Shaheed Bhagat Singh State Technical Campus

Moga Road, Ferozepur-152004 (Punjab)

Study Scheme for B.Tech. in ECE (Batch 2015)

Semester – 3

Course Code	Course Title	L	T	P	Internal Marks	External Marks	Total	Credits
BTEC-301A	Analog Communication Systems	3	1	0	40	60	100	4
BTEC-302A	Analog Devices & Circuits	3	1	0	40	60	100	4
BTEC-303A	Digital Electronics	3	1	0	40	60	100	4
BTEC-304A	Network Analysis & Synthesis	3	1	0	40	60	100	4
BTEC-305A	Electromagnetic Field Theory	3	1	0	40	60	100	4
BTEC-306A	Lab Analog Devices & Circuits	0	0	2	30	20	50	1
BTEC-307A	Lab Digital Electronics	0	0	2	30	20	50	1
BTHU-301A	Professional Skills-1	0	0	2	30	20	50	1
BTEC-308A	Training-I	0	0	4	60	40	100	2
Total		15	5	10	**350**	**400**	**750**	**25**

Semester – 4

Course Code	Course Title	L	T	P	Internal Marks	External Marks	Total	Credits
BTEC-401A	Digital Communication Systems	3	1	0	40	60	100	4
BTEC-402A	Digital System Design	3	1	0	40	60	100	4
BTEC-403A	Linear Integrated Circuits	3	1	0	40	60	100	4
BTEC-404A	Signals & Systems	3	1	0	40	60	100	4
BTEC-DE1A	Departmental Elective-1	3	0	0	40	60	100	3
BTEC-405A	Lab Communication Systems	0	0	2	30	20	50	1
BTEC-406A	Lab Linear Integrated Circuits	0	0	2	30	20	50	1
BTEC-407A	Lab Signals & Systems	0	0	2	30	20	50	1
BTHU-401A	Professional Skills-2	0	0	2	30	20	50	1
Total		15	4	8	**320**	**380**	**700**	**23**

Semester – 5

Course Code	Course Title	L	T	P	Internal Marks	External Marks	Total	Credits
BTEC-501A	Digital Signal Processing	3	1	0	40	60	100	4
BTEC-502A	Antenna & Wave Propagation	3	1	0	40	60	100	4
BTEC-503A	Linear Control Systems	3	1	0	40	60	100	4
BTEC-504A	Microprocessors and Microcontrollers	3	1	0	40	60	100	4
BTEC-DE2A	Departmental Elective-2	3	0	0	40	60	100	3
BTEC-505A	Lab Digital Signal Processing	0	0	2	30	20	50	1
BTEC-506A	Lab Microprocessors and Microcontrollers	0	0	2	30	20	50	1
BTEC-507A	Training-II	0	0	6	60	40	100	3
BTHU-501A	Professional Skills-3	0	0	2	30	20	50	1
Total		15	4	12	**350**	**400**	**750**	**25**

Semester – 6

Course Code	Course Title	L	T	P	Internal Marks	External Marks	Total	Credits
BTHU-602A	Human Resource Management	3	1	0	40	60	100	4
BTEC-601A	VLSI Design	3	1	0	40	60	100	4
BTEC-602A	Microwave & Radar Engineering	3	1	0	40	60	100	4
BTEC-603A	Wireless & Mobile Communication	3	1	0	40	60	100	4
BTEC-DE3A	Departmental Elective-3	3	0	0	40	60	100	3
BTEC-604A	Lab Microwave Engineering	0	0	2	30	20	50	1
BTEC-605A	Lab VLSI Design	0	0	2	30	20	50	1
BTHU-601A	Professional Skills-4	0	0	2	30	20	50	1
Total		15	4	6	**290**	**360**	**650**	**22**

Core Elective Courses for B.Tech. ECE (Batch 2015)

Code	Course Name	Specialization
BTEC-DE1A	**Departmental Elective-1 (Sem-4)**	
BTEC-411A	Web Systems and Technology	Computer
BTEC-412A	Display Technologies	Instrumentation
BTEC-413A	Computer Networks	Communication
BTEC-414A	Engineering Materials	VLSI & Embedded Systems
BTEC-DE2A	**Departmental Elective-2 (Sem-5)**	
BTEC-511A	Python Programming	Computer
BTEC-512A	AC & DC Motors	Instrumentation
BTEC-513A	Information Theory & Coding	Communication
BTEC-514A	Modular Electronics	VLSI & Embedded Systems
BTEC-DE3A	**Departmental Elective-3 (Sem-6)**	
BTEC-611A	Relational Data Base Management Systems	Computer
BTEC-612A	Electronics Measurements & Instrumentation	Instrumentation
BTEC-613A	Satellite Communication	Communication
BTEC-614A	PIC & ARM Processor	VLSI & Embedded Systems

3rd Semester

Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Electronics & Communication Engineering

[Batch 2015 onwards]

BTEC-301A	Analog Communication Systems

Mid-Sem	End-Sem	MM	L	T	P	C
40	60	100	3	1	0	4

Course Objectives:

The Objective of this first course on communication engineering is to create foothold for ECE undergraduates to help them in better understanding of advanced concepts of communication systems.

Course Outcomes:

After undergoing this course students will be able to

I. Understand & describe AM, FM and PM signals in mathematical illustrations
II. Understand various concepts and modules of AM transmitters and receivers
III. Understand various concepts and modules of FM transmitters and receivers
IV. Understand working of different types of AM Systems and their transmitter and receiver approaches

Unit I: Modulation Techniques

Electromagnetic Spectrum, need of modulation. Introduction to Amplitude Modulation, Frequency Modulation, Phase Modulation, Mathematical representation of AM and Power relation in AM waves, Mathematical representation of FM, Frequency Spectrum of FM waves, Wideband and Narrow Band FM, Phase Modulation, Comparison between AM,FM and PM, Pulse Modulation and Demodulation Techniques.

Unit II: AM Transmitters and Receivers

AM Transmission: Generation of AM, low level and high level modulators, Balanced Modulator, Vander Bijl modulator, AM Reception: Tuned Radio Frequency (TRF) receiver; Super heterodyne receiver, RF section and characteristics, mixers, Tracking and Alignment, IF amplifiers; Detectors: Square Law detector, Envelope Detector, Automatic Gain Control (AGC), AM receiver characteristics.

Unit III: FM Transmitters and Receivers

FM Transmission: Direct methods, Varactor Diode Modulator, FET Reactance Modulator, Pre-emphasis, Disadvantages of direct method. Indirect methods: RC-phase shift-modulators, Armstrong FM systems; FM Reception: Slope Detector, Balanced slope detector, Foster-Seeley or Phase Discriminator, Ratio Detector, De-emphasis, FM receiver.

Unit IV: SSB Transmitters and Receivers

Generation of SSB, filter method, phase shift method, third method, Phase cancellation method, Independent side band and Vestigial side band, Comparison of SSB Transmission to conventional AM, Demodulation of SSB, Product demodulator, Envelope detection technique of SSB, Coherent and Non Coherent reception of SSB, Multi Channel Pilot Carrier SSB Receiver.

Recommended Text and Reference Books

1. Wayne Tomasi, Electronic Communication System Fundamentals through Advance, Pearson Education
2. Kennedy & Davis, Electronics Communication System
3. Taub & Schilling, Principles of Communication Systems, Tata McGraw Hill
4. Symon Hykens, Analog Communication Systems, John Wiley & Sons
5. B.P.Lathi, Modern Digital and Analog Communication Systems, Oxford

Note: Atleast one question must be set from each unit/course outcome.

Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Electronics & Communication Engineering

[Batch 2015 onwards]

BTEC-302A — Analog Devices & Circuits

Mid-Sem	End-Sem	MM	L	T	P	C
40	60	100	3	1	0	4

Course Objectives:

This is the most fundamental course on electronics devices and circuits meant for understanding of structures, characteristics of semiconductor devices and their use in circuits. This provides mathematical foundation to electronics engineers for design and analysis of circuits.

Course Outcomes:

After undergoing this course students will be able to

I. Understand the concept of PN junction diode and various other diodes with their V-I characteristics
II. Know about various types of transistors and various biasing circuits.
III. Know and classify power amplifiers, feedback amplifiers and oscillators.
IV. Design h-parameter circuit and hybrid model of transistor amplifiers.

Unit I: Semiconductor Diodes

Semiconductors: energy bands, diffusion current, drift current, mobility and resistivity, carrier generation and recombination, Poisson and continuity equations; PN junction diode: depletion region, avalanche and Zener breakdowns, V-I Characteristics, Switching characteristics of diode, Temperature Dependence of PN diode; Diode Types: construction & characteristics of LED, LCD, photo diodes, tunnel diode, Schottky diode, Zener diode; Circuits: clipper, clamper, rectifiers, voltage regulator.

Unit II: Transistors

Bipolar Junction Transistors: Construction, transistor current components, V-I characteristics in CB, CE and CC, quiescent point, early effect, power dissipation curve, switching characteristics of transistor; BJT biasing techniques: fixed bias circuit, collector to base bias circuit, biasing circuit with emitter resistor, voltage divider biasing circuit, emitter bias circuit, stability analysis; Transistors types: construction & characteristics of UJT, JFET and MOSFET; Emitter follower, Darlington pair

Unit III: Power Amplifiers

Transformer coupled audio amplifier: construction, working, efficiency & distortion analysis; Classifications: class-A, class-B, class-AB and class-C amplifiers, efficiency; Complementary push-pull amplifier working, heat sink;

Unit IV: Feedback Amplifiers

Feedback concepts: theory, advantages & disadvantages of feedback; Classification: current-series, current-shunt, voltage-series, voltage-shunt feedback amplifier; Oscillators: Barkhausen's Criteria, General form of oscillator circuit, Colpitts, Hartley, RC phase shift, Wein Bridge, crystal oscillators.

Unit V: Low and High Frequency Amplifiers

Low frequency: BJT amplifier analysis using h-model in CE, CB and CC configurations, simplified BJT h-model, emitter follower, Miller's theorem; High frequency: π-model and BJT amplifier analysis, π-model at low frequency, gain-bandwidth product.

Recommended Text and Reference Books

1. Millman, Halkias, Electronic Devices & Circuits, Tata Mcgraw Hill
2. Boylested, Electronic Devices & Circuits Theory, Pearson Education
3. J.D. Ryder, Electronic Fundamentals & Application, PHI
4. Floyd, Electronic Devices, Pearson Education
5. J.B. Gupta, Electronics Devices & Circuits, Katson
6. Millman and Halkias, Integrated Electronics-Analog and Digital Circuits & Systems, McGraw Hill
7. Mottershed, Electronic Devices and Circuits, McGraw Hill

Note: Atleast one question must be set from each unit/course outcome.

Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Electronics & Communication Engineering

[Batch 2015 onwards]

BTEC-303A	Digital Electronics

Mid-Sem	End-Sem	MM	L	T	P	C
40	60	100	3	1	0	4

Course Objectives:

Primary objective of the course is to introduce basic concepts of design and analysis of digital combinational and sequential circuits to the students. This knowledge acquired in this course will be useful to them in Microprocessor, VLSI, Advanced Digital Systems, etc. courses.

Course Outcomes:

After undergoing this course students will be able to

I. Understand various number systems and their arithmetic operations.
II. Acquire knowledge about logic gates, basic postulates of Boolean algebra and the methods for simplifying Boolean expressions
III. Understand the design and working of basic combinational and sequential circuits
IV. Understand various types of DACs and ADCs and logic families.

Unit I: Number System and Codes

Number System: binary, octal and hexadecimal number system, conversions (Addition, subtraction, Multiplication and Division), signed and unsigned number representations; Binary operations: arithmetic operations, subtractions using 1's and 2's complement; Coding: ASCII code, Excess-3 code, Grey code and Unit distance code, BCD code and BCD additions.

Unit II: Minimization of logic function

Logic gates: basic logic gates, universal gates, symbols, truth-tables; Boolean algebra: sum of products, product of sums, Karnaugh map, Quine-McCluskey methods for expression simplification.

Unit III: Combinational Circuits

Combinational circuits: encoder, decoder, multiplexers and de-multiplexer, Application: half and full adders &subtractors, code converters, parity checker, 7-segment display codes generators and binary comparators; Implementations: combinational circuit using MUX, DeMUX, encoder and decoders.

Unit IV: Sequential Circuits

Flip-flops: SR, JK, D and T, edge triggered, master slave FF, truth tables, excitation tables, state table, conversion; Sequential circuits: shift registers, synchronous and asynchronous counters

Unit V: DAC and ADC Converters

Types of DAC: weighted register, binary ladder, accuracy and resolution, Types of ADC: parallel converter, counter type, successive approximation. single and dual slope, accuracy and resolution

Unit VI: Logic Families

RTL, DCTL, DTL, TTL, ECL, CMOS and its various types, Comparison of logic families.

Recommended Text and Reference Books

1. Ronald J.Tocci, Neal S.Widmer, Gregory L.Moss, Digital Systems: Principles and Applications, Pearson Ed.
2. Morris Mano, Digital Design, PHI
3. Thomas L. Floyd, Digital Fundamentals, Pearson Ed.
4. Malvino& Leech, “Digital Principles & Applications”, Tata Mc Graw Hill
5. R P Jain, Modern Digital Electronics, Tata McGraw Hill
6. Taub and Schilling: “Digital Integrated Electronics”, McGraw-Hill

Note: Atleast one question must be set from each unit/course outcome.

Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Electronics & Communication Engineering

[Batch 2015 onwards]

BTEC-304A	Network Analysis and Synthesis

Mid-Sem	End-Sem	MM	L	T	P	C
40	60	100	3	1	0	4

Course Objectives:

Objective of the course is to familiarise the undergraduate students with fundamental electrical rules required in analysis of steady-state and transient behaviour of electrical circuits and synthesis of networks & filters.

Course Outcomes:

After undergoing this course students will be able to

I. Understand and apply fundamental electrical theorems in analysing different electrical circuits
II. Appropriately use Laplace Transform for analysing various RLC circuits in frequency domain
III. Understand and apply the concepts of network synthesis and analysis of 2-port networks
IV. Understand structures and analysis of difference types of passive filters

Unit I: Fundamental Network Theorems

Sources: Independent and dependent current and voltage sources; Signals: classification, impulse, step, ramp, sine, exponential; Network Theorems: Superposition, Thevenin's, Norton's, Maximum Power Transfer, Reciprocity and Wye-Delta transformation;

Unit II: Time and Frequency Response

Laplace Transform: Need of LT, properties of LT, S-Plane, analysis of RL and RC circuits as high pass and low pass filters in frequency response, convolution theorem; Filters: HPF and LPF as differentiator and integrator, transient and steady response; Resonance: series and parallel resonance; S-Plane: pole-zero for stability analysis.

Unit III: Network Synthesis

Network functions: Impedance and admittance function, transfer functions, impulse response, poles and zeros and their restrictions; 2-port networks: Impedance parameters, admittance parameters, transmission parameters, series-series, parallel- parallel, series-parallel, parallel-series and cascade connections; Synthesis: network synthesis techniques for 2-terminal network, Foster and Cauer forms, driving point impedance.

Unit IV: Passive Filters

Filters: Classification, characteristics impedance and propagation constant of pure reactive filters, Ladder network; T & π-sections: T-section, π-section, T-π transformations, terminating half section; Filter designs: terminology, derivation, design of constant-K, m-derived filters and composite filters.

Recommended Text and Reference Books

1. Van Valkenberg, M.E., Network Analysis and Synthesis, PHI learning
2. Chakraborty, Abhijit, Circuit Theory, Dhanpat Rai
3. Chaudhury D. Roy, Networks and Synthesis, New Age International
4. Mohan, Sudhakar Sham, Circuits, Networks Analysis and Synthesis, Tata McGraw Hill

Note: Atleast one question must be set from each unit/course outcome.

Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Electronics & Communication Engineering

[Batch 2015onwards]

BTEC-305A Electromagnetic Field Theory

Mid-Sem	End-Sem	MM	L	T	P	C
40	60	100	3	1	0	4

Course Objectives:

Primary objective is to familiarize the student with basic concepts and computations to determine behaviour and response of electric and magnetic fields in conductors and dielectrics. This knowledge will help them in understanding antenna designs & their radiation patterns and microwave systems.

Course Outcomes:

After undergoing this course students will be able to

I. Apply vector calculus to electric and magnetic fields
II. Understand the basic concepts of static electric & magnetic fields
III. Analyze Maxwell's equation in different forms and their applications
IV. Examine the phenomenon of wave propagation in different media and its interfaces

Unit I: Review of Vector Analysis

Vector analysis, Physical interpretation of gradient, divergence and curl; vector relations in other coordinate systems; Integral theorems: divergence theorem, Stoke's theorem, Green's theorem and Helmholtz theorem.

Unit II: Electrostatics

Introduction to fundamental relations of electrostatic field; Gauss's law and its applications; potential function; Field due to continuous distribution of charges; Equipotential surfaces; Divergence theorem; Poisson's equation and Laplace's equation, capacitance, electrostatic energy, Conditions at Boundary between dielectrics, Uniqueness theorem.

Unit III: Steady Magnetic Field

Magnetic induction and Faraday's laws; magnetic Flux Density; magnetic field strength and magnetomotive force; Ampere's work Law in the differential vector form; permeability; energy stored in a magnetic field; Ampere's force law; magnetic vector potential, Analogy between electric and magnetic fields.

Unit IV: Maxwell's Equations and Poynting Vector

Equation of continuity for time varying fields, Inconsistency of Ampere's law, Maxwell's equations in integral and differential form for static and time varying fields, conditions at a Boundary surface, Concept of Poynting vector, Poynting Theorem, Interpretation of E×H

Unit V: Electromagnetic Waves

Solutions for free-space conditions; Uniform plane Wave Propagation; Wave equations for a conducting medium; Sinusoidal time variations; Polarization; Conductors and Dielectrics; Direction Cosines; Reflection by Perfect Conductor -normal and oblique incidence, Perfect Dielectric-normal incidence, Perfect Insulator–Oblique incidence; Brewster angle, Reflection at a surface of Conductive medium, Surface impedance

Recommended Text and Reference Books

1. G.S.N. Raju, Electromagnetic Field Theory and Transmission Lines, Pearson Education
2. W. H. Hayt Jr., Engineering Electromagnetics, McGraw Hill
3. E. C. Jordan, EM Waves and Radiating Systems, Pearson Education
4. John D. Kraus, Electromagnetics, Tata McGraw Hill
5. R. F. Harington, Time Harmonic EM Fields, McGraw Hill
6. Joseph A. Edminister, Schaum's Outline of theory and problems of Electromagnetics,PHI

Note: Atleast one question must be set from each unit/course outcome.

Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Electronics & Communication Engineering

[Batch 2015 onwards]

BTEC-306A — Lab Analog Devices & Circuits

Mid-Sem	End-Sem	MM	L	T	P	C
30	20	50	0	0	2	1

Course Objectives:

The main aim of this course is to make the students familiar with basic electronic components & devices to understand their working and limitations for further use in various application circuits.

Course Outcomes:

After undergoing this course students will be able to

I. Understand and verify the functioning of diodes & their applications
II. Explore the VI characteristics of transistor in various configuration
III. Design and analyse practical behaviour of power amplifiers
IV. Design oscillators and compute their oscillation frequency

List of Experiments

1. Design and study the Zener regulator as voltage regulator on breadboard
2. Design and study half-wave, full-wave & Bridge rectifiers using breadboard
3. To plot input and output characteristics of CE and CB configuration
4. To plot input and output characteristics of CE, CB and CC configuration using simulation tools
5. To study the characteristics and working of a Class-A amplifier
6. To study the characteristics and working of Class-B amplifier.
7. To study the characteristics and working of Class-B push-pull amplifier.
8. To study the response of Wien Bridge oscillator and determine frequency of oscillation
9. To study the response of RC phase shift oscillator and determine frequency of oscillation.
10. To study the response of Hartley oscillator and determine frequency of oscillation.
11. To study the response of Colpitt's oscillator and determine frequency of oscillation.

Micro Lab Projects

1. Mobile phone charger
2. BJT as switch
3. BJT Amplifier
4. RC High Pass and Low Pass filters

Important Note

1. From above given list at least 8 experiments will be performed by the students in a group of maximum three in the laboratory
2. Every student in a group of maximum three will undertake one Micro Lab Project from the above list or in consultation of class teacher.

Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Electronics & Communication Engineering

[Batch 2015 onwards]

BTEC-307A	Lab Digital Electronics

Mid-Sem	End-Sem	MM	L	T	P	C
30	20	50	0	0	2	1

Course Objectives:

The main objective of this laboratory course is to provide hand-on experience in designing and implementing digital logic circuits which will help them in designing projects and completing professional assignments

Course Outcomes:

After undergoing this course students will be able to

I. Understand working of logic gates practically
II. Demonstrate combinational circuits such as adder, subtractor, code convertors, MUX, DEMUX etc.
III. Demonstrate sequential circuits such as Flip-flops, shift registers and counters etc.
IV. Design and analyse working of digital circuits in simulation environment

List of Experiments

1. Truth-table verification of OR, AND, NOT, XOR, NAND and NOR gates on breadboard
2. Realization of OR, AND, NOT and XOR functions using universal gates on breadboard
3. Realization of full adder circuit using logic gates on breadboard
4. Realization of full subtractorcircuit using logic gates on breadboard
5. Design 4-Bit Binary-to-Graycode converter in simulation environment
6. Design and study of 4-Bit BCD adder in simulation environment
7. Realize binary full adder circuit using two 2x1 Multiplex on breadboard
8. Realize Full subtractor using single 1:8 De-Multiplex
9. Verify truth tables and excitation tablesof RS, D, JK and T flip flops
10. Design MOD-5synchronous up-counter using JK/RS/D flip flops in simulation environment
11. Study working of SIPO, SISO, PIPO, PISO shift registers using IC7495 chip
12. Study the working of Digital to Analog Convertor and Analog to Digital Converters

Micro Lab Projects

1. 1-bit decimal counter with Seven-Segment Display
2. Alternate blinking LEDs

Important Note

1. From above given list at least 8 experiments will be performed by the students in a group of maximum three in the laboratory
2. Every student in a group of maximum three will undertake one Micro Lab Project from the above list or in consultation of class teacher.

Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Electronics & Communication Engineering

[Batch 2015 onwards]

BTHU-301A	Professional Skills-I

Mid-Sem	End-Sem	MM	L	T	P	C
30	20	50	0	0	2	1

Course Objectives:

This is the practical course meant for overall grooming of engineering undergraduate acquiring professional skills with a sense of confidence. This may help in overcoming their weaknesses so as to lead a successful life.

Course Outcomes:

After undergoing this course students will be able to

I. Acquire the understanding of the multifaceted aspects of Personality, their significance and assessment.
II. Understand the different aspects of intelligence and their relative relevance in effective utilization of one's abilities in diversified situations.
III. Recognize the significance of social image and personal grooming.
IV. Develop a knack for effective communication by understanding its both verbal and non-verbal aspects.
V. Demonstrate various acquired professional skills with a sense of confidence.

Unit I: Personality Development

General overview of personality, Understanding Self; Concept and Self Esteem, Building Self Esteem, Self Confidence, Assertiveness (Activity based training) Understanding assessment of Personality.

Unit II: Mental Abilities

Understanding Intelligence, emotional intelligence, successful intelligence, Development of emotional intelligence

Unit III: Social Etiquettes and Personal Grooming

Importance of social image, Dos and Don'ts in dressing up, Developing an Understanding of Social Etiquettes

Unit IV: Communication Skills

Features of an effective communication. Verbal and Non-verbal communication, Understanding role of body language in effective communication

Recommended Text and Reference Books

1. Harold Wallace and L. Ann Masters, Personality Development, Cengage Learning
2. Baron, Psychology Prentice Hall India
3. Anita Woolfolk, Educational Psychology, Pearson Education
4. Stephen Robbins, Organizational Behaviour, Pearson Education
5. J.W Newstrom and Keith Davis, Organizational Behaviour, Tata McGraw Hills
6. Dalmer Fisher, Communication in organizations, Jaico Publishing House, New Delhi
7. M. Ashraf Rizvi, Effective Technical Communication, Tata McGraw Hills

4^{th} Semester

Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Electronics & Communication Engineering

[Batch 2015 onwards]

BTEC-401A	Digital Communication Systems

Mid-Sem	End-Sem	MM	L	T	P	C
40	60	100	3	1	0	4

Course Objectives:

The objective of this course is to make the students familiar with the fundamental digital communication concepts, different types of digital pulse and base pass signalling techniques and to analyze the performance of various digital modulation techniques.

Course Outcomes:

After undergoing this course students will be able to

I. Understand the basic concepts of digital communication system and its various source coding techniques
II. Analyze/Learn pulse code modulation and its modified techniques such as DM, adaptive DM and DPCM along with evaluation of performance parameters
III. Analyze various line coding techniques and their properties
IV. Acquire knowledge of several digital carrier modulation and demodulation techniques along with their analysis and evaluation of performance parameters.

Unit I: Elements of Digital Communication System

Block diagram of Digital Communication system, Digital representation of Analog signals, Advantages and Disadvantages of Digital Communication system, Hartley Shannon Law, Concept of amount of Information and entropy, Shannon Fano Source Coding, Huffman source coding and Lampel-Ziv Source coding algorithm.

Unit II: Waveform Coding Techniques

Sampling, Sampling Rate, Aliasing, Uniform and Non uniform quantization, quantization error, Dynamic Range, Coding efficiency, A law & μ law companding, Bandwidth of PCM, Block diagram of PCM system, Time division multiplexing hierarchy for PCM, Bit versus word interleaving, Statistical TDM, Delta Modulation, Adaptive Delta Modulation, Differential Pulse Code Modulation.

Unit III: Digital Base Band Transmission

Line Coding & its properties. NRZ & RZ types, Signaling format for unipolar, Polar, bipolar (AMI) and Manchester coding and their power spectra (No derivation), HDB and B8ZS signaling, Intersymbol Interference, Eye Patterns, Nyquist's criterions for pulse shaping.

Unit IV: Digital Carrier Modulation & Demodulation Techniques

Introduction, Amplitude Shift Keying (ASK), ASK Spectrum, ASK Modulator, Coherent ASK Detector, Noncoherent ASK Detector, Frequency Shift Keying (FSK), FSK Bit Rate and Baud, Bandwidth and Frequency Spectrum of FSK, FSK Transmitter, Non-coherent FSK Detector, Coherent FSK Detector, FSK Detection Using PLL, Binary Phase Shift Keying, Binary PSK Spectrum, BPSK Transmitter, Coherent PSK Detection, Quadrature Phase Shift Keying (QPSK), QPSK Demodulator, Offset QPSK, M-Ary BPSK, Quadrature Amplitude Modulation (QAM); MQAM transmitters and receivers, Band Width efficiency, Differential PSK, DBPSK transmitter and receiver, Constant Envelop Modulation; Minimum Shift Keying (MSK) & Gaussian Minimum Shift Keying (GMSK), matched filter receivers, bandwidth consideration and probability of error calculations for ASK, PSK, FSK schemes.

Recommended Text and Reference Books

1. Wayne Tomasi, Electronic Communication System Fundamentals through Advanced, Pearson Education
2. Simon Haykin, Communication Systems, Wiley Publication
3. Gary M. Miller, Modern Electronic Communication, Prentice-Hall
4. Sklar, Digital Communication- Fundamentals and Applications, Pearson Education
5. Proakis J J, Digital Communications, McGraw Hill

Note: Atleast one question must be set from each unit/course outcome.

Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Electronics & Communication Engineering

[Batch 2015 onwards]

BTEC-402A	Digital System Design

Mid-Sem	End-Sem	MM	L	T	P	C
40	60	100	3	1	0	4

Course Objectives:

The main objective of the course is to develop the fundamentals of digital logic with thorough study of digital circuits systems and the use of finite state machines in the design of sequential systems.

Course Outcomes:

After undergoing this course students will be able to

I. Acquire in-depth knowledge about designing of combinational circuits and understand functioning of programmable devices & their use in designing digital systems
II. Understand ASM chart and design of sequential machine from ASM chart
III. Acquire knowledge about Finite State Machines (FSM) and implement Moore and Mealy FSM with state reduction methods
IV. Analyse and design synchronous and asynchronous sequential circuits

Unit I: Combinational Logic & Programmable Logic Devices

Designing of Combinational Circuits, Review of Programmable Logic Devices, Designing of ROM, PAL and PLA

Unit II: Algorithmic State Machines

ASM chart, Timing considerations, Control implementation, Control Design with multiplexers

Unit III: Finite State Machines

Finite state model, Memory elements and their excitation functions, Synthesis of Synchronous sequential circuits, Capabilities and limitations of FSM, Design, Modeling and Simulation of Moore and Mealy machines

Unit IV: Synchronous Sequential Logic

Designing of Sequential Circuits, Analysis of clocked sequential circuits, State reduction and assignment

Unit V: Asynchronous Sequential Logic

Analysis Procedure, Circuits with latches, Design procedure, Reduction of state and flow tables, Race-free state assignment and Hazards

Recommended text and Reference Books

1. An Engineering Approach to Digital Design- William L. Fletcher-PHI
2. Digital Design - M. Morris Mano
3. Fundamentals of Digital Logic with VHDL design – Stephen Brown, ZvonkoVranesic –TMH.
4. Digital Design Principles – William I Fletcher.
5. Digital System Design Using VHDL – Chales H. Roth.
6. Digital System Design – John Wakerley.

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Note: Atleast one question must be set from each unit/course outcome.

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Department of Electronics & Communication Engineering

[Batch 2015 onwards]

BTEC-403A	Linear Integrated Circuits

Mid-Sem	End-Sem	MM	L	T	P	C
40	60	100	3	1	0	4

Course Objectives:

To teach the basic concepts in the design of electronic circuits using linear integrated circuits and their applications.

Course Outcomes:

After undergoing this course students will be able to

I. Analyze different differential amplifier configurations and its current stabilization.
II. Classify ICs and define the stages of Op-amp, its electrical parameters and its various closed loop configurations.
III. Identify and explain the various applications of an Op-amp
IV. Describe various specialized ICs and their applications.

UNIT I: Differential and Cascade Amplifiers

Introduction, Differential Amplifier, Differential Amplifier Circuit Configuration, Dual Input-Balanced output Differential Amplifier, Dual Input-Unbalanced output Differential Amplifier, Single Input-Balanced output Differential Amplifier, Single Input-unbalanced output Differential Amplifier with their DC and AC analysis, Differential Amplifier with swamping resistors, Constant current bias, Current Mirror, Cascaded differential Amplifier Stages, Level Translator

UNIT II: Introduction to Operational Amplifiers

Block diagram of a typical Op-Amp, Schematic symbol, integrated circuits and their types, IC package types, Pin Identification and temperature range, Interpretation of data sheets, Overview of typical set of data sheets, Characteristics and performance parameters of and Op-Amp, Ideal Op-Amp, Equivalent circuit of an Op-Amp, Ideal voltage transfer curve, Open loop configurations: Differential, Inverting & Non Inverting. Practical Op-Amp: Input offset voltage, Input bias current, Input offset current, total output offset voltage, Thermal drift, Effect of variation in power supply voltages on offset voltage, Change in Input offset voltage and Input offset current with time, Temperature and supply voltage sensitive parameters, Noise, Common Mode configuration and common mode rejection Ratio. Feedback configurations.

UNIT III: Applications of Op-Amp

DC and AC amplifiers, Peaking Amp, Summing, Scaling and Averaging Amp, Instrumentation Amplifier, V to I and I and to V converter, Log and Antilog Amp, Integrator, Differentiator. Active filters: First order LP Butterworth filter, Second order LP Butterworth filter, First order HP Butterworth filter, Second order HP Butterworth filter, Higher order filters, Band pass filter, Band reject filters, All pass filter, Phase shift oscillator, Wein bridge oscillator, Quadrature oscillator, Square wave generator, Triangular wave generator, Saw tooth wave generator, Voltage controlled oscillator, Basic comparator, Zero crossing detector, Schmitt trigger, window detector, Peak Detector, Sample and Hold Circuit.

UNIT IV: Specialized IC Applications

IC 555 Timer: Pin configuration, Block diagram, application of IC 555 as Monostable and Astable Multivibrator., Phase Lock Loops: Operating principles & applications of IC 565, Voltage Regulators: Fixed voltage regulators, Adjustable voltage regulators, Switching Regulators.

Recommended text and Reference Books

1. RamakantA.Gayakwad, OP-AMP and Linear IC's, Prentice Hall / Pearson Education.
2. Robert F.Coughlin, Frederick F.Driscoll, Operational Amplifiers and Linear Integrated Circuits, PHI

3. D.Roy Choudhry, Shail Jain, Linear Integrated Circuits, New Age International Pvt. Ltd.
4. William D.Stanley, Operational Amplifiers with Linear Integrated Circuits, Pearson Education
5. B.S.Sonde, System design using Integrated Circuits , New Age Publication
6. S.Salivahanan& V.S. KanchanaBhaskaran, Linear Integrated Circuits, TMH

Note: Atleast one question must be set from each unit/course outcome.

Shaheed Bhagat Singh State Technical Campus, Ferozepur
Department of Electronics & Communication Engineering
[Batch 2015 onwards]

BTEC-404A	Signals & Systems

Mid-Sem	End-Sem	MM	L	T	P	C
40	60	100	3	1	0	4

Course Objectives:

Being the most important fundamental course, the objective of this course is to facilitate the understanding of mathematical concepts that are applied in electrical signals and systems.

Course Outcomes:

After undergoing this course students will be able to

I. Understand the fundamental signals and classification approachesfor signals and systems.
II. Apply concepts of Fourier Transform to analyse continuous signals and discrete signals in time and frequency domains.
III. Develop mathematical skills to analyse LTI continuous systems.
IV. Understand and analyse response of DT systems using mathematical tools like DTFT and Z-Transform

Unit I: Classification of Signals and Systems

Continuous Time (CT) signals, Discrete Time (DT) signals - Step, Ramp, Pulse, Impulse, Exponential, Classification of CT and DT signals - periodic & aperiodic, random & deterministic signals, Even & Odd Signals, Energy & Power Signals, Description of continuous time and discrete time systems.

Unit II: Analysis of Continuous Time Signals

Fourier series analysis, Spectrum of CT signals, Fourier Transform and its properties in Signal Analysis, Power Spectral Density and Energy spectral density.

Unit III: Analysis of Discrete Time Signals

Sampling of CT signals and aliasing, DTFT and its properties, Z- transform and properties of Z-transform.

Unit IV: Linear Time Invariant –Continuous Time Systems

Linear Time invariant Systems and their properties. Differential equation & Block diagram representation, Impulse response, Convolution integral, Frequency response (Transfer Function), Fourier transforms analysis.

Unit V: Linear Time Invariant - Discrete Time System

Difference equations, Block diagram representation, Impulse response, Convolution sum, LTI systems analysis using DTFT and Z-transforms.

Recommended Text and Reference Books

1. Allan V.Oppenheim, S.Wilsky and S.H.Nawab, Signals and Systems, Pearson Education.
2. Simon Haykins, Communication Signals & System, John Wiley & Sons.
3. H P Hsu, RakeshRanjan, Schaums Outlines, Signals and Systems, Tata McGraw Hill.
4. S Salivahanan, A. Vallavaraj, C. Gnanapriya, Digital Signal Processing, McGraw Hill International.
5. Simon Haykins and Barry Van VeenSignals and Systems, John Wiley & sons, Inc.
6. Phillips, Signal, System &Transforms, Pearson Education.
7. Robert A. Gabel and Richard A., Signals& Linear Systems, John Wiley.

Note: Atleast one question must be set from each unit/course outcome.

Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Electronics & Communication Engineering

[Batch 2015 onwards]

BTEC-405A Lab Communication Systems

Mid-Sem	End-Sem	MM	L	T	P	C
30	20	50	0	0	2	1

Course Objectives:

The main aim of this course is to make the students familiar with working of analog and digital communication systems by studying the various modulation and demodulation techniques.

Course Outcomes:

After undergoing this course students will be able to

I. Understand the operation of analog modulators and demodulators
II. Explore the process of analog to digital conversion in different waveform coding techniques
III. Learn conversion of digital data into digital signals
IV. Understand operation of digital modulators and demodulators

List of Experiments

1. Generations of DSB & DSB-SC AM signal using balanced modulator & determine modulation Index & detection of DSB using Diode detector.
2. Generation of SSB AM signal & detection of SSB signal using product detector.
3. Generation of FM Signal using Varactor& reactance modulation.
4. Detection of FM Signal using foster seelay& ratio detector.
5. To study the circuit of PWM & PPM modulator & Demodulator.
6. Sampling Theorem & Reconstruction of Signal from its samples using Natural Sampling, Flat Top Sampling & Sample & Hold Circuits & effect of duty cycle.
7. Study of pulse code modulation and demodulation.
8. Study of delta modulation and demodulation and observe effect of slope overload.
9. Study of pulse data coding and decoding techniques for various formats.
10. Study of amplitude shift keying modulator and demodulator.
11. Study of frequency shift keying modulator and demodulator.
12. Study of phase shift keying modulator and demodulator.
13. Study of Time Division Multiplexing system.

Important Note

1. From above given list at least 8 experiments will be performed by the students in a group of maximum three in the laboratory.

Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Electronics & Communication Engineering

[Batch 2015 onwards]

BTEC-406A	Lab Linear Integrated Circuits

Mid-Sem	End-Sem	MM	L	T	P	C
30	20	50	0	0	2	1

Course Objectives:

The main aim of this course is to make the students familiar with performance, behaviour of linear ICs and their applications.

Course Outcomes:

After undergoing this course students will be able to

I. Analyze the performance of Integrated Circuits.
II. Evaluate the close loop gain of an op-amp.
III. To use OP Amp as summer, Subtractor, filters and various other applications.
IV. Able to use OP Amp to generate sine waveform, Square wave form and Triangular wave forms.

List of Experiments

1. To study differential amplifier configurations.
2. To measure the performance parameters of an Op amp.
3. Application of Op amp as Inverting and Non Inverting amplifier.
4. To study frequency response of an Op Amp
5. To use the Op-Amp as summing, scaling & averaging amplifier.
6. To use the Op-Amp as Instrumentation amplifier
7. Design differentiator and Integrator using Op-Amp.
8. Application of Op Amp as Log and Antilog amplifier. Design Low pass, High pass and Band pass 1st order butterworth active filters using Op Amp.
9. Design Phase shift oscillator using Op-Amp.
10. Design Wein Bridge oscillator using Op-Amp.
11. Application of Op Amp as Sawtooth wave generator.
12. Application of Op Amp as Zero Crossing detector and window detector.
13. Application of Op Amp as Schmitt Trigger.
14. Design a delay circuit using 555.
15. To examine the operation of a PLL and to determine the free running frequency, the capture range and the lock in range of PLL.

Important Note

1. From above given list at least 8 experiments will be performed by the students in a group of maximum three in the laboratory.

Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Electronics & Communication Engineering

[Batch 2015 onwards]

BTEC-407A	Lab Signals & Systems

Mid-Sem	End-Sem	MM	L	T	P	C
30	20	50	0	0	2	1

Course Objectives:

The objective of this lab is for understanding the fundamental and mathematical ground of the signals generation and handling, working of systems with the help of programming in MATLAB environment.

Course Outcomes:

After undergoing this course students will be able to

I. Write MATLAB programs to generate, plot and operate on the basic signals like unit step, ramp, exponential and sinusoidal signals in continuous as well as discrete forms.
II. Write MATLAB programs for the analysis of continuous and discrete time signals using Fourier Transform, Power and Energy Spectral Density and Z Transform.
III. Understand the statistical concepts for signals analysis.
IV. Write MATLAB programs to analyse LTI continuous and discrete time systems.

List of Experiments

1. Write a program to generate and plot continuous unit step, ramp and exponential signals.
2. Write a program to generate and plot discrete unit step, ramp and exponential signals.
3. Write a program to generate and plot a sinusoidal signal of given signal frequency in continuous and discrete time domain and understanding the effect of sampling frequency on signal regeneration.
4. Write a program for performing addition and subtraction of two signals in continuous and discrete time domain.
5. Write a program for performing operation on sequences like signal shifting, signal folding, signal addition and signal multiplication in continuous and discrete time domain.
6. Write a program to find and display graphically convolution of two signals.
7. Write a program to find and display graphically the Fourier Transform of a signal.
8. Write a program to find ad display Z transform and inverse Z transform of a function.
9. Write a program to generate random sequences with arbitrary distribution and find their means and variances for following:
    a. Rayleigh Distribution
    b. Uniform distribution
    c. Gaussian distribution
10. Write a program to plot probability density functions.
11. Write a program to study Power Spectrum Density and Energy spectral density of signals.
12. Write a program for finding response of the LTI system described by the difference equation.
13. Write a program for finding response of the LTI system described by its unit impulse response

Important Note

1. From above given list at least 8 experiments will be performed by the students in a group of maximum three in the laboratory.

Shaheed Bhagat Singh State Technical Campus, Ferozepur

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[Batch 2015 onwards]

BTHU-401A	Professional Skills - II

Mid-Sem	End-Sem	MM	L	T	P	C
30	20	50	0	0	2	1

Course Objectives:

The objective of this course is make the students to explore the communication skills to improve and manage interpersonal relationships in social environment. Additionally the students will learn the stress management and the tactic to cope up with it.

Course Outcomes:

After undergoing this course students will be able to

I. Understand varied aspects of interpersonal -relations and develop ability for creating harmonious relations.
II. Sharpen and demonstrate Numerical Ability and Reasoning Abilities..
III. Apply stress management techniques after going through the knowledge of Stress and its coping strategies.
IV. Develop and Demonstrate Speaking skills in various contexts such as Public speaking, Impromptu, Introducing Oneself and Telephonic conversation.

Unit I: Inter-Personal Skills

Introduction to Interpersonal Relations, Transactional analysis, Understanding Emotions, Emotional empathy and Sensitivity Training.

Unit II: Mental Abilities

Numerical Ability, Inductive Reasoning and Deductive Reasoning

Unit III: Stress Management

Introduction to Stress, Causes of Stress, Impact of Stress, and Managing Stress, Coping strategies (Individual and Group).

Unit IV: Communication Skills

Public speaking, Impromptu, Introducing Yourself and Telephone Etiquettes.

Recommended text and Reference Books

1. Richard S. Lazarus and Susan Folkman; Stress, Appraisal and coping ,Springer publication
2. Brian Parkinson, Agneta H. Fisher,Antony S. R. ; Emotion in Social Relations, Cultural, Group and Interpersonal Processes, Manstead Psychology Press
3. Sunita Mishra and C. Muralikrishna ,Communication Skills for Engineers, Pearson Education
4. M. Ashraf Rizvi ,Effective Technical Communication, Tata McGraw Hill
5. Chrissie Wright ,Handbook of Practical Communication Skills, Jaico Publications
6. Robert Baron and Donn Irwin Byron, Social Psychology, Pearson India

Shaheed Bhagat Singh State Technical Campus, Ferozepur

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[Batch 2015 onwards]

BTEC-411A	Web Systems and Technology

Mid-Sem	End-Sem	MM	L	T	P	C
40	60	100	3	0	0	3

Course Objectives:

The purpose of this course is to study the fundamental concepts in web technology and to study the various server side and client side scripting languages.

Course Outcomes:

After undergoing this course students will be able to

I. Understand internet technologies.
II. Work with various scripting languages.
III. Develop web pages in ASP and PHP.
IV. Present data in XML format.

Unit I: Introduction

Understanding websites and web servers, Safe internet surfing, Choosing a web server and service providers, Internet & intranet webhosting, e-commerce, Cybercrime

Unit II: HTML and CSS

HTML, Tags, Text Decoration, Colors, Forms, Tables, Frames, CSS Styling, Responsive CSS Styling

Unit III: JavaScript

An introduction to JavaScript, Function Callback, Objects in JavaScript, Data and Objects, Regular Expressions, Exception Handling, Built-in objects, DHTML with JavaScript.

Unit IV:PHP and XML

Using PHP, Variables, Program control, Built-in functions, Basicsof XML, Document Type Definition, XML Schema DOM and Presenting XML.

Unit V:Database Management System

Benefits of DBMS & Characteristics, Data Types, Relational DBMS design, Entity-Relationship model, Transaction management, Basic concepts of Structured Query Language, SQL functions

Recommended text and Reference Books

1. Stephen Wynkoop, Running a perfect website, QUE, 1999.
2. Chris Bates, Web Programming – Building Intranet applications, Wiley Publications, 2004.
3. Deitel, Deitel& Nieto, Internet and World Wide Web - How to Program, Pearson Education Asia, 2000.
4. Eric Ladd, Jim O' Donnel, Using HTML 4, XML and Java", Prentice Hall of India– QUE, 1999.
5. www.w3schools.org

Note: Atleast one question must be set from each unit/course outcome.

Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Electronics & Communication Engineering

[Batch 2015 onwards]

BTEC-412A	Display Technologies

Mid-Sem	End-Sem	MM	L	T	P	C
40	60	100	3	0	0	3

Course Objectives:

The objective of the course is to give an overview to the students about various display technologies used in the past and present systems.

Course Outcomes:

After undergoing this course students will be able to

I. Understand construction and working of CRT and CRT based display devices
II. Understand construction of various types of LEDs and their pros & cons
III. Familiarize themselves with the 3D displays used for better visualization and virtual reality applications
IV. Acquaint themselves with the recent display technologies

Unit I: Cathode Ray Tube

Block diagram, Working, Electron gun, Electrostatic deflection, monochrome CRT monitor, Coloured CRT monitor, Advantages and disadvantages, Applications

Unit II: Light-Emitting Diode

Working principle, Colours and materials, RGB LEDs, Organic light-emitting diodes (OLEDs), Advantages and Disadvantages of LEDs, Applications

Unit III: Liquid Crystal Displays

Construction and Working Principle of LCD Display, Advantages & disadvantages, Applications, Numeric and alphanumeric displays, Dot matrix displays

Unit IV:3D Display Technologies

Linear Time invariant Systems and their properties. Differential equation & Block diagram representation, Impulse response, Convolution integral, Frequency response (Transfer Function), Fourier transforms analysis.

Unit V:Recent Technologies

Electronic Paper (E-Ink) Displays, Plasma Displays, Working principles of touch screens

Recommended Material Source

1. Wikipedia
2. YouTube
3. Google Search

Note: Atleast one question must be set from each unit/course outcome.

Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Electronics & Communication Engineering

[Batch 2015 onwards]

BTEC-413A	Computer Networks

Mid-Sem	End-Sem	MM	L	T	P	C
40	60	100	3	0	0	3

Course Objectives:

The objective of this course is to present the essential communication Networks concepts, different types of communication models used in communication networks and various protocols used in communication networks.

Course Outcomes:

After undergoing this course students will be able to

I. Understand the importance of data communication and its system components & topologies, internet and analyze the services and features of various layers of data networks & role of protocols in networking.
II. Enumerate the layers of OSI and TCP/IP, explain the function of each layer
III. Analyze the features of various data link and network layer protocols such as HDLC, IPV4, IPV6, ARP, RARP etc. Calculate subnet mask & addresses to fulfil networking requirements.
IV. Familiarize with various principles of routing algorithms & their efficiency and analyze various protocols used at application layer.

Unit I: Introduction

Introduction, Network Topologies, Wired Vs wireless Networks, LAN, MAN, WAN, Internet, Intranet & Extranet, Connection-Oriented and Connectionless Services, Elements of protocols, Need of Protocols & their significance in Networking, TCP/IP reference Model, OSI reference Model ,Comparison of OSI & TCP/IP.

Unit II: Network Protocols

ALOHA (pure ALOHA & Slotted ALOHA), Carrier Sense Multiple Access Protocols (CSMA-CA, CSMA-CD), Data Link Layer services:-Framing, One-Bit Sliding Window Protocol, Protocol Using Go Back N, Protocol Using Selective Repeat, High-Level Data Link Control (HDLC)

Unit III: Routing Algorithms

The Optimality Principle, Shortest Path Routing, Flooding, Distance Vector Routing, Link State Routing, Hierarchical Routing, Broadcast Routing, Multicast Routing, Routing for Mobile Hosts, Routing in Ad Hoc Networks, Node Lookup in Peer-to-Peer Networks

Unit IV: Internetwork Protocols

Internet Protocol & IP Addresses, Principles of Internetworking, Internet Protocol Operation, IPv6, ARP, RARP

Unit V: Application Protocols

Terminal Access: Telnet, File transfer: FTP, Email: SMTP & MIME & POP3, Web Applications: HTTP,DNS

Recommended text and Reference Books

1. William Stallings —Computer Networking with Internet Protocols and Technology‖, Pearson Education.
2. Andrew S. Tanenbaum —Computer Networks‖, PHI
3. Keneth C .Mansfield, Jr. James L. Antonakos — An Introduction to Computer Networking, PHI
4. Behrouz A. Forouzan —Data Communications and Networking, McGraw Hill

Note: Atleast one question must be set from each unit/course outcome.

Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Electronics & Communication Engineering

[Batch 2015 onwards]

BTEC-414A	Engineering Materials

Mid-Sem	End-Sem	MM	L	T	P	C
40	60	100	3	0	0	3

Course Objectives:

The objective of this course is to provide basic understanding of engineering materials and their mechanical, electrical and magnetic properties.

Course Outcomes:

After undergoing this course students will be able to

I. Understand the importance of engineering materials, their classification and types of defects involved in engineering materials.
II. Analyze the various kinds of mechanical properties such as Stiffness, Ductility, Brittleness, Resilience etc. of materials.
III. Analyze the properties and applications of electrical and magnetic materials and factors affecting electrical resistance of materials.
IV. Understand about selection of engineering materials for a particular application on the basis of their properties.

Unit I: Structure of solids

Classification of engineering materials, Structure - property relationship in engineering materials, Crystalline and non- Crystalline materials. Defects: Point, Line and Surface defects.

Unit II: Mechanical properties of materials

Elastic, Inelastic and Viscoelastic materials, Yielding and yield strength, Stiffness, Ductility, Brittleness, Resilience, Toughness, True stress – true strain relationship, Hardness, Shrinkage, Plastic deformation by twinning and slip, Movement of dislocation, Critical shear stress, Strengthening mechanism and creep

Unit III: Electrical and Magnetic Materials

Factors affecting electrical resistance of materials, Superconductivity, Properties and applications of conducting materials, Properties and applications of semi-conducting materials, Properties and applications of insulating materials; Magnetic materials, soft and hard magnetic materials and their applications; Smart materials: sensors and actuators, piezoelectric, magnetostrictive and electrostatic materials

Unit IV: Materials Selection

Overview of properties of engineering materials, Material selection in design based on properties covering timber, aluminium, glass, polymers and ceramics

Recommended text and Reference Books

1. W.D. Callister, Materials Science and Engineering; John Wiley & Sons
2. W.F. Smith, Principles of Materials Science and Engineering: An Introduction; Tata Mc-GrawHill
3. Raghavan, Introduction to Materials Science and Engineering; PHI
4. S. O. Kasap, Principles of Electronic Engineering Materials; Tata Mc-Graw Hill
5. L. H. Van Vlack, Elements of Material Science and Engineering; Thomas Press

Note: Atleast one question must be set from each unit/course outcome.

5^{th} Semester

Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Electronics & Communication Engineering

[Batch 2015 onwards]

BTEC-501A	Digital Signal Processing

Mid-Sem	End-Sem	MM	L	T	P	C
40	60	100	3	1	0	4

Course Objectives:

The objective of this course is to provide knowledge of basic concepts and techniques of digital signal processing. This course will emphasize on insightful understanding and practical implementations of digital filter design, transform-domain processing and importance of Signal Processors.

Course Outcomes:

After undergoing this course students will be able to

I. Understand the fundamentals of digital signal processing, DFT, FFT computation and its properties.
II. Acquire the knowledge of z-transform, discrete LTI systems properties and analysis.
III. Designing of digital filters using different methods.
IV. Develop understanding of architectures of DSP Processors.

UNIT I: Introduction

Basic fundamentals and building block of Digital Signal Processing, Comparison with Analog Signal Processing, Advantages and applications of digital signal processing, Elementary discrete time sequences and operations, Linear and Circular Convolution, Correlation and Autocorrelation, Concepts of discrete time systems: Stability, Causality, Linearity, Difference equations.

DFT: DFT and its properties, Linear filtering methods based on DFT, Relationship between DFT and other transforms, Computation of N-point DFT, Inverse DFT

FFT: Direct computation of DFT, Radix-2 FFT algorithm, Computation of FFT algorithm using decimation in time and decimation in frequency techniques, Goertzel algorithm.

UNIT II: Discrete Time Systems

Review of Z-transform and its properties, Region of convergence, Inverse Z Transform methods, Basic concepts of LTI system and its properties, Response of LTI systems to arbitrary input, LTI systems characterized by linear constant coefficient difference equations, Analysis of LTI system using z- transform, Response of systems with rational system functions, Transient and Steady-state response, Causality and stability, Pole-zero cancellations, Multiple-order poles and stability, Stability of second-order systems.

UNIT III: Design of Digital Filters

Structures of realization of discrete time system: Direct form, Cascade form, Parallel form and Lattice structure of FIR and IIR systems. Linear phase FIR filters, Design methods for FIR filters, IIR filter design by Impulse Invariance, Bilinear transformation, Matched Z-Transformation, Frequency warping effect, Prewarping, Analog and Digital Transformation in the frequency domain, Finite Precision Effects: Fixed point and Floating point representations, Effects of coefficient unitization, Effect of round off noise in digital filters, Limit cycles.

UNIT IV: DSP Processors

Advantages of DSP processors, Architectures of ADSP and TMS series of processors.

Recommended Text and Reference Books

1. John G. Proakis, Dimtris G. Manolakis, Digital Signal Processing Principles, Algorithms and Application, Pearson Prentice Hall.
2. Alan V. Oppenheim, Ronald W. Schafer, John R. Buck, Discrete-Time Signal Processing, Prentice Hall.
3. S. Salivahan, A. Vallavaraj, C. Gnanapriya, Digital Signal Processing, Tata McGraw Hill.
4. S. K. Mitra, Digital Signal Processing-A computer based approach, Tata McGraw Hill
5. Jervis, Digital Signal Processing, Pearson Education India.
6. Johnny R. Johnson, Introduction to Digital Signal Processing, Prentice Hall.

Note: At least one question must be set from each unit/course outcome.

Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Electronics & Communication Engineering

[Batch 2015 onwards]

BTEC-502A	Antenna & Wave Propagation

Mid-Sem	End-Sem	MM	L	T	P	C
40	60	100	3	1	0	4

Course Objectives:

The objective of this course is to provide introduction to antennas, their principle of operation, types of antennas and antenna arrays. The course will make the student acquainted with basics of wave propagation and propagation effects on radio frequencies.

Course Outcomes:

After undergoing this course students will be able to

I. Understand the concept of antenna and its parameters, current distribution of short dipole and half wave dipole.
II. Acquire the knowledge of various types of antenna arrays.
III. Analyze the Field Equivalence principle and various aperture and microstrip antennas.
IV. Develop understanding of wave propagation and concepts of waveguides and transmission lines.

Unit I: Antenna & its parameters

Radiation patterns, Antenna beam area, Antenna beam width, Radiation intensity, Gain, Directive gain, Power gain, Directivity (D), Antenna bandwidth, Effective height, Reciprocity theorem, Self impedance, Mutual impedance, Radiation resistance, Front to back ratio, Antenna temperatures.

Unit II: Linear wire antenna

Concept of radiation in single wire, two wire, and dipole, Retarded potential, Infinitesimal dipole, Current distribution of short dipole and half wave dipole, Far-field, Radiating near-field and reactive near-field region, Monopole and Half wave dipole.

Unit III: Antenna Arrays

Array of two point sources, Array factor, Array configurations, Hansen-woodyard end fire array, n-element linear array with uniform amplitude and spacing, n-element linear array with non-uniform spacing, Analysis of Binomial and Dolph-Tschebysceff array, Scanning Array, Super directive array.

Unit IV: Aperture & Microstrip Antennas

Field Equivalence principle, Rectangular and circular aperture antennas, Horn antenna, Babinet's Principle, Slot Antenna, Reflector antenna, Microstrip Antennas and their advantages, Dielectric effect, Dielectric Loss Tangent-tan δ, Substrates.

Unit V: Wave Propagation

Free space equation, Reflection from earth's surface, Surface and Space wave propagation, Range of space wave propagation, Effective earth's radius, Duct propagation, Troposphere propagation. Structure of ionosphere, Propagation of radio waves through ionosphere, Critical frequency, Maximum usable frequency, Optimum working frequency, Lowest usable high frequency, Virtual height, Skip Distance, Effect of earth's magnetic field.

Unit VI: Waveguides and Transmission Lines

Waves between parallel planes. TE, TM and TEM Waves, Velocities of propagation, Attenuation in parallel plane guides, Wave impedance. Circuit representation of parallel plane transmission lines. Low loss transmission lines. Distortion less condition. Smith charts. Rectangular and circular wave guides. Wave impedance and characteristics impedances. Transmission line analogy for wave guides.

Recommended text and Reference Books

1. C.A Balanis, Antenna Theory, John Wiley & sons.
2. R.L.Yadava, Antenna and wave propagation, PHI.

3. J.D. Krauss, Antenna Theory, McGraw Hill.
4. Liang Chi *Shen*, Jin Au *Kong*, Amalendu *Patnaik,* Engineering Electromagnetics, Cengage Learning.
5. E.C. Jordan, Electromagnetics and radiating systems, PHI.
6. William H Hayt and John A buck, Problem and solutions in electromagnetics, Tata McGraw Hill.

Note: Atleast one question must be set from each unit/course outcome.

Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Electronics & Communication Engineering

[Batch 2015 onwards]

BTEC-503A	Linear Control Systems

Mid-Sem	End-Sem	MM	L	T	P	C
40	60	100	3	1	0	4

Course Objectives:

The objective of this course is to teach fundamental concepts & mathematical modeling of Control systems, analysis of control systems in time and frequency domain along with various stability analysis techniques.

Course Outcomes:

After undergoing this course students will be able to

I. Understand the fundamental concepts of control systems, block diagram representation and signal flow graphs.
II. Analyze control systems in time and frequency domain.
III. Apply stability analysis techniques on control systems.
IV. Develop understanding of compensating networks and various control components.

Unit I: Introductory Concepts

Plant, Systems, Servomechanism, Regulating systems, Disturbances, Open loop control system, Closed loop control systems, Linear and non-linear systems, Time variant and invariant, Continuous and sampled-data control systems, Block diagrams.

Unit II: Modeling

Formulation of equation of linear electrical, mechanical, thermal, pneumatic and hydraulic system, Electrical mechanical analogies. Transfer function, Block diagram representation, Signal flow graphs and associated algebra, Characteristics equation.

Unit III: Time and Frequency Domain Analysis

Typical test - input signals, Transient response of the first and second order systems. Time domain specifications, Steady state error and coefficients, Closed loop frequency response, Frequency response specifications, Relation between time and frequency response for second order systems.

Unit IV: Stability Analysis Techniques

Pole-zero location and stability, Routh-Hurwitz Criterion, Root Locus techniques: The extreme points of the root loci for positive gain. Asymptotes to the loci, Breakaway points, Intersection with imaginary axis, location of roots with given gain and sketch of the root locus plot. Bode plots, Stability and loop transfer function, Relative stability, Log Magnitude versus Phase angle plot, Nyquist criterion for stability.

Unit V: Compensation

Necessity of compensation, Series and parallel compensation, Compensating networks, Applications of lag and lead-compensation.

Unit VI: Control Components

Error detectors: Potentiometers and synchros, Servo motors, A.C. and D.C. tachogenerators, Magnetic amplifiers.

Recommended text and Reference Books

1. Richard C. Dorf and Robert H. Bishop, Modern Control System, Pearson Education, New Delhi.
2. K. Ogata, Modern Control Engineering, Prentice Hall.
3. B. C. Kuo, Automatic Control System, Prentice Hall.
4. I.J. Nagrath and M. Gopal, Control System Engineering, Wiley Eastern Ltd.
5. S. Janardhanan, Yadhuvir Singh, Modern Control Engineering, Cengage Learning.
6. Kilian, Modern Control Technology: Components and Systems, Cengage Learning.

Note: Atleast one question must be set from each unit/course outcome.

Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Electronics & Communication Engineering

[Batch 2015 onwards]

BTEC-504A	Microprocessors and Microcontrollers

Mid-Sem	End-Sem	MM	L	T	P	C
40	60	100	3	1	0	4

Course Objectives:

The objective of the course is to develop an in-depth understanding of the operation of microprocessors and microcontrollers, machine language programming & interfacing techniques. Students will able to interface the microprocessor/microcontroller with the I/O devices to develop simple applications on microprocessor and microcontroller-based systems.

Course Outcomes:

After undergoing this course students will be able to

I. Acquire the knowledge of hardware features, architecture of 8085 and 8086 microprocessor along with instruction set of 8085.
II. Understand the importance of micro-processors and micro-controllers, detailed study of architecture and pin configuration of 8051
III. Interpret the detailed study of programming concepts of 8051 micro-controller, instruction set and various addressing modes of 8051.
IV. Analyze the concept of serial communication and interfacing the external devices with the 8051 Microcontroller and 8085 Microprocessor.

Unit I: Introduction To 8085 Microprocessor

History and evolution of Microprocessors, 8085 Microprocessor, Architecture and pin configuration of 8085, Memory Interfacing, Memory mapped I/O and peripheral mapped I/O 8085, Microprocessor Programming model.
Introduction to 8085 instructions, Addressing modes, Programming techniques, Counters and time delays, Stack and subroutines, Interrupts. 8086 Microprocessor: 8086 Internal architecture, 8086 System configuration and timing, Minimum and maximum mode, Memory segmentation, Address modes.

Unit II: 8051 Microcontroller & its Architecture

Comparison of Microprocessor and Microcontroller, micro controller and embedded processors, Introduction to 8051 architecture and pin configuration of 8051, 8051 flag bits and PSW register, Register banks and stack.

Unit III: 8051 Assembly Language Programming

Introduction to 8051 Assembly programming, Data Types and directives, Jump loop and call instructions, I/O Port programming, Addressing modes and accessing memory using various addressing modes, Arithmetic instructions and programs, Logic instructions and programs, Single bit instructions and programming, 8051 interrupts, Timer/counter programming in the 8051.

Unit IV: Interfacing with External Devices

Introduction to Peripheral devices,8255Programmable Peripheral Interface, 8253 Programmable Interval Timer and 8251, Universal Synchronous Asynchronous Receiver Transmitter (USART)
8051 connection to RS 232, 8051 serial communication programming, Interfacing of 8051 microcontroller- LCD, ADC and DAC, Stepper motor.

Recommended Text and Reference Books

1. R. S. Gaonkar, Microprocessor Architecture, Programming and application with 8085, Penram International Publishing Pvt. Ltd.
2. D.V. Hall, Microprocessors and Interfacing: Programming and hardware, Glencoe Publication.
3. Ali Mazidi, J. G. Mazidi, The 8051 Microcontroller and embedded Systems, Pearson Education.
4. K. J. Ayala, The 8051 Microcontroller, Cengage Learning.

Note: Atleast one question must be set from each unit/course outcome.

Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Electronics & Communication Engineering

[Batch 2015 onwards]

BTEC-511A	Python Programming

Mid-Sem	End-Sem	MM	L	T	P	C
40	60	100	3	0	0	3

Course Objectives:

The Objective of this course is to cover the basic and advanced Python programming to harness its potential for modern computing requirements.

Course Outcomes:

After undergoing this course students will be able to

I. Develop proficiency in creating applications using the Python Programming Language.
II. Understand the various data structures available in Python programming language and apply them in solving computational problems.
III. Draw various kinds of plots using PyLab and test & debug Python code
IV. Understand the data base connection in Python and create GUI applications.

Unit I: Introduction to Python

Introduction, Python basics, Python data variables and its types, operators, id() and Type() functions. Control Structures: if else, else if, Nested if, Iteration Control Structures, Break, Continue and Pass. Data structures: Strings, Tuples, Lists, Sets & Dictionary.

Unit II: Functions

Defining & Calling a function, Passing arguments to functions: Mutable & Immutable Data Types, Different types of arguments, Recursion, Scope of variables, Introduction to Python Tutor.

Unit III: Modules

Standard Library: Math Module, String Module, List Module, Date & Time Module. Regular Expressions: match, search, replace. File Operations: Open, Close, Write, Read. Errors and Exception Handling: try-except-else, try-except, try-finally. Modules and Package.

Unit IV: Introduction to OOC

Need of OO Approach, Classes and Objects, OO Concepts, OO Approach Benefits, UML, UML Diagrams, Class Diagram, Object Oriented Programming: Creating Classes, Instance Variables & Access Specifiers, Methods & Complete Python Program, Importance of self, __init__() method, Instance Methods, Class Methods and Static Methods, Using default parameters in Methods. Relationships, Inheritance, Aggregation, Association.

Unit V: Data Base Programming

Database Connectivity, Retrieving Data from Database, Parameters Passing Execute many Method, Cursor Attributes, Invoke Stored Procedures, Invoke Stored Functions.

Unit VI: GUI and CGI Web Programming

GUI Programming Toolkit, Overview of Tkinter, Visual Tkinter IDE, CGI and Apache Server Configurations, CGI Module and Debugging, CGI Cookies.

Recommended Text and Reference Books

1. John V Guttag, Introduction to Computation and Programming Using Python, Prentice Hall of India.
2. R. Nageswara Rao, Core Python Programming, Dreamtech Press.
3. Magnus Lie Hetland, Beginning Python: From Novice to Professional, Apress publication.
4. Kenneth A. Lambert, Fundamentals of Python – First Programs, Cengage Publication.

Note: Atleast one question must be set from each unit/course outcome.

Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Electronics & Communication Engineering

[Batch 2015 onwards]

BTEC-512A	AC & DC Motors

Mid-Sem	End-Sem	MM	L	T	P	C
40	60	100	3	0	0	3

Course Objectives:

The Objective of this course is to introduce the ECE undergraduates to basic concepts, constructional features and working of DC, AC and Special motors.

Course Outcomes:

After undergoing this course students will be able to

I. Understand the principle of energy conversion.
II. Explain the working principle, construction and applications of DC motors.
III. Explain the working principle, construction and applications of AC motors.
IV. Gain knowledge about the fundamentals of Special motors.

UNIT I: Introduction

Energy conversion principle: Concept of co-energy, Coupling-field reaction for energy conversion, Mechanical work, Mechanical forces and torques in singly and doubly excited systems. Concepts of reluctance and electromagnetic torques. Singly excited electric field systems.

UNIT II: DC Motors

Constructional features and principle of working, Function of the Commutator for motoring and generating action, Types of armature winding, factors determining induced e.m.f., Factors determining electromagnetic torque, Relationship between terminal Voltage and induced e.m.f. for different DC machines, Factors determining Speed of DC motors, Speed control methods, Performance Characteristics of different DC Machines(working as motors and generators), Starting of DC motors and starters, Application of DC motors.

UNIT III: AC Motors

Brief introduction about three phase induction motors, Principle of operation, Types of induction Motors and constructional feature of squirrel cage and slip ring motors, Starting of three phase induction motors: Star Delta and DOL (direct-on-line) starters, Reversal of direction of rotation of three motors, Application of Induction Motors, Introduction of Synchronous Machines, alternators and its principle of operation, Synchronous motors and their applications.

UNIT IV: Special Motors

Single phase synchronous motors, Reluctance motors, Hysteresis motors, Linear induction motor, stepper motors, step angle, variable reluctance stepper motor, Permanent magnet stepper motor, Detent torque, Hybrid stepper motor, Torque-pulse rate characteristics, Applications of stepping motors, Permanent magnet DC motors, printed circuit board motors.

Recommended Text and Reference Books

1. P.S. Bimbhra, Electrical Machinery, Khanna Publications.
2. P.S. Bimbhra, Generalized Theory of Electrical machines, Khanna Publications.
3. Nagrath, I.J. and Kothari, D.P., Basic Electrical Engineering, Tata McGraw Hill.
4. Ashfaq Hussain, Electric Machines, Dhanpat Rai & Co.

Note: Atleast one question must be set from each unit/course outcome.

Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Electronics & Communication Engineering

[Batch 2015 onwards]

BTEC-513A	Information Theory & Coding

Mid-Sem	End-Sem	MM	L	T	P	C
40	60	100	3	0	0	3

Course Objectives:

The objective of this fundamental course is to introduce principles and applications of Information theory and to understand the fundamental limits of communication.

Course Outcomes:

After undergoing this course students will be able to

I. Understand the basic concepts of information theory and calculate the capacity of system with and without noise.
II. Acquaint with various types of waveform coding schemes.
III. Familiarize with various error control codes.
IV. Understand automatic repeat request strategies for flow control.

Unit I: Review of Concepts of Information Theory

The concept of Amount of Information, Average Information, Entropy, Information rate, Shannon's Theorem, Mutual information, Channel capacity**,** BSC and other channels, Capacity of a Gaussian Channel, Bandwidth - S/N Trade-off, Channel Models, Channel Capacity Theorem, Shannon Limit. Huffman source coding algorithm, Lempel Ziv source coding algorithm.

Unit II: Waveform Coding

Review of Base band and band pass sampling concepts, PCM Channel noise and error probability, DPCM and DM Coding speech at low bit rates, Prediction and adaptive filters, Base band shaping for data transmission.

Unit III: Introduction to Error Control Coding

Linear Block Codes: Introduction to Linear Block codes, Syndrome and Error detection, Minimum distance of block code, Hamming Code.

Cyclic Codes: Description of Cyclic codes, Generator and parity check matrices of cyclic codes, Error detection & decoding of cyclic codes.

BCH Codes: Description of codes, Decoding of BCH codes, Implementation of error correction.

Convolutional Codes: Encoding of convolutional codes, Structural properties of Convolutional codes, Distance Properties of convolutional codes.

Viterbi decoding algorithm and trellis codes: Introduction to Viterbi decoding algorithm and trellis codes.

Unit IV: Automatic Repeat Request Strategies

Stop and wait, Go back N and selective repeat ARQ strategies, Hybrid ARQ Schemes.

Recommended Text and Reference Books

1. F.M Reza, Information Theory, McGraw Hill
2. ShuLin & J. Costeib, Error Control Coding, PHI
3. Dass, Mullick & Chatterjee, Digital Communication, John Wiley
4. Robert G. Gallanger, Information Theory and Reliable Communication, McGraw Hill
5. Related IEEE/IEE publications.

Note: Atleast one question must be set from each unit/course outcome.

Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Electronics & Communication Engineering

[Batch 2015 onwards]

BTEC-514A	Modular Electronics

Mid-Sem	End-Sem	MM	L	T	P	C
40	60	100	3	0	0	3

Course Objectives:

This will give exposure to real-world off-the-shelf modular approach to design and implement electronic systems in less time.

Course Outcomes:

After undergoing this course students will be able to

I. Understand what are Arduino boards and how can be used for sensing parameters.
II. Appreciate features and working of Arduino daughter boards for designing versatile gadgets
III. Understand working mechanism of Data Acquisition Card for collecting and analysis of data on computers
IV. Understand features and functionalities of commonly available ready to interface electronic modules for microcontrollers and computers

Unit I: Arduino Boards

Introduction; Datasheet; Features on Board;Arduino Family; Interfacing Sensorsfor measurements of light, temperature, degree of flex, pressure, proximity, acceleration, carbon monoxide, radioactivity, humidity, barometric pressure.

Unit II: Arduino Shields

Motors Controllers, Internet interface, Cellular or other wireless communication, LCD screen interface.

Unit III: Data Acquisition Cards

Introduction; Components of data acquisition systems; Controlling Software & Features: Assembly, C/C++, LabView, MATLAB.

Unit IV: Miscellaneous Modules

RFID Reader Module: Introduction, Protocols, Datasheet; GPS Receiver: Introduction, Datasheet, ZigBee: Features, Datasheet, Protocols, Applications.

Recommended Text and Reference Books

1. Michael McRoberts, Beginning Arduino, APress
2. Marco Schwartz, Internet of Things with the Arduino Yun, Packt Publishing
3. Website for Datasheets - https://www.sparkfun.com/
4. Fundamental Knowledge -https://en.wikipedia.org

Note: Atleast one question must be set from each unit/course outcome.

Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Electronics & Communication Engineering

[Batch 2015 onwards]

BTEC-505A	Lab Digital Signal Processing

Mid-Sem	End-Sem	MM	L	T	P	C
30	20	50	0	0	2	1

Course Objectives:

The main aim of this course is to provide hands-on experience of MATLAB software to students to understand and implement various DSP transforms and filters.

Course Outcomes:

After undergoing this course students will be able to

I. Understand the MATLAB software by making m-files for signal generation and operations.
II. Design programs for computation of DFT, IDFT.
III. Design programs for analysis of LTI system and Z-transform.
IV. Design FIR and IIR filters using MATLAB software.

List of Experiments:

1. To develop elementary signal function modules (m-files) for unit sample, unit step, exponential and unit ramp sequences.
2. Write a program in MATLAB to generate the sinusoidal signal of given frequency demonstrating the signal reconstruction from samples.
3. Write a program in MATLAB to compute power density spectrum of a sequence.
4. To develop program modules based on operation on sequences like signal shifting, signal folding, signal addition and signal multiplication.
5. Write a program in MATLAB to verify linear convolution.
6. Write a program in MATLAB to verify the circular convolution.
7. To develop program for computing DFT and IDFT.
8. To develop program for finding magnitude & phase response of LTI system described by system function H (z).
9. To develop program for finding response of the LTI system described by the difference equation.
10. To develop program for computing inverse Z-transform.
11. To develop program for conversion of direct form realization to cascade form realization.
12. To develop program for cascade realization of IIR and FIR filters.
13. To develop program for designing FIR filter.
14. To develop program for designing IIR filter.
15. To write a MATLAB programs for pole-zero plot, amplitude, phase response and impulse response from given transfer function of a discrete-time causal system.
16. Write a program in MATLAB to find frequency response of different types of digital filters.
17. Write a program in MATLAB to design FIR filter (LP/HP) through Window technique
    a. Using rectangular window b. Using triangular window
18. To write a MATLAB program for noise reduction using correlation and autocorrelation methods.

Important Note: From above given list at least 12 experiments will be performed by the students in a group of maximum three in the laboratory.

Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Electronics & Communication Engineering

[Batch 2015 onwards]

BTEC-506A Lab Microprocessors & Microcontrollers

Mid-Sem	End-Sem	MM	L	T	P	C
30	20	50	0	0	2	1

Course Objectives:

The main aim of this course is to make the students familiar with microprocessor and microcontroller Programming and their applications.

Course Outcomes:

After undergoing this course students will be able to

I. Familiarize with the 8085/8086Microprocessor and8051/8031Micro controller kits.
II. Knowledge of 8085 instruction set and ability to utilize it in assembly language programming.
III. Understand the programming and application of Microcontrollers.
IV. Know how to Interface various devices to 8085 and 8051.

LIST OF EXPERIMENTS

Part-A: List of Experiments using 8085:

1. Study of 8085 and 8086 Microprocessor Kits.
2. Write a program to add two 8-bit number using 8085.
3. Write a program to add two 16-bit number using 8085.
4. Write a program to subtract two 8-bit number using 8085.
5. Write a program to subtract two 16-bit number using 8085.
6. Write a program to multiply two 8 bit numbers by repetitive addition method using 8085.
7. Write a program to sort series using bubble sort algorithm using 8085.
8. Write a program to copy 12 bytes of data from source to destination using 8085.
9. Write a program to find maximum and minimum from series using 8085.
10. Write a program to control speed of DC motor using 8085 microprocessors and 8255 PPI.

Part-B: List of Experiments using 8051:

1. Study of 8051/8031 Micro controller kits.
2. Write a program to add two numbers lying at two memory locations and display the result.
3. Write a program for multiplication of two numbers lying at memory location and display the result.
4. Write a Program to arrange 10 numbers stored in memory location in ascending and descending order.
5. Write a program to convert packed BCD to two ASCII numbers.
6. Write a program to show the use of INT0 and INT1.
7. Write a program of Flashing LED connected to port 1 of the Micro Controller
8. Write a program to generate a Ramp waveform using DAC with micro controller.
9. Write a program to interface the ADC.
10. Write a program to control a stepper motor in direction, speed and numbers of steps.

Important Note:

From above given list at least 15 experiments will be performed by the students in a group of maximum three in the laboratory.

Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Electronics & Communication Engineering

[Batch 2015 onwards]

BTHU-501A	Professional Skills -III

Mid-Sem	End-Sem	MM	L	T	P	C
30	20	50	0	0	2	1

Course Objectives:

The objective of this course is to enhance student's ability to work in team, sharpen verbal and spatial ability. This course will develop oral and written communication skills of the students.

Course Outcomes:

After undergoing this course students will be able to

I. Understand nuances of group dynamics and team-work and also to develop ability for effective conflict management.
II. Sharpen and demonstrate Verbal Ability, Spatial Ability and Memory skills.
III. Understand the linkage between attitude and behaviour and its role in professional and personal well-being.
IV. Develop and demonstrate oral and written communication skills such as Oral presentations, Group discussion, Resume writing, job application writing and email writing.

Unit I: Concepts of Groups and Teams

Groups and Group dynamics, Group cohesiveness, Compliance and conformity. Team building, Team work, Conflict: types and resolutions.

Unit II:Mental Abilities

Verbal Ability, Spatial Ability, Memory.

Unit III: Attitude

Meaning of attitude, Link between attitude and behavior, Persuasion, Attitude towards work environment, Work-force diversity, Significance of Happiness, Optimism, Well-being.

Unit IV: Communication Skills

Job Application Writing, Resume Writing, email writing, Group Discussion, Power Point Presentation.

Recommended Text and Reference Books

1. Stephen Robbins, Organizational Behaviour, Pearson Education
2. C. R. Snyder and Shane J. Lopez, Jennifer Teramoto Pedrotti, Positive Psychology: The Scientific and Practical Explorations of Human Strengths, Sage Publications.
3. Robert Baron and Donn Irwin Byron, Social Psychology, Prentice Hall India.
4. Chrissie Wright, Handbook of Practical Communication Skills, Jaico Publications, Mumbai.
5. M. Ashraf Rizvi, Effective Technical Communication, Tata McGraw Hill.
6. Shirley Taylor, Model Business Letters, E-mails & Other Business Documents, Pearson Education.
7. Sunita Mishra and C. Muralikrishna, Communication skills for Engineers, Pearson Education.

Note: At least one question must be set from each unit/course outcome.

6^{th} Semester

Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Electronics & Communication Engineering

[Batch 2015 onwards]

BTHU-602A	Human Resource Management

Mid-Sem	End-Sem	MM	L	T	P	C
40	60	100	3	1	0	4

Course Objectives:

This course introduces the management of an organization's workforce through the design and implementation of effective human resources policies and procedures. The students will also be made familiar with the problems of HRM, their causes and required action plans to solve the problems.

Course Outcomes:

After undergoing this course students will be able to

I. Understand the meaning of Human Resource Management, its nature scope, Significance in an organization.
II. Understand the key terms and concepts within the field of Human Resource Management.
III. Understand and explain theories and practices within the field of human resource management.
IV. Develop knowledge and understanding of primary organizational behavior concepts.
V. Describe the significance of legal enactments in HR practices and the management of people in the workplace.

Unit I: Introduction

Introduction to Human Resource Management and its definition, functions of Human Resource Management & its relation to other managerial functions. Nature, Scope and Importance of Human Resource Management in Industry, Role & position of Personnel function in the organization.

Unit II: Procurement and Placement

Need for Human Resource Planning, Process of Human Resource Planning, Methods of Recruitment, Psychological tests and interviewing, Meaning and Importance of Placement and Induction, Employment Exchanges (Compulsory Notification of vacancies) Act 1959, The Contract Labour (Regulation & Abolition) Act 1970.

Unit III: Training & Development

Difference between Training and Development, Principles of Training, Employee Development, Promotion-Merit v/s seniority Performance Appraisal, Career Development & Planning.

Unit IV: Job analysis & Design

Job Analysis: Job Description & Job Description, Job Specification.

Unit V: Job Satisfaction

Job satisfaction and its importance, Motivation, Factors affecting motivation, introduction to Motivation Theory, Workers, Participation, Quality of work life.

Unit VI: The Compensation Function

Basic concepts in wage administration, company's wage policy, Job Evaluation, Issues in wage administration, Bonus & Incentives, Payment of Wages Act-1936, Minimum Wages Act-1961.

Unit VII: Integration

Human Relations and Industrial Relations, Difference between Human Relations and Industrial Relations, Factors required for good Human Relation Policy in Industry, Employee Employer relationship Causes and Effects of Industrial disputes, Employees Grievances & their Redressal, Administration of Discipline, Communication in organization, Absenteeism, Labour Turnover, Changing face of the Indian work force and their environment, Importance of collective Bargaining, Role of trader unions in maintaining cordial Industrial Relations.

Unit VIII: Maintenance

Fringe & retirement terminal benefits, administration of welfare amenities, Meaning and Importance of Employee Safety, Accidents-Causes & their Prevention, Safety Previsions under the Factories Act 1948, Welfare of Employees and its Importance, Social security, Family Pension Scheme, ESI act 1948, Workmen's Gratuity Act 1972, Future challenges for Human Resource Management.

Recommended Text and Reference Books

1. T.N.Chhabra- Human Resource Management, Dhanpat Rai & Co.
2. Lowin B. Flippo, Principles of personnel Management, Mc Graw-Hill.
3. R.C. Saxena, Labour Problems and social welfare, K.Math & Co.
4. A Minappa and M. S. Saiyada, Personnel Management, Tata Mc. Graw-Hill.
5. C.B. Mamoria, Personnel Management, Himalaya Publishing House, Bombay.
6. T.N. Bhagotiwal, Economics of Labour and Industrial Relations, Sahitya Bhawan Agra.

Note: Atleast one question must be set from each unit/course outcome.

Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Electronics & Communication Engineering

[Batch 2015 onwards]

BTEC-601A	VLSI Design

Mid-Sem	End-Sem	MM	L	T	P	C
40	60	100	3	1	0	4

Course Objectives:

This course offers a profound understanding of the design of digital VLSI circuits & systems, computer aided simulation and synthesis tool for hardware design.

Course Outcomes:

After undergoing this course students will be able to

I. Recognize various VHDL keywords and statements.
II. Design combinational circuits based on various design approaches in VHDL.
III. Design sequential circuits based on various design approaches in VHDL
IV. Implement circuits using ROM & PLDs and know the basics of FPGA and CPLD.

Unit I: Introduction

Introduction to Computer-aided design tools for digital systems. Hardware description languages, Introduction to VHDL, Data objects, Classes and data types, Operators, Overloading, Logical operators, Types of delays, Entity and Architecture declaration, Introduction to behavioural, Dataflow and structural models.

Unit II: VHDL Statements

Assignment statements, Sequential statements and process, Conditional statements, Case statements, Array and loops, Resolution functions, Packages & Libraries, Concurrent statements.

Unit III: Combinational Circuit Design

VHDL models and simulation of combinational circuits: Multiplexers, Demultiplexers, Encoders, Decoders, Code converters, Comparators, Implementation of Boolean functions.

Unit IV: Sequential Circuit Design

VHDL Models and simulation of sequential circuits: Flip-flops, Shift registers, Counters.

Unit V: Programmable logic devices

ROM, PLAs, PALs, CPLDs and FPGA, Implementation using ROM and PLDs.

Recommended Text and Reference Books

1. Neil H. E. Weste, Principles of CMOS VLSI Design, Pearson Education.
2. Kohavi, Switching & Finite Automata Theory, TMH.
3. Samuel C. Lee, Digital Circuits and Logic Design, PHI Learning.
4. Jr. Charles H. Roth, Larry L Kinney, Fundamentals of Logic Design, Jaico Publishing House.
5. Parag K. Lala, Fault Tolerant and Fault Testable Hardware Design, BS Publications.

Note: Atleast one question must be set from each unit/course outcome.

Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Electronics & Communication Engineering

[Batch 2015onwards]

BTEC-602A	Microwave & Radar Engineering

Mid-Sem	End-Sem	MM	L	T	P	C
40	60	100	3	1	0	4

Course Objectives:

The primary objective is to familiarize the student with microwave components & devices. This course will also introduce the basic concepts of Radar and various tracking & scanning techniques.

Course Outcomes:

After undergoing this course students will be able to

I. Understand the operation of various microwave tubes and solid state devices such as Diodes and Transferred Electron devices.
II. Acquire knowledge of different microwave components such as Tees, Couplers & ferrite devices.
III. Develop understanding of measurement of power, frequency and VSWR.
IV. Understand the basic principle of RADAR, its types and have comprehensive knowledge of various scanning and tracking techniques.

Unit I: Microwave Tubes and Microwave Solid State Devices

Limitations of conventional tubes, multi cavity, construction, operation and properties of Klystron Amplifier, reflex Klystron, Magnetron, Travelling Wave Tube (TWT), Backward Wave Oscillator (BWO), Crossed field amplifiers.
Limitations of conventional solid state devices at Microwaves, Transistors (Bipolar, FET), Diodes (Tunnel, Varactor, PIN), Transferred Electron Devices (Gunn diode), Avalanche transit time effect (IMPATT, TRAPATT, SBD), Microwave Amplification by Stimulated Emission of Radiation (MASER).

Unit II: Microwave Components

Analysis of Microwave components using s-parameters, Junctions (E, H, Hybrid), Directional coupler, Bends and Corners, Microwave posts, S.S. tuners, Attenuators, Phase shifter, Ferrite devices (Isolator, Circulator, Gyrator), Cavity resonator, Matched termination.

Unit III: Microwave Measurements

Power measurements using calorimeters and bolometers, Measurement of Standing Wave Ratio (SWR), Frequency and wavelength, Microwave bridges.

Unit IV: Introduction to Radar Systems and its types

Basic Principle, Block diagram and operation of Radar, Radar range Equation, Pulse Repetition Frequency (PRF) and Range Ambiguities, Applications of Radar, Doppler Radars, Doppler determination of velocity, Continuous Wave (CW) radar and its limitations, Frequency Modulated Continuous Wave (FMCW) radar, Basic principle and operation of Moving Target Indicator (MTI) radar, Delay line cancellers, Blind speeds and staggered PRFs.

Unit V: Scanning and Tracking Techniques

Various scanning techniques (Horizontal, vertical, spiral, palmer, raster, nodding), Angle tracking systems (Lobe switching, conical scan, monopulse), Range tracking systems, Doppler (velocity) tracking systems.

Recommended Text and Reference Books

1. Samuel Liao, Microwave devices and circuits, PHI.
2. M. Kulkarni, Microwave devices and Radar Engg., Umesh Publications.
3. Merill I. Skolnik, Introduction to radar systems, McGraw Hill.
4. R.E. Collin, K.C Gupta, Foundation of Microwave Engg., McGraw Hill.

Note: Atleast one question must be set from each unit/course outcome.

Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Electronics & Communication Engineering

[Batch 2015 onwards]

BTEC-603A — Wireless & Mobile Communication

Mid-Sem	End-Sem	MM	L	T	P	C
40	60	100	3	1	0	4

Course Objectives:

The primary objective of this course is to familiarize the students with the principles of wireless communication systems & technologies and impart knowledge of different generations of wireless standards.

Course Outcomes:

After undergoing this course students will be able to

I. Understand operation of various types of wireless systems.
II. Develop understanding of elements necessary for designing a cellular radio system.
III. Know about effect of fading on digital communication and develop knowledge of different combining methods to overcome effect of fading.
IV. Have knowledge of various multiple access techniques.
V. Acquire knowledge of features and specifications of various generations of wireless standards.

Unit I: Introduction

History of wireless communication, Examples of Wireless Communication Systems: Paging Systems, Cordless Telephone Systems, Cellular Telephone Systems, A basic cellular system, Performance criteria, Operation of cellular systems, Planning a cellular system, Bluetooth and ZigBee.

Unit II: Fundamentals of Cellular Radio System Design

General description of the problem, Concept of frequency reuse channels, Co-channel interference reduction factor, Desired C/I from a normal case in an omni-directional antenna system, Cell splitting, Cell sectoring, Handoff strategies, Consideration of the components of cellular systems.

Unit III: Digital Communication through Fading Multipath Channels

Fading channel and their characteristics, Channel modeling, Digital signaling over a frequency non selective slowly fading channel. Concept of diversity branches and signal paths, RAKE Receiver, Combining methods: Selective diversity combining, Switched combining, Maximal ratio combining, Equal gain combining. Multiple input multiple output (MIMO).

Unit IV: Multiple Access Techniques for Wireless Communications

Introduction, Frequency Division Multiple Access (FDMA), Time Division Multiple Access (TDMA), Orthogonal Frequency division Multiple Access and Multiplexing**,** Spread Spectrum Multiple Access, Space Division Multiple Access, Packet Radio Protocols: Pure ALOHA, Slotted ALOHA.

Unit V: Wireless Systems & Standards

AMPS and ETACS, United states digital cellular (IS- 54 & IS 136).Global system for Mobile (GSM): Services, Features, System Architecture, Channel Types, Frame Structure for GSM, Speech Processing in GSM. CDMA Digital standard (IS 95): Frequency and Channel specifications, Forward CDMA Channel, Reverse CDMA Channel. GPRS/EDGE specifications and features. 3G systems: UMTS & CDMA 2000 standards and specifications, 4G mobile techniques, Comparison of 2G, 3G and 4G. Future trends: 5G mobile techniques.

Recommended Text and Reference Books

1. T.S.Rappaport, Wireless Communications: Principles and Practice, Pearson Education Asia.
2. William C Y Lee, Mobile Cellular Telecommunications, MGH.
3. Raj Pandya, Mobile and Personal Communication systems and services‖, Prentice Hall of India.
4. Kamilo Feher, Wireless and Digital Communications, Prentice Hall of India.

Note: Atleast one question must be set from each unit/course outcome.

Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Electronics & Communication Engineering

[Batch 2015 onwards]

BTEC-611A Relational Database Management System

Mid-Sem	End-Sem	MM	L	T	P	C
40	60	100	3	0	0	3

Course Objectives:

This course offers a good understanding of basic and advanced database systems concepts and prepares the student to be in a position to use and design databases for different applications.

Course Outcomes:

After undergoing this course students will be able to

I. Describe DBMS architecture, physical and logical database designs, database modeling, relational, hierarchical and network models.
II. Understand and apply Relational Model in Database design, Structured query language (SQL) for database definition and database manipulation.
III. Understand different transaction processing concepts and use different concurrency control techniques.
IV. Understand different types of databases such as object oriented and distributed databases.
V. Understand different types of database failures and techniques to recover from such failures.

UNIT I: Introduction to Database Systems

File Systems Versus a DBMS, Advantages of a DBMS, Describing and Storing Data in a DBMS, Database System Architecture, DBMS Layers, Data independence.

UNIT II: Data and Relational Models

Relational Model, Network Model, Hierarchical Model, ER Model: Entities, Attributes and Entity Sets, Relationships and Relationship Sets, Constraints, Weak Entities, Class Hierarchies, Aggregation, Conceptual Database Design with the ER Model, Comparison of Models. The Relational Model: Introduction to the Relational Model, ER to Relational Model Conversion, Integrity Constraints over Relations, Enforcing Integrity Constraints, Relational Algebra, Relational Calculus, Querying Relational Data.

UNIT III: Relational Query Languages

Basic SQL Query, Creating Table and Views, SQL as DML, DDL and DCL, SQL Algebraic Operations, Nested Queries, Aggregate Operations, Cursors, Dynamic SQL, Integrity Constraints in SQL, Triggers and Active Database, Relational Completeness, Basic Query Optimization Strategies, Algebraic Manipulation and Equivalences.

UNIT IV: Database Design

Functional Dependencies, Reasoning about Functional Dependencies, Normal Forms, Schema Refinement, First, Second and Third Normal Forms, BCNF, Multi-valued Dependency, Join Dependency, Fourth and Fifth Normal Forms, Domain Key Normal Forms, Decompositions.

UNIT V: Transaction Management

ACID Properties, Serializability, Two-phase Commit Protocol, Concurrency Control, Lock Management, Lost Update Problem, Inconsistent Read Problem , Read-Write Locks, Deadlocks Handling, 2PL protocol.

UNIT VI: Object Oriented and Object Relational Databases

Object Oriented Concepts, Object Oriented Data Model, Object Definition Language, Object Query Language, Object Relational Systems, SQL3, ORDBMS Design.

UNIT VII: Distributed Databases

Distributed Database Concepts, Advantages and Disadvantages, Types of Distributed Database Systems, Data Fragmentation, Replication and Allocation Techniques for Distributed Database Design, Five Level Schema Architecture, Query Processing, Concurrency Control and Recovery in Distributed Databases.

UNIT VIII: Backup and Recovery

Types of Database Failures, Types of Database Recovery, Recovery Techniques: Deferred Update, Immediate Update, Shadow Paging, Checkpoints, Buffer Management.

Recommended Text and References Books:

1. Ramez Elmasri, Shamkant Navathe, Fundamentals of Database Systems, Pearson Education.
2. C.J. Date, An Introduction to Database Systems, Pearson Education.
3. Alexis Leon, Mathews Leon, Database Management Systems, Leon Press.
4. S. K. Singh, Database Systems Concepts, Design and Applications, Pearson Education.
5. Raghu Ramakrishnan, Johannes Gehrke, Database Management Systems, Tata McGraw-Hill.
6. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, Database System Concepts, Tata McGraw Hill.
5. S. K. Singh, Database Systems Concepts, Design and Applications, Pearson Education.
6. Chris Eaton, Paul Zikopoulos, Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data.

Note: Atleast one question must be set from each unit/course outcome.

Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Electronics & Communication Engineering

[Batch 2015 onwards]

BTEC-612A Electronics Measurement & Instrumentation

Mid-Sem	End-Sem	MM	L	T	P	C
40	60	100	3	0	0	3

Course Objectives:

The objective of this course is to introduce students to the use of various electrical/electronic instruments, their construction, applications, and principles of operation and standards of measurements. This course will provide the opportunities to the students to develop basic skills in the design of electronic equipments.

Course Outcomes:

After undergoing this course students will be able to

I. Understand the significance of measurement system, their use, peculiar errors associated with the instruments and ways to minimise such errors.
II. Identify and understand various types of electronic meters and principle of operation of various measuring instruments.
III. Have acquaintance about waveform analyzer, signal generator and wave generator.
IV. Understand the use of different storage and display devices.
V. Familiarize with transducers and telemetry.

Unit I: Fundamentals

Generalized instrumentation system (Units and Standards), Calibration Methods, Standards of measurements, Classification of errors, error analysis, Static Characteristics and Dynamic Characteristics.

Unit II: Electronic Meters and Measuring Instruments

Electronic Analog voltmeter: DC voltmeters- solid state voltmeter, Differential voltmeter, peak responding voltmeter, True RMS voltmeter, calibration of DC voltmeters.

Digital Voltmeter: Introduction, general specifications and Resolution & sensitivity of digital meters. CRO: Introduction, measurement of voltage, current, phase and frequency, Digital storage oscilloscope (DSO).

Measuring Instruments: Principle of operation of galvanometer, PMMC, Moving Iron instruments, Resistance measurements using Wheatstone bridge, Kelvin Double Bridge, Ohm meter, AC bridges: Maxwell bridge, Maxwell wein bridge, Schering Bridge, Anderson Bridge, Campbell Bridge.

Unit III: Instrumentation for Generation and Analysis of Waveforms

Signal generators: Fixed and variable AF oscillators, AF sine and square wave generator, Function generator: Square and pulse generator, Sweep generator, wave analyzer, harmonic distortion analyzer, spectrum analyzer, spectrum analysis.

Unit IV: Storage and Display Devices

Necessity of recorders, recording requirements, graphic recorders, strip chart recorders, magnetic tape recorders, digital tape recorders.

Electronic indicating instruments: LED, LCD as display units, seven segment display, fourteen segmental display & dot matrix display, Nixie tube display.

Unit V: Transducers and DATA Acquisition Systems

Strain gauge, LVDT, thermocouple, piezoelectric, crystal and photoelectric transducers and their applications. Data acquisition systems.

Unit VI: Telemetry

Introduction, method of data transmission, types of telemetry systems and applications.

Recommended Text and Reference Books

1. A K. Sawney, Electrical and Electronic Measurements and Instrumentation, Dhanpat Rai & Co.
2. Helfrick Albert D., William D. Cooper, Modern Electronic Instrumentation and Measurement Techniques, PHI.
3. H.S. Kalsi, Electronic Instrumentation, Tata McGraw Hill.

4. David Buchla, Wayne Melachlan, Applied Electronics Instrumentation and measurement.
5. Bernard M. Oliver & John M. Cage, Electronic Measurements and Instrumentation, McGraw-Hill.
6. K. Lal Kishore, Electronic Measurments & Instrumentation, Pearson Education.
7. Bartelt, Process Control Systems and Instrumentation, Cengage Learning.

Note: Atleast one question must be set from each unit/course outcome.

Shaheed Bhagat Singh State Technical Campus, Ferozepur

Department of Electronics & Communication Engineering

[Batch 2015 onwards]

BTEC-613A	Satellite Communication

Mid-Sem	End-Sem	MM	L	T	P	C
40	60	100	3	0	0	3

Course Objectives:

This course presents the fundamentals of satellite communications link design and an in-depth knowledge of practical considerations. After going through this course they will have better understanding of unique challenges of designing, developing and operating satellite communications systems.

Course Outcomes:

After undergoing this course students will be able to

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

Unit I: Introduction to Satellite Communication

Evolution and growth of communication satellite, Advantages of satellite communication, Active & Passive satellite, Orbital aspects and their effects on satellite communications.

Unit II: Satellite Link Design

Basic transmission theory, Link design equation, System noise temperature, C/N & G/T ratio, Atmospheric & ionospheric effects on link design, Uplink design, Complete link design, Interference effects on complete link design, Earth station parameters, Earth space propagation effects, Frequency window, Free space loss, Atmospheric absorption, Rainfall Attenuation, Ionospheric scintillation, Telemetry, Tracking and command of satellites.

Unit III: Fixed and Demand Assignment Multiple Access Systems

FDMA techniques, SCPC & CSSB systems, TDMA frame structure, Burst structure, Frame efficiency, Super-frame, Frame acquisition & synchronization, TDMA vs FDMA, Burst time plan, Beam hopping, Satellite switched, Erlang call congestion formula, DA-FDMA, DA-TDMA.

Unit IV: Special Purpose Communication Satellites

INTELSAT, INSAT Series, VSAT, Weather forecasting, Remote sensing, LANDSAT, Satellite Navigation, Mobile satellite Service, Defence satellites.

Unit V: Laser Satellite Communication and CATV System

Link analysis, Optical satellite link Tx & Rx, Satellite beam acquisition, Tracking & pointing, Cable channel frequency, Head end equation, Distribution of signal, Network specifications and architecture, Optical fibre CATV system.

Recommended Text and Reference Books

1. Trimothy Pratt, Charles W. Bostian, Satellite Communications, John Wiley & Sons.
2. Dr. D.C. Aggarwal, Satellite Communications, Khanna Publishers.
3. Dennis Roddy, Satellite Communications, McGraw Hill.
4. K.N. Raja Rao, Fundamentals of Satellite Communications, Prentice Hall India Learning Private Limited.

Note: Atleast one question must be set from each unit/course outcome.

Shaheed Bhagat Singh State Technical Campus, Ferozepur

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[Batch 2015 onwards]

BTEC-614A	PIC & ARM Processor

Mid-Sem	End-Sem	MM	L	T	P	C
40	60	100	3	0	0	3

Course Objectives:

The objective of this course is to understand the evolution in microcontroller technology and get comprehensive knowledge on ARM and PIC programming.

Course Outcomes:

After undergoing this course students will be able to

I. Understand the PIC microcontroller architecture and write the assembly language programs.
II. Understand and write the PIC I/O programming.
III. Gain in-depth knowledge about ARM processor architecture and write the assembly language & C programs.
IV. Write ARM I/O programs.

Unit I: PIC Architecture

Introduction to PIC microcontrollers, PIC architecture, comparison of PIC with other CISC and RISC based systems and microprocessors, memory map, assembly language programming, addressing modes, instruction set.

Unit II: PIC I/O Programming

PIC I/O ports, I/O bit manipulation programming, timers/counters, programming to generate delay and waveform generation, I/O programming, LEDs, 7 segment, LCD and Keypad interfacing.

Unit III: ARM Processor

ARM processor family, Application of ARM Processor, The Acorn RISC machine**,** Architectural inheritance, The ARM programmer's model, ARM development tools, Memory System Architecture, Memory types: FLASH Memory, DRAM, Memory map, Registers and addresses.

Unit IV: ARM Programming

Programmer's model and instruction set, ARM Data processing instructions, Data transfer instructions, Control flow instructions, Conditional execution, ARM Condition codes, Software interrupt (SWI), Multiply instructions, 3-stage pipeline ARM organization, 5-stage pipeline ARM organization, Understanding of ARM instruction execution, Exceptions in ARM, Introduction to Embedded C of ARM microcontroller, Development Tools.

Unit V: I/O Devices of ARM processor

General purpose I/O, Timers and counters, Watchdog timer, PWM device, Interrupt controllers, A/D and D/A converters, Serial communication devices.

Recommended Text and Reference Books

1. Michael J. Pont, Embedded C, Addison-Wesley.
2. Ken Arnold, Embedded Controller Hardware Design, Newnes.
3. Steve Furber, ARM: System-on-Chip Architecture, Addison-Wesley.
4. Richard H. Barnet, Sarah Cox, Larry O'Cull, Embedded C Programming and the Atmel AVR, Delmar Learning.
5. Milan verle, PIC microcontrollers- Programming in C, Mikroelectronika.
6. Chuck Hellebuyck, Programming PIC microcontrollers with PicBasic, Newnes.

Note: Atleast one question must be set from each unit/course outcome.

Shaheed Bhagat Singh State Technical Campus, Ferozepur

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[Batch 2015 onwards]

BTEC-604A	Lab Microwave Engineering

Mid-Sem	End-Sem	MM	L	T	P	C
30	20	50	0	0	2	1

Course Objectives:

The main aim of this course is to make the students familiar with basic of microwave components and instruments to understand their working and limitations for use in various applications.

Course Outcomes:

After undergoing this course students will be able to

I. Understand and verify the characteristics of microwave tubes.
II. Study and Measure characteristic parameters of microwave waveguides.
III. Explore the VI characteristics of Gunn Diode.

List of Experiments:

1. Study of microwave components and instruments.
2. Analytical analysis of the characteristics of the Reflex Klystron tube.
3. To study and determine the frequency and different modes of a Reflex Klystron tube.
4. To determine the frequency and wavelength of a rectangular waveguide.
5. To determine the standing wave ratio and reflection coefficient.
6. To determine the unknown impedance.
7. To measure the Dielectric constant.
8. To measure the Q of a cavity.
9. To study the V-I characteristics of Gunn Diode.
10. To study the Microwave antennas.

Important Note:

1. From above given list at least 8 experiments will be performed by the students in a group of maximum three in the laboratory

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[Batch 2015 onwards]

BTEC-605A	Lab VLSI Design

Mid-Sem	End-Sem	MM	L	T	P	C
30	20	50	0	0	2	1

Course Objectives:

The objective of this course is to make the students understand the use of VHDL statements and syntax for implementation and designing digital circuits in VHDL.

Course Outcomes:

After undergoing this course students will be able to:

I. Write VHDL codes of combinational and sequential digital circuits.
II. Simulate combinational and sequential digital circuits.
III. Verify the truth tables of combinational and sequential digital circuits.

List of Experiments:

Combinational Design Exercises

1. Design of AND, OR, XOR Gates
2. Design of 4:1 MUX using other basic gates
3. Design of 3 to 8 Decoder
4. Design of Half-Adder, Full Adder, Half Subtractor, Full Subtractor
5. Design of 8:3 Priority Encoder
6. Design of 4 Bit Binary to Grey code Converter
7. Design of 1's and 2's complementing circuit.

Sequential Design Exercises

8. Design of all type of Flip-Flops
9. Design of 8-Bit Shift Register with shift Right, Shift Left, Load and Synchronous reset.
10. Design of Synchronous 8-bit Johnson Counter.
11. Design of Synchronous 8-Bit universal shift register (parallel-in, parallel-out)
12. Design of 4 Bit Binary to BCD Converter using sequential statement.
13. Design of Mod 5, Mod 8, Mod 16 Counter and 4 bit Johnson counter
14. Design of decimal up/down counters that counts up from 00 to 99 or down from 99 to 00.

Important Note:

From above given list at least 10 experiments will be performed by the students in a group of maximum three in the laboratory.

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[Batch 2015 onwards]

BTHU-601A	Professional Skills – IV

Mid-Sem	End-Sem	MM	L	T	P	C
30	20	50	0	0	2	1

Course Objectives:

This fundamental course will enhance the leadership qualities in the students and build confidence to be a phenomenal speaker. This will develop competency in students to participate actively in oral and written activities that model effective scientific and technical communication in the workplace.

Course Outcomes:

After undergoing this course students will be able to

I. Understand implications of varied aspects of Motivation and its assessment.
II. Understand and imbibe leadership skills and various styles of leadership.
III. Sharpen and demonstrate problem solving abilities, logical reasoning skills, verbal and numerical reasoning, Pictorial comparison, shapes and symbols
IV. Develop and Demonstrate oral and written communication Skills such as Negotiation Skills, Meeting Skills, Interview Skills, Report Writing.

Unit I: Motivation

Introduction to Motivation, Relevance and Intrinsic and Extrinsic Motivation, Achievement motivation, Assessment of Motivation.

Unit II: Leadership

Characteristics of a good leader. Styles of leadership (Transformational, Transactional, Charismatic).

Unit III: Aptitude

Meaning and measurement, problem solving abilities, logical reasoning skills, verbal and numerical reasoning, Pictorial comparison, shapes and symbols.

Unit IV: Communication Skills

Report Writing, Negotiation Skills, Meeting Skills, Interview Skills.

Recommended Text and Reference Books

1. Stephen Robbins, Organizational Behaviour, Pearson Education.
2. Fred Luthans, Organizational Behaviour, Tata McGraw Hill.
3. David A.McMurrey and Joanne Buckley, Handbook of Technical Writing, Cengage Learning.
4. Chrissie Wright, Handbook of Practical Communication Skills, Jaico Publications, Mumbai.
5. M. Ashraf Rizvi, Effective Technical Communication, Tata McGraw Hill.
6. Shirley Taylor, Model Business Letters, E-mails & Other Business Documents, Pearson Education.
7. Nitin Bhatnangar and Mamta Bhatnagar, Communicative English for Engineers and Professionals, Pearson Education.

Note: At least one question must be set from each unit/course outcome.