary approach to understand key environmental issues and critically analyze them to explore the possibilities to mitigate these problems.
			4. Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex,

			interconnected world
15	Analog Circuits Lab	BTEC-411-18	1. Study and verify the characteristics of diodes in circuits with proper understanding to their working.
			2. Understand characteristics & working of BJT in different configurations.
			3. Understand characteristics & working of OP-AMPs in circuits.
			4. Think and design working circuits based on diodes, BJTs and MOSFETs
16	Microprocessors and Microcontrollers Lab	BTEC-411-18	1. Realize combinational circuits using logic gates.
			2. Realize sequential circuits using logic gates.
			3. Write & simulate VHDL programs for combinational & sequential circuits.
			4. Think and design working projects using digital 74XX ICs.
17	Analog and Digital Communication	BTEC-501-18	1. Analyze and compare different analog modulation schemes for their efficiency and bandwidth.
			2. Analyze the behavior of a communication system in presence of noise.
			3. Investigate pulsed modulation system and analyze their system performance.
			4. Analyze different digital modulation schemes and can compute the bit error performance.
18	Digital Signal Processing	BTEC-502-18	1. Represent signals mathematically in continuous and discrete time and frequency domain.
			2. Get the response of an LSI system to different signals.
			3. Design of different types of digital filters for various applications.
19	Linear Integrated Circuits	BTEC-503-18	1. Understand Differential and Cascade Amplifiers.
			2. Know the basics, working and characteristics of Op-Amps.
			3. Investigate various applications of Op-amps.
			4. Understand some specialized Op-Amps.
			5. Interpretation of Data Sheets and their Applications thereof.
20	Control Systems		1. Characterize a system and find its study state

		BTEC-504-18	behavior
			2. Investigate stability of a system using different tests
			3. Design various controllers
			4. Solve liner, non-liner and optimal control problems
21	Cloud Computing and Services	BTEC-905C-18	1.Analyse the fundamentals of cloud computing technologies and applications
			2. Cloud computing characteristics and service attributes for compliance with enterprise objectives.
			3. Manage the cloud and understand the security prospective involved in protecting against breaches.
			4. Examine the emerging areas of cloud computing and its relation with traditional model of commuting.
22	Analog and Digital Communication Laboratory	BTEC-511-18	1. study and verify the characteristics and output waveforms of AM, FM, PCM
			2. study and compare noise in AM and FM systems
			3. Investigate the output responses of PAM, PCM, PSK, FSK and MSK.
23	Digital Signal Processing Laboratory	BTEC-512-18	1. Write programs to develop various signals.
			2. Write programs to generate standard sequences.
			3. Develop programs to verify convolution
			4. Develop programs to design various filters.
24	Linear Integrated Circuits Laboratory	BTEC-513-18	1. Study and investigate the configurations of Differential amplifiers.
			2. Measure the performance parameters of am OP-Amp.
			3. use Op-Amps for various applications
25	4-Week Industrial Training I	BTEI-521-18	1. To learn the advance level of a domain specific software or Hardware
			2. To learn problem solving skill.
			3.To implement the knowledge to develop an engineering project
26	Wireless Communication	BTEC-601-18	1.Understand the basic elements of Cellular Radio Systems and its design
			2.Learn about the concepts Digital comm. through fading multipath channels
			3.Understand various Multiple Access techniques for Wireless communication
			4. Know about the Wireless standards and systems

27	Computer Networks	BTCS-504-18	1. Explain the functions of the different layer of the OSI Protocol
			2. Describe the function of each block of wide-area networks (WANs), local area networks (LANs) andWireless LANs (WLANs)
			3. Develop the network programming for a given problem related TCP/IP protocol
			4. Learn about DNS DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP,Bluetooth, Firewalls using open source available software and tools.
28	Optical Fibres and Communication	BTEC-602-18	1. Understand the basics of Optical Communication and Optical fibers.
			2. Learn about the Optical Transmitters and Receivers
			3. Explain the Light wave Architecture and systems
			4. Ability to explain the manufacturing, modulation and wave mixing in Optical Communication
29	Microwave and Antenna Engineering	BTEC-603-18	1. Understand the working and operation of various Microwave Tubes and Microwave Solid-state devices.
			2. Learn about various important Microwave Components and the Microwave measurements thatcan be carried out.
			3. Explain the basic concepts and types of Antennas and its regions.
			4. Describe the important concepts of Antenna Arrays and Antenna Aperture.
30	WLAN and Security	BTEC-906A-18	1. Develop an understanding WLAN and its architecture
			2. Understand the gap between wired and wireless networks
			3. Build the knowledge of security building blocks which enable them to solve the problems ofdesigning security solutions in wireless networks.
			4. Learn the wireless LAN authentication protocols in detail, and enhance the skills of configuring a secure wireless network.

31	Satellite Communication	BTEC-906B-18	1. Visualize the architecture of satellite systems as a means of high speed, high range communication system.
			2. State various aspects related to satellite systems such as orbital equations, sub-systems in asatellite, link budget, modulation and multiple access schemes.
			3. Understand the Phenomena in Satellite communication.
			4. Understand the general Link Design equation and the concepts related to it.
			5. Learn about VSAT system and its applications.
32	CMOS and RF Circuit Design	BTEC-906C-18	1. Get familiar with the concepts of CMOS and RF circuit designs.
			2. Explore the design methods of RF receivers and transmitters.
			3. Understand the concepts of Mixed signal design.
			4. Use the design methods of Receivers and Transmitters.
33	C# AND .NET Programming	BTEC-906D-18	1. Write various applications using C# Language in the .NET Framework.
			2. Develop distributed applications using .NET Framework.
			3. Create mobile applications using .NET compact Framework.
			4. Learn other concepts of .NET approach towards problem solving
34	Optical Fibres and Communication Lab	BTEC-611-18	1. To perform experiments based on optical communication in order to understand in depth concepts of latest communication system.
			2. To study various types of optical sources and light detectors
			3. To know methods of slicing and connecting techniques of optical fibres
			4. To study different types of losses in optical fibres.
			5. To know applications of optical fibres.
35	Microwave and Antenna Engineering Lab	BTEC-612-18	1. Learn about general Microwave components and Microwave bench.
			2. Measure common parameters related to Microwave Oscillator(s).
			3. Determine frequency and wavelength of waveguides.
			4. Measure and plot radiation patterns of various types of Antennas.

36	Internet Of Things (IOT) & Cloud Computing	BTEC-907A-18	1. Understanding concept of cloud computing and analyze trade-off betweendeploying application on cloud and using local infrastructure
			2. Identify issues and design challenges in IoT applications.
			3. Select appropriate hardware and software components for IoT applications.
			4. Conceptual knowledge will help students to build IOT applications.
37	Antenna Radiating Systems	BTEC-907B-18	1. To understand the basic concepts of radiation
			2. To understand various antenna types.
			3. To analyse the radiation pattern of antenna arrays.
			4. To understand the concept of various wave propagation techniques.
			5. To understand the concept of radiating systems on environment.
38	Robotics and Embedded Systems	BTEC-907C-18	1. Ability to understand basic concept of robotics.
			2. To analyze Instrumentation systems and their applications to various
			3. To know about the differential motion, add statics in robotics
			4. To know about the various path planning techniques.
			5. To know about the dynamics and control in robotics industries.
39	Python Programming	BTEC-907D-18	1. Read and write simple Python programs.
			2. Develop Python programs with conditionals and loops.
			3. Define Python functions and to use Python data structures–lists, tuples, dictionaries.
			4. Perform input/output operations with files in Python.
			5. Execute Searching, sorting and merging in Python.
40	Adaptive Signal Processing	BTEC-907E-18	1. Understand the non-linear control and the need and significance of changing the control parameters with respect to real-time situation.
			2. Mathematically represent the ‘adaptability requirement’.
			3. Understand the mathematical treatment for the modeling and design of the signal processingsystems.

41	Artificial Intelligence	BTEC-908A-18	1. Learn about the basic understanding of Artificial Intelligent system
			2. explain about various types of Artificial Neural Networks & their models
			3. describe Artificial Neural networks methods, operation and parameters
			4. explore Neural Network MATLAB Toolbox
42	Mobile Communication and Networks	BTEC-908B-18	1. Understand the working principles of the mobile communication systems.
			2. Understand the relation between the user features and underlying technology.
			3. Analyze mobile communication systems for improved performance
43	VLSI Design	BTEC-908C-18	1. Understand the concepts and various processes related to VLSI
			2. Understand the VLSI Circuit Design processes and Gate level design
			3. Learn about VHDL Synthesis and the tools involved
			4. Describe about CMOS Testing techniques
44	Soft Computing	BTEC-908D-18	1. Understand the concepts of Soft Computing and Algorithms involved there-in
			2. Understand Genetic Algorithms with its operators and applications
			3. Learn about the Neural Network models and its applications
			4. Describe the Fuzzy systems and Swarm Intelligence
45	Digital Image and Video Processing	BTEC-908E-18	1. Mathematically represent the various types of images and analyze them.
			2. Process these images for the enhancement of certain properties or for optimized use of the resources.
			3. Develop algorithms for image compression and coding.
46	Big Data Fundamentals	BTEC-909A-18	1. Understand the Evolution and basics of Big Data.
			2. Understand the Architecture of Hadoop with its file system and its Programming.
			3. Explain the Advanced analytical theory and methods.
			4. Describe the challenges in handling streaming data from the real world.

47	Information Theory and Coding	BTEC-909B-18	1. Understand the concept of information and entropy
			2. Understand Shannon's theorem for coding
			3. Calculation of channel capacity
			4. Apply coding techniques
48	Embedded System Design	BTEC-909C-18	1. Learn about the basic architecture of 32-bit microcontrollers
			2. Understand hardware interfacing concepts to connect digital as well as analog sensorswhile ensuring low power considerations.
			3. Reviews and implement the protocols used by microcontroller to communicate with external sensors and actuators in real world.
			4. Understand Embedded Networking concepts based upon connected MCUs
49	AI & Machine Learning	BTEC-909D-18	1. To learn the difference between optimal reasoning Vs human like reasoning.
			2. To understand the notions of state space representation, exhaustive search, heuristic searchalong with the time and space complexities
			3. To learn different knowledge representation techniques
			4. To understand the applications of AI namely, Game Playing, Theorem Proving, Expert Systems, Machine Learning and Natural Language Processing
50	Biomedical Signal Processing	BTEC-909E-18	1. Understand the fundamentals of signal processing for various bio-signal analysis
			2. Learn the Infinite impulse response (IIR) filter and study its applications
			3. Attain in-depth knowledge about the basic concepts of finite impulse response (FIR) filter andstudy its applications
			4. Apply different methods of signal processing techniques in analyzing the various bio-signals such as Electro cardiogram (ECG), Electro myogram (EMG) and Phonocardiogram (PCG)