B.E. (Part Time) Electrical & Electronics Engineering

BEPT 401 - Analog and Digital Communication

Subject code	Subject name	L	T	P
BEPT 401	Analog and Digital Communication	3	1	2

COURSE CONTENT-

Time domain and frequency domain representation of signal, Fourier Transform and its properties, Transform of Gate, Periodic gate, Impulse periodic impulse sine and cosine wave, Concept of energy density and power density (Parseval's theorem), Power density of periodic gate and impulse function, impulse response of a system, convolutions, convolution with impulse function,causal and non causal system impulse response of ideal low pass filter, Correlation & Auto correlation.

Base band signal, need of modulation, Introduction of modulations techniques, Amplitude modulation, Equation and its frequency domain representation, Bandwidth, Power distribution. AM suppressed carrier waveform equation and frequency domain representation Generation (Balance/Chopper modulator) and synchronous detection technique, errors in synchronous detection, Introduction to SSB and VSB Transmission Angle modulation, Frequency and phase modulation equation and their relative phase and frequency deviations, modulation index frequency spectrum, NBFM and WBFM, Bandwidth comparison of modulation techniques.

Sampling of signal, sampling theorem for low pass and Band pass signal, Pulse amplitude modulation (PAM), Time division, multiplexing (TDM). Channel Bandwidth for PAM-TDM signal Type of sampling instantaneous, Natural and flat top, Aperture effect, Introduction to pulse position and pulse duration modulations, Digital signal, Quantization, Quantization error, Pulse code modulation, signal to noise ratio, Companding, Data rate and Baud rate, Bit rate, multiplexed PCM signal, Differential PCM (DPCM), Delta Modulation (DM) and Adaptive Delta Modulation (ADM), comparison of various systems.

Digital modulations techniques, Generation, detection, equation and Bandwidth of amplitude shift keying (ASK) Binary Phase Shift keying (BPSK), Differential phase shift keying (DPSK), offset and non offset quadrature phase shift keying (QPSK), M-Ary PSK, Binary frequency Shift Keying (BFSK), M-Ary FSK Quadrature Amplitude modulation (QAM), MODEM, Introduction to probability of error.

Information theory and coding- Information, entropies (Marginal and conditional), Model of a communication system, Mathematical representation of source, channel and receiver characteristics, Mutual information, channel capacity efficiency of noise free channel Binary symmetric channel (BSC) Binary erasure channel (BEC), Repetition of signal, NM symmetric Binary channel, Shannon theorem, Shanon-Hartley theorem (S/N-BW trade off)Source encoding code properties; Shanon, Fano and Huffman coding methods and their efficiency error control coding, Minimum Hamming distance, Linear Block Code, Cyclic code and convolution codes. Line Encoding: Manchester coding, RZ, NRZ coding.

EVALUATION

Evaluation will be continuous an integral part of the class as well through external assessment.

References:

1. Robert L Boylestad, Louis Nashelsky; Electronic Devices and Circuits; Pearson
2. Jacob Millman, Cristos C Halkias, Satyabrata Jit; Electronic Devices and Circuits; McGraw- Hill
3. Anil K Maini, Electronic Devices and Circuits, Wiley
4. S Salivahanan, N Suresh Kumar; Electronic Devices and Circuits; McGraw- Hill

ListofExperiments(Expandable)

1. Studyofsamplingprocessandsignalreconstructionandaliasing.
2. StudyofPAMPPMandPDM
3. StudyofPCMtransmitterandreceiver.
4. Timedivisionmultiplexing(TDM)andDemultiplexing
5. StudyofASKPSKandFSKtransmitterandreceiver.
6. StudyofAMmodulationandDemodulationtechniques(TransmitterandReceiver)Calculateofparameters
7. StudyofFMmodulationanddemodulation(TransmitterandReceiver)&Calculationofparameters
8. Toconstructandverifypreemphasisandde-emphasisandplotthewaveforms.

B.E. (Part Time) Electrical & Electronics Engineering

BEPT 402 - Electrical & Electronics Instrumentation

Subject code	Subject name	L	T	P
BEPT 402	Electrical & Electronics Instrumentation	3	1	2

COURSE OBJECTIVE-

The objective of the course is to provide the student knowledge about theoperating principle and structures of different digital instruments and teach them the use of transducers, display devices, signal generators and wave analyzers.

COURSE CONTENT-

ElectronicVoltmeter: Electronicvoltmeterandtheiradvantages,VTVMsDifferentialamplifiertypeelectronicvoltmeter,D.C.voltmeterusingdirectcoupledamplifier,chopperamplifiertypeofvoltmeter,Electronicvoltmetersusingrectifiers,TrueRMSrespondingvoltmeter,Electronicmultimeters,Differentialvoltmeter,Vectorvoltmeter, Vectorimpedancemeter,measurementofpoweratradiofrequency,calorimeter,Bolometer
CRO: DifferentpartsofCRO,ItsBlockdiagram,Electrostaticfocusing,Electrostaticdeflection,postdeflectionacceleration,ScreenforCRTs,Graticule,Vertical&Horizontaldeflectionsystem,Timebasecircuit,Oscilloscopeprobesandtransducers,Attenuators,ApplicationofCROs,Lissajouspatterns,SpecialpurposeCROs-Multiinput,Dualtrace,Dualbeam,Sampling,Storage(Analog&Digital)Oscilloscopes.

A.C.
BridgeMeasurement:Sourcesanddetectors,UseofBridgesformeasurementofinductance,Capacitance&QfactorMaxwellsbridge,Maxwellsinductancecapacitancebridge,Haysbridge,Andersonsbridge,Owen'sBridge,De-sauty'sBridge,ScheringBridge,HighVoltageScheringbridge,Measurementofrelativepermittivity,Heavisidecambell'sbridge,Weinsbridge,Universalbridge,SourcesoferrorsinBridgecircuit,Wagner'sEarthingdevice,Qmeranditsapplicationsandmeasurementmethods.

Transducers: Transducersdefinitionandclassification,mechanicaldevicesasprimarydetectors,Characteristic&choiceofTransducers,Resistiveinductiveandcapacitivetransducers,straingaugeandgaugefactor,Thermistor,Thermocouples,LVDT,RVDT,Synchros,Piezo-Electrictransducers,MagnetelasticandmagnetostrictiveHalleffecttransducers,Opto-electronictransducerssuchasphotovoltaic,Photoconductive,photodiodeandphotoconductivecells,Phototransistors,Photooptictransducers.

SignalGenerators:Fixed&variablefrequencyAFoscillators,Sinewavegenerators,Standardsignalgenerator,AFSineandSquarewavegeneratorFunctiongenerator,Squareandpulsegenerator,Randomnoisegenerator,Sweepgenerator,TVSweepgenerator,Markergenerator,Sweep-Markergenerator, Wobblyscope,VideopatterngeneratorVectroscope,Beatfrequencyoscillator
Waveanalyser:Basicwaveanalyzer,Frequencyselectivewaveanalyzer,Heterodynewaveanalyzer,Harmonicdistortion,analyzer,spectrumanalyzerdigitalFourieranalyzer.

DigitalInstrumentsAdvantagesofDigitalinstrumentsoveranaloginstruments,resolutionandsensitivityofDigitalmeters.DigitalVoltmeter-Ramptype,Dualslopeintegrationtype,Integratingtype,Successiveapproximationtype,ContinuousbalanceDVMorServobalancingpotentiometertype VM.DigitalMultimeter,Digitalfrequencymeter,Timeperiodmeasurement,Highfrequencymeasurement,Electroniccounter,Digitaltachometer,DigitalPHmeter,Digitalphasemeter,

Digitalcapacitancemeter.Digitaldisplaysystemandindicatorslike CRT,LED,LCD,Nixies,Electroluminescent,Incandescent,Electrophoreticimagedisplay,Liquidvapourdisplaydot-matrixdisplayAnalogrecorders,Graphicrecorders,Stripchartrecorders,Galvanometertyperecorders,Nullrecorders,singlepoint&multipointrecorders,X-Yrecords,Ultravioletrecorders,Magnetictaperecorders,Basiccomponentsoftaperecorders,Methodsofrecording,Directrecording,Frequencymodulatedrecording,Pulsedurationmodulationrecording, Digitaltaperecorders.

Instrumentsusedincomputer-controlledinstrumentationRS232CandIEEE488,GPIBelectricinterface.Introductiontoanalog&Digitaldataacquisitionsystems-Instrumentationsystemsused,Interfacingtransducerstoelectroniccontrol&measuringsystemsMultiplexing-D/AmultiplexingA-DMultiplexing,Specialencoders.DigitalcontroldescriptionMicrowaveinstruments,Scatteringparameters,Transmissionandreflectionparameters,Networkanalyzer,Measurementuncertaintymeasurementwithscalar&vectornetwork,Networkanalyzers,Microwavepowermeasurement-Sources&detectors,Fiberopticpowermeasurement,Stabilizedcalibratedlightsourcesendtoendmeasurementoffiberlosses,Opticaltimedomainreflectometry.

COURSE OUTCOME-

Student will be equipped with essential knowledge about theoperating principle and structures of different digital instruments and teach them the use of transducers, display devices, signal generators and wave analyzers.

EVALUATION

Evaluation will be continuous an integral part of the class as well through external assessment.

Text book:-

1. A.K. Sawhney; ‘A course in Electrical & Electronic Measurements & Instrumentation’; Dhanpat Rai &co(p) Ltd ,New Delhi

Reference books:-

2. G. K. Banerjee,’ Electrical and Electronic Measurements’. PHI Learning Pvt.Ltd.
3. R. B. Northrop,’ Introduction to Instrumentation and Measurement’; CRC press Taylor & Francis
4. Vijay Singh;’ Fundamentals of Electrical & Electronic Measurements’, New Age International Publishers.

ListofExperiments:

1. MeasurementofinductanceofA coilusingAndersonBridge.
2. MeasurementofcapacitanceofacapacitorusingscheringbridgE.
3. LVDTandcapacitancetransducerscharacteristicsandcalibration.
4. Resistancestraingauge-Strain Measurement andcalibration.
5. MeasurementofR,L,C&QusingLCR-Qmeter.
6. Study&measurementoffrequencyusingLissajouspatterns.
7. Measurementofpressureusingpressuresensor.
8. StudyofPiezo-electricTransducerandMeasurementofimpact usingPiezo-electricTransducer
9. MeasurementofDisplacementusingLVDT.
10. MeasurementofspeedofaMotorusingphotoelectrictransducer.
11. Study&Measurementusingphmeter.
12. Temperaturemeasurement&Controlusingthermocouple&usingthermistor.

B.E. (Part Time) Electrical & Electronics Engineering

BEPT 403 - Digital Electronics & Logic Design

Subject code	Subject name	L	T	P
BEPT 403	Digital Electronics & Logic Design	3	1	2

COURSE CONTENT-

Number Systems and Codes : Digital number systems, base conversion, Binary, Decimal, octal,Hexadecimal, number system with radix r, Gray codes.Alphanumeric codes – ASCII code andEBCDIC codes, Hollerith code, concept of parity, complement r's & (r-1)'s, subtraction withcomplements, signed Binary numbers, Error Detecting & Correcting codes. Basic Theorems &Properties of Boolean Algebra: AND, OR, NOT operators, laws of Boolean Algebra, Demorgon's theorem, Boolean expression & logic diagram. Negative logic, Alternate logic gate representation (concept of bubbled gates) canonical and standard Forms (Minterms&Maxterms), sum of minterms& product of maxterms, conversion between canonical forms. Truth table & maps, 2,3,4,5 and 6 variable maps, Solving digital problems using Maps, Don't care conditions, Tabular minimization. Sum of product & product of sum reduction, Exclusive OR & Exclusive NOR circuits, Parity generator & checkers.

Combinational Circuits : Design procedure, Adders (half and Full), subtractor (half and full) code convertors, Analysis of design, Universal building blocks, Implementation of any logic circuit with only NAND gates or with only NOR gates, Binary serial adder, parallel adder, serial/parallel adder, look ahead carry generator, BCD adder, Binary multiplier, Magnitude comparator, Decoder, Demultiplexer, Encoders, priority encoder, Multiplexers & implementation of combinational logic diagram, HDL for combinational circuit.

Sequential Logic Circuit : Latches, SR latch with NAND & NOR gates, D latch, edge triggered flip flop, J-K flip flop, T flip flop, Master slave flip flop, Analysis of clocked sequential circuit, state table, state diagram, state reduction state equations, state assignments, flip flop excitation table & characteristic equations, Design procedure for sequential circuits, Design with state reduction, Applications of flip flop.

Registers and Counters : Asynchronous and Synchronous counter, counters with MOD numbers,Down counter, UP/DOWN counter, propagation delay in ripple counter, programmable counter, Presettable counter, BCD counter, cascading, counter applications, Decoding in counter, Decoding glitches, Ring Counter, Johnson counter, Rotate left & Rotate right counter, Registers – Buffer, Shift left, shift right, shift left/Right registers, parallel in parallel out, serial in serial out, parallel in serial out, serial in parallel out registers.

Random Access Memory, Timing waveform, Memory Decoding, Internal Construction, Coincident decoding, Address multiplexing, Read only memory – Combinational circuit implementation, Typeof ROMs, combinational PLDs, Programmable Logic Array (PLA), Programmable Array Logic (PAL), sequential programmable device. Analog to digital conversion – Ramp type, dual slope, integration, successive approximation, parallel conversion, parallel/ serial conversion, convertor specifications, Digital to Analog convertors – Binary weighted & R/2R D to A convertors.

EVALUATION

Evaluation will be continuous an integral part of the class as well through external assessment.

References:

1. A. Anand Kumar, Fundamentals of digital circuits, PHI
2. A K Maini, Digital Electronics, Wiley India
3. Thomas Blakeslee; Digital Design with standard MSI and LSI; Wiley Interscience
4. Jain RP; Modern digital electronics; TMH
5. M Mano; Digital Logic & Computer design; PHI
6. Tocci ; Digital Systems Principle & applications; Pearson EducationAsia
7. Gothmann; Digital Electronics;PHI
8. Malvino, Leech; Digital Principles and applications–(TMH)
9. Floyad; Digital Fundamentals(UBS)
10. Nripendra N. Biswas; Logic Design Theory(PHI)
11. D.C. Green; Digital Electronics (Pearson EducationAsia)
12. SubrataGhoshal; Digital Electronics, Cengage

List of Experiments (Expandable):

1. Verification of all the logic gates.
2. Design of BCD to Excess-3 code converter.
3. Implementation of NAND & NOR as Universal gate.
4. Design of RS, JK, T& D Flip flop.
5. Multiplexer /Demultipexer based boolean function
6. Design of combinational circuit for the
(i) Half adder(ii) Full adder(iii) Half subtractor(iv) Fullsubtractor
7. Design various A-D & D-A convertors.

NOTE- All experiments (wherever applicable) should be performed through the following steps.

Step1: Circuit should be designed/ drafted on paper.

Step2: Where ever applicable the designed/drafted circuit should be simulated using Simulation S/W (TINA-V7/ PSPICE/ Labview/ CIRCUIT MAKER etc.).

Step 3: The designed/drafted circuit should be tested on the bread board and compare the results with the simulated results.

Step 4: Where ever required the bread board circuit should be fabricated on PCB.

B.E. (Part Time) Electrical & Electronics Engineering

BEPT 404 - Principles of Management & Managerial Economics

Subject code	Subject name	L	T	P
BEPT 404	Principles of Management & Managerial Economics	3	1	

COURSE CONTENT-

Management Concept: Management, Administration and Organization Difference and Relationship between Organization Management and Administration. Importance of Management, Characteristics of Management

Management: Scientific Management, Principles of Management, Process of Management, Functions of Management, Levels of Management, Project Management

Decision Making: Introduction and Definition, Types of Decisions, Techniques of Decision Making, Decision making under certainity Decision making under uncertainty, Decision Making under risk

Managerial Economics: Introduction, Factors Influencing Manager, Micro and Macro-economics, Theory of the Cost, Theory of the Firm, Theory of Production Function.

Productivity: Input-Output Analysis, Micro-economics Applied to Plants and Industrial Undertakings, Production and Production system, Productivity, Factors affecting Productivity, Increasing Productivity ofResources

EVALUATION

Evaluation will be continuous an integral part of the class as well through external assessment.

Reference Books

Peter Drucker Harper and Row,"The Practice of Management".
Koontz,"Essentials of Management", Prentice Hall of India.
Prentice Hall of India, "Management Staner".
T.N. Chhabra,"Principle and Practice of Management", Dhanpat Rai New Delhi.
T.R. Banga and S.C. Sharma,"Industrial Organisation and Engineering",Economics Khanna Publishers
O.P. Khanna,"Industrial Engineering and Management", Dhanpat Rai.
Joel Dean,"Managerial Economics", Prentice Hall of India
V.L. Mote, Samuel Paul, G.S. Gupta "Managerial Economics Concepts & Cases", Tata Mc Graw Hill New Delhi.
V.L.Mote,"Managerial Economics", Tata McGraw Hill.
Schweyer Reinhold,"Analytical Models for Managerial and Engineering Economics".

B.E. (Part Time) Electrical & Electronics Engineering

BEPT 405 - Computer Programming- IV

Subject code	Subject name	L	T	P
BEPT 405	Computer Programming- IV			2

COURSE CONTENT-

Classes and Objects Specifying a Class, Defining Member Functions, Making a Outside Function Inline, Nesting of Member Functions, Private Member Functions, Arrays within a Class, Memory Allocation for Objects, Static Data Members, Static Member Functions, Array of Objects, Objects as Function Arguments, Returning Objects, Pointers to Members.

Constructors and Destructors Constructors, Parametric Constructors, Multiple Constructors in a Class, Constructors with Default Arguments, Dynamic Initialization of Objects, Copy Constructor, Dynamic Constructor, Destructors. Operator Overloading and Type Conversions Definition, Overloading Unary Operators, Binary Operators, Binary Operators using Friends, Rules for Overloading Operators.

Inheritance Defining Derived Classes, Single Inheritance, Multilevel Inheritance, Multiple Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Virtual Base Classes, Abstract Classes, Constructors in Derived Classes, Member Class : Nesting of Class.

Pointers, Virtual Functions and Polymorphism Pointers to Objects, this Pointer, Pointers to Derived Classes, Virtual Functions, Pure Virtual Functions.

Managing Console 1/0 Operations C++ Streams, C++ Stream Classes, Unformatted I/0 Operations, Formatted Console I/0 Operations, Managing Output with Manipulators.Working with Files Classes for File Strewn Operations, Opening and Closing a File, Detecting EOF, File Pointers, Updating a File, Error Handling During File Operations.

Suggested List of Experiments:
C++ programs based on course contents. (At least two program from each unit.)

EVALUATION

Evaluation will be continuous an integral part of the class as well through external assessment.

Reference Books:-

E.Balagurusamy,"Object Oriented Programming with C++", TMH.
Robert Lafore,"Programming in C++".
"ISRD-Object Oriented Programing with C++", TMH.
Herbert Schildt,"C++ the complete reference" TMH.
Venugopal, "Mastering C++", TMH.
Hubbert,"Programing with C++", Schaum Series, TMH.