MVN UNIVERSITY

ELECTRONICS & COMMUNICATION ENGINEERING DEPARTMENT

SCHEME & SYLLABUS

5^{TH} SEM

B. TECH.

B. TECH.(LEET)

B. TECH. + M. Tech.

B. TECH. + MBA

MVN University, Palwal(Haryana)

Scheme of Studies & Syllabus 2013-14

Four year Regular Course: B. Tech. (ECE) with specialization in CDMA Technology, Medical Instrumentation, Remote Sensing, Agri Electronics

Three year Regular Course with Lateral Entry Scheme: B. Tech. (ECE) with specialization in CDMA Technology, Medical Instrumentation, Remote Sensing, Agri Electronics

Five Year Regular Dual Degree Course: B.Tech(ECE) + M.B.A

Semester:V

S. No	Course Title	Paper Code	Teaching Schedule			Total	Credit
			L	T	P		
1	Integrated Electronics	ECL305	3	1	0	4	4
2	Microprocessor and Interfacing	ECL307	3	1	2	6	5
3	Antenna and Wave Propagation	ECL309	3	1	0	4	4
4	Analog and Digital Communication	ECL311	3	1	2	6	5
5	MOS Integrated Circuits	ECL313	3	1	0	4	4
6	Electronic Measurement & Instrumentation	ECL315	3	1	2	6	5
7	Practical Training -I	ECT317	0	0	2	2	1
8	Professional Communication -IV	AHP 301	1	0	2	3	NC
	Total		19	6	10	35	28

MVN University, Palwal(Haryana)

Scheme of Studies & Syllabus 2013-14

Five year Regular integrated Course: B.Tech + M.Tech (ECE)with specialization in VLSI,Nano Technology, Microwave Engineering, Embedded System Design

Semester:V

S. No	Course Title	Paper Code	Teaching Schedule			Total	Credit
			L	T	P		
1	Integrated Electronics	ECL305	3	1	0	4	4
2	Antenna and Wave Propagation	ECL309	3	1	0	4	4
3	MOS Integrated Circuits	ECL313	3	1	0	4	4
4	Electronic Measurement & Instrumentation	ECL315	3	1	2	6	5
5	Advanced Microprocessor and Interfacing	ECL319	3	1	2	6	5
6	Communication Techniques	ECL321	3	1	2	6	5
7	Practical Training - I	ECT317	0	0	2	2	1
8	Professional Communication - IV	AHP 301	1	0	2	3	NC
	Total		19	6	10	35	28

ECL 305	INTEGRATED ELECTRONICS	L	T	P	Cr
		3	1	0	4

Objective: The objective of the course is to introduce the fundamentals of single-stage and multi-stage amplifiers, feedback amplifiers, oscillators, power amplifiers and operational amplifiers providing an in-depth understanding of analog electronics circuits**.**

THEORY:

Note: Question No 1 is compulsory and will be of short answer type from entire syllabus. Two questions are to be attempted out of three questions from each Section A & B.

SECTION – A

UNIT 1: Analog Integrated circuit an overview:

Operational amplifier, Ideal operation amplifier, feedback in ideal Op-amp, differential amplifier, transfer characteristics of a differential amplifier, common mode rejection ratio (CMRR), Circuit for improving CMRR Simple current Mirror.

UNIT 2: Op-Amp Circuits: Applications

Summer, adder, Current to voltage converters, V to I converters, Instrumentation Amplifiers, integrators and differentiators.

UNIT 3: Active filters & Converters

First and second order low pass & High pass filters, Band Pass & Band-Reject filters, All-Pass filter, Analog to Digital and Digital to Analog Converters.

SECTION – B

UNIT 4: Non Linear Circuits

Voltage Comparators, Precision Rectifiers, Schmitt Triggers, Peak detectors, Sample and Hold circuit, Square and Triangular Wave Generators.

UNIT 5: Non Linear Amplifier& Regulators

Log/Antilog Amplifiers, Analog Multipliers, Operational Trans conductance Amplifiers, Linear Regulators.

UNIT 6: Timer and phase locked loops(PLL)

Integrated Circuit Timer: The 555 Circuit, Implementing a Monostable Multivibrator Using the 555 IC, Astable Multivibrator Using the 555 IC.

Phase locked loops (PLL): Ex-OR Gates and multipliers as phase detectors**,** Block Diagram of IC PLL, Working of PLL and Applications of PLL

Text Books:

1. Ramakant A. Gayakwad, "Op-Amps and Linear Integrated Circuits" Prentice Hall of India
2. Microelectronic Circuits : Sedra & Smith.

Reference Books:

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1. Electronic Circuit Analysis and Design (Second edition) : D.A.Neamen; TMH
2. Millman J.& Halkias C.C., "Integrated Electronics Analog and Digital Circuits & Systems" McGraw Hill.

ECL 307	MICROPROCESSOR & INTERFACING	L T P	Cr
		3 1 2	5

Objective: The objective of the course is to introduce the fundamentals of 8085 and 8086 microprocessors and their interfacing with the real world environment with the help of various interfacing devices like 8255 etc.

THEORY:

Note: Question No 1 is compulsory and will be of short answer type from entire syllabus. Two questions are to be attempted out of three questions from each Section A & B.

SECTION – A

UNIT 1: The 8085 Processor : Introduction to microprocessor, 8085 microprocessor : Architecture.

UNIT 2: Instruction Set of 8085: Instruction set, interrupt structure, and Assembly language programming.

UNIT 3: The 8086 Microprocessor Architecture : Architecture, block diagram of 8086, details of sub-blocks such as EU, BIU; memory segmentation and physical address computations, program relocation, addressing modes, instruction formats, pin diagram and description of various signals

SECTION – B

UNIT 4: Instruction Set of 8086 : Instruction execution timing, assembler instruction format, data transfer instructions, arithmetic instructions, branch instructions, looping instructions, NOP and HLT instructions, flag manipulation instructions, logical instructions, shift and rotate instructions, directives and operators, programming examples.

UNIT 5: Interfacing Device : 8255 Programmable peripheral interface, interfacing keyboard and seven segment display, 8254 (8253) programmable interval timer, 8259A programmable interrupt controller

UNIT 6: Direct Memory Access:
Direct Memory Access and 8237 DMA controller and its interfacing.

Text Books:

1. Microprocessor Architecture, Programming & Applications with 8085 : Ramesh S Gaonkar; Wiley Eastern Ltd.
2. The Intel Microprocessors 8086- Pentium processor : Brey; PHI

Reference Books:

1. Microprocessors and interfacing : Hall; TMH

2. The 8088 & 8086 Microprocessors-Programming, interfacing,Hardware & Applications :Triebel & Singh; PHI
3. Microcomputer systems: the 8086/8088 Family: architecture, Programming & Design : Yu-Chang Liu & Glenn A Gibson; PHI.
4. Advanced Microprocessors and Interfacing : Badri Ram; TMH

Note: At least ten experiments are to be performed during the semester. At least eight experiments should be performed from the list of experiments. Two experiments may either be performed from the given list of experiments or may be designed by the concern faculty in consultation with H.O.D as per the scope of syllabus.

List of Experiments:

1. Write a program using 8085 for Hexadecimal addition & subtraction of two numbers.
2. Write a program using 8085 Microprocessor for addition and subtraction of two BCD numbers
3. Write a program to perform multiplication and division of two 8 bit numbers using 8085
4. Write a program using 8086 for division of a defined double word (stored in a data segment) by another double Word division and verify.
5. Write a program using 8086 for finding the square root of a given number and verify.
6. Write a program using 8086 to copy 12 bytes of data from source to destination & verify.
7. Write a program to find maximum and minimum from series using 8086.
8. Write a program to initiate 8251 and to check the transmission and reception of character.
9. Write a program to interface ADC & DAC with 8085 & demonstrate generation of square wave.
10. Write a program to control the operation of stepper motor using 8085/8086 and 8255 PPI.
11. Write a program to interface 8X8 LED Matrix Display using 8085/8086 microprocessors and 8255 PPI.
12. Write a program to control the traffic light system using 8085/8086 and 8255 PPI.
13. Write a program to control simulated elevator 8085/8086 microprocessors and 8255 PPI.

ECL 309	ANTENNA AND WAVE PROPAGATION	L	T	P	Cr
		3	1	0	4

Objective: The objective of the course is to provide knowledge of Antenna. It covers basic principle of operations and usefulness of Antenna in the telecommunication

THEORY:

Note: Question No 1 is compulsory and will be of short answer type from entire syllabus. Two questions are to be attempted out of three questions from each Section A & B.

SECTION – A

UNIT 1: Radiation Of Electromagnetic Waves

Retarded potential, field of short dipole, Antenna pattern & antenna parameters.

UNIT 2: Antenna Parameters

Antenna pattern, Gain, Directivity, Radiation resistance, Aperture, Beam-width etc, Reciprocity theorem for antenna.

UNIT 3: . Elemental Antenna

Wave equation for radiated fields from current and voltage sources in terms of electric scalar potential and magnetic vector potential .Fields and pattern of an infinitesimal dipole. Definition of various potentials used in antenna theory .

SECTION – B

UNIT 4: Practical Linear Antennas

Relation between current distribution and field pattern of an antenna, linear antenna, half wave dipole, Antenna impedance, Directivity, Radiation resistance, Directional properties, Effect of ground on antenna pattern, Input impedance Broad band matching. Mutual impedance .

Unit 5: Antenna Arrays

Two element array, broad side, End fired pattern, Beam width pattern multiplication, multi element array and their properties, Synthesis of an array.

UNIT 6: Practical Antennas And Propagation Of Waves

parabolic feeds, conical, helix, log periodic, horn, Microwave antenna. Ground waves, Space waves, Effect of Earth, Duct formation, Ionosphere, and sky waves

Text Books:

1. Antennas by J.D.Kraus, TMH.
2. Antenna & Wave Propagation by K.D Prasad.

Reference Books:

1. Antenna & Radiowave Propogation by Collin,TMH
2. Electromagnetic Waves & Radiating Systems by Jordan & Balman, PHI.

ECL 311	ANALOG & DIGITAL COMMUNICATION	L T P	Cr
		3 1 2	5

Objective: The objective of the course is to introduce the fundamentals of communication systems, different types of modulations, data transmission system, standards in data communication and in-depth understanding of security in communication systems.

THEORY:

Note: Question No 1 is compulsory and will be of short answer type from entire syllabus. Two questions are to be attempted out of three questions from each Section A & B.

SECTION – A

UNIT 1: Communication System Components:
Introduction to Communication: Definition & means of communications; Digital and analog Signals: sign waves, square waves; Properties of signals: amplitude, frequency, phase,

UNIT 2: Theoretical basis of signal Processing tools: Fourier analysis: Fourier series and Fourier Transform (property, ESD, PSD and Raleigh) effect of limited bandwidth on digital Signal.

UNIT 3: Amplitude Modulation: Introduction to amplitude modulation, mathematical representation of AM wave, modulation index, advantage disadvantage and application of AM Power relation, DSB-SC, SSB modulation,AM generation and reception,

SECTION – B

UNIT 4: Angle Modulation: Frequency modulation, mathematical expression for FM, FM Sideband & modulation Index, frequency spectrum of FM, bandwidth requirement, types of FM mathematical representation of phase modulation, deviation sensitivity of PM comparison of FM and PM system effect of noise in FM and PM, generation and reception of FM and PM, Armstrong method of FM generation, Introduction to super heterodyne receiver.

UNIT 5: Introduction to digital Modulation: Data encoding, binary encoding (NRZ), Manchester encoding, differential Manchester encoding. Introduction to sampling theory, PCM, DPCM, Companding, quantization.digital modulation techniques ASK,FSK, PSK.

UNIT 6: Introduction to error detection, correction & Coding: Introduction to information and entropy, channel capacity for discrete and continuous channels, Shannons Theorem, Shannon-Hartley Theorem, Noisy channels.
Coding theory: Shannon-Fano coding, Hauffman coding , Linear block codes ,Cyclic codes, maximization of entropy of a continuous message transmission rate, effect of medium on the information.

Text Books:

1. Principles of Communication Systems : Taub Schiling; TMH
2. Digital Communications, J.G. Proakiss, 4th Ed., MGH

Reference Books:

1. Communication Systems : Singh and Sapre ; TMH
3. Communication Systems : A Bruce Carlson; TMH
4. Data Communications and Networking, Behrouz A. Forouzan, 2003, 2nd Edition, T.M.H

Note: At least ten experiments are to be performed during the semester. At least eight experiments should be performed from the list of experiments. Two experiments may either be performed from the given list of experiments or may be designed by the concern faculty in consultation with H.O.D as per the scope of syllabus.

List of Experiments:

1. Generation of DSB-SC AM signal using balanced modulator.
2. Generation of SSB AM signal
3. To study envelop detector for demodulation of AM signal and observe diagonal peak clipping effect.
4. Frequency modulation using voltage controlled oscillator.
5. To generate a FM Signal using Varactor & reactance modulation.
6. Detection of FM Signal using PLL & foster seelay method..
7. To Study Super heterodyne AM receiver and measurement of receiver parameters viz.sensitivity, selectivity & fidelity.
8. To study the circuit of PAM/PWM/PPM modulator & Demodulator
9. Study of Frequency Division Multiplexing/Demultiplexing with sinusoidal & audio inputs.
10. Generation & study of Analog TDM at least 4 channels.
11. Study of 4 channel Time Division Multiplexing system.
12. Study of pulse code modulation and demodulation with parity & Hamming code.
13. Study pulse data coding & Decoding techniques for various formats.
14. Study of ASK, FSK modulator and demodulator.
15. Study of PSK & QPSK modulator and demodulator.

ECL 313	MOS INTEGRATED CIRCUITS	L	T	P	Cr
		3	1	0	4

Objective: The course is designed to give the student an understanding of the different circuit level aspects of MOS ICs. Also gives an idea about logic gate design at the transistor level, transistor sizing, gate delay characterization.

THEORY:

Note: Question No 1 is compulsory and will be of short answer type from entire syllabus. Two questions are to be attempted out of three questions from each Section A & B.

SECTION – A

UNIT 1: MOS transistor Introduction :

Evolution of VLSI, MOS transistor theory – MOS structure, enhancement & depletion transistor, Threshold voltage, MOS device design equations,

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UNIT 2: CMOS inverter:

DC characteristics, static load MOS inverter, pull up/pull down ratio, state & Dynamic power dissipation, CMOS & NMOS process technology – explanation of different stages in fabrication, latch up.

UNIT 3: Inverter Characterstics:

Switching characteristics & inter connection effects: Rise time, fall time delays Inverter design with delay constants. Parasitic effect,.

CMOS logic gate design: Fan in, fan out Typical NAND, NOR, delays Transistor Sizing.

SECTION – B

UNIT 4: CMOS logic Structures:

CMOS complimentary logic, static and dynamic CMOS structures, Clocked CMOS logic , pass transistor logic, Stick diagrams .

UNIT 5: Clocking strategies:

clocked system, latches & Registers, system timing set-up & hold timing, signal phase memory structure, 2 phase clocking, Two phase memory structure.

UNIT 6: VLSI designing methodology :

Introduction, VLSI designs flow, Design Hierarchy Concept of regularity, Modularity & Locality, VLSI design style, Design quality. Lambda based design rules.

Text Books:

1. S. M. Kang, Y. Lebiebici, "CMOS digital integrated circuits analysis & design" TMH, 3rd Edition.
2. Weste and Eshrighian, "Principle of CMOS VLSI Design" Pearson Education, 2001.

Reference Books:

1. R. J. Baker, H.W.Li, D. E. Boyce, "CMOS Circuit Design, Layout and Simulation" PHI – 2000.
2. J. M. Rabaey, "Digital Integrated Circuits" PHI – 2nd Edition.
3. W. Wolf Pearson, "Modern VLSI Design Systems on Silicon" Pearson Education – 2nd Edition.
4.J. P. Vyenmura, "Introduction to VLSI Circuits and Systems" John Wiely, 1st Edition.

ECL 315	ELECTRONIC MEASUREMENT & INSTRUMENTATION	L T P	Cr
		3 1 2	5

Objective: The objective of the course is to introduce the fundamentals of Electronics Instrumentation and Measurements, Providing an in-depth understanding of Measurement Errors, Bridge Measurements, Digital Storage Oscilloscope, Function Generator & Analyzer, Data Acquisition Systems and Transducers**.**

THEORY:

Note: Question No 1 is compulsory and will be of short answer type from entire syllabus. Two questions are to be attempted out of three questions from each Section A & B.

SECTION – A

UNIT 1: Measuring Instruments & Errors:

Measuring Instruments: General block diagram of an Instrument for measurement, Static and dynamic characteristics; Accuracy Precision, Repeatability, Reproducibility, and Resolution. PMMC Instruments.

Measurement Errors: Gross error, Systematic error, absolute error and relative error, limiting errors.

UNIT 2: Electronic Instruments:

Instruments for measurement of voltage, current & other circuit parameters, Q-meters, R.F. power

Measurements, Introduction to digital meter, true RMS voltmeter, and electronic Multimeter.

UNIT 3: Oscilloscope:

CRT, Block diagram of CRO, study of various stages in brief & there applications, high frequency CRO considerations, electrostatic deflection, dual trace & dual beam oscilloscope, Digital storage oscilloscope.

SECTION – B

UNIT 4: Bridge Measurements:

Wheatstone bridge, Kelvin Bridge, AC Bridge and their applications; Maxwell Bridge, Hay's bridge, Anderson's bridge, Schering Bridge.

UNIT 5: Transducers & Signal Conditioning:

Classification, Transducers of types; RLC, Thermocouple transducer, Piezo-Electric transducer etc.

Signal conditioning system; DC and AC signal conditioning system, Data acquisition system.

UNIT 6: Generation & Analysis of Waveforms:

Block diagram of pulse generator, Signal generator, Function generator, Wave analyzer, Distortion analyzer, Spectrum analyzer, Harmonic analyzer, FFT analyzer.

Text Books:

1. A course in Electrical & Electronics Measurements & Instrumentation: A.K.Sawhney; Dhanpat
Rai & Sons.
2. Electronic instrumentation by H.S. Kalsi, 2nd Edition ,Tata McGraw Hill Publications.

Reference Books:

5. Electronics Instrumentation & Measurement Techniques : Cooper; PHI
6. Electronics Instruments & Measurements : David A. Bell oxford Univ. Press.1997
3. Modern electronics Instrumentation and measurement techniques by Albert D. Helfrick & William D. Cooper

Note: At least ten experiments are to be performed during the semester. At least eight experiments should be performed from the list of experiments. Two experiments may either be performed from the given list of experiments or may be designed by the concern faculty in consultation with H.O.D as per the scope of syllabus.

List of Experiments:

1. To get familiar with the working knowledge of the Analog and Digital Oscilloscope & Function Generator.
2. To get familiar with the working knowledge of the Multimeter (Analog and Digital).
3. To study and measure an unknown frequency from Lissajous figures using CRO.
4. To study and plot the output characteristics of a LVDT.
5. To Study and plot the output characteristic of RTD transducer.
6. To Study and plot the output characteristic of Thermocouple transducer.
7. To study and plot the output characteristic of piezo-electric Transducer.
8. To study and plot the output characteristic of strain gauge transducer.
9. To study and plot the output characteristic of capacitive transducer.
10. Study Measurement of different components & parameters like Q of a coil etc using LCRQ meter.
11. To study and plot the output characteristic of Thermister.

ECT 317	PRACTICAL TRAINING - I	L	T	P	Cr
		0	0	2	1

Each student has to undergo practical training of 6 weeks during summer vacation and its evaluation shall be carried out in the V semester. Assessment of Practical Training-I, undergone at the end of IV semester, will be based on seminar, viva-voce, report and certificate of practical training obtained by the student from the industry. According to performance letter grades A, B, C, F are to be awarded. A student who is awarded 'F' grade is required to repeat Practical Training.

AHP-301	PROFESSIONAL COMMUNICATION-IV	L T P	Credits
		1 0 2	0

(Common for B. Tech, Integrated M. Tech, Dual Degree MBA)

Practical

External Practical Exam: 30 Marks
Internal Practical Exam: 20 Marks
Total Marks: 50

UNIT-1: PHONETICS

- Practising words beginning and ending with
  - /f/ and /P/ sounds
  - /z/ and /dʒ/ sounds
  - /S/ and /ʃ/ sounds
  - /v/ and /w/ sounds
  - /tʃ/ and /ʃ/ sounds
- Words commonly mispronounced

UNIT-2: READING PRACTICE

- Reading newspaper articles
- Reading magazine articles

UNIT-3: ORAL PRACTICE

- Language Functions – Asking for information, Seeking permission, Giving directions, etc
- Extempore Speeches
- Debate and Group Discussion
- Group Presentation

UNIT-4: STUDY SKILLS

- Looking up a dictionary
- Learning pronunciation from a dictionary
- Word Power Enhancement – Noun and Verb Identification
- Spell Check

ECL 319	ADVANCED MICROPROCESSORS AND INTERFACING	L T P	Cr
		3 1 2	5

Objective: To make the students fully conversant with 16 bit microprocessors and its peripherals and to expose them to advances in 32 and 64 bit microprocessors. It will also cover the 8 and 16 bit micro-controller which finds wide applications in Industry.

THEORY:

Note: Question No 1 is compulsory and will be of short answer type from entire syllabus. Two questions are to be attempted out of three questions from each Section A & B.

SECTION – A

UNIT 1: The 8085 Processor & Its Instruction Set: Introduction to microprocessor, 8085 microprocessor : Architecture, instruction set, interrupt structure, and Assembly language programming. Instruction set, interrupt structure, and Assembly language programming.

UNIT 2: The 8086 Microprocessor Architecture : Architecture, block diagram of 8086, details of sub-blocks such as EU, BIU; memory segmentation and physical address computations, program relocation, addressing modes, instruction formats, pin diagram and description of various signals

UNIT 3: Instruction Set of 8086 : Instruction execution timing, assembler instruction format, data transfer instructions, arithmetic instructions, branch instructions, looping instructions, NOP and HLT instructions, flag manipulation instructions, logical instructions, shift and rotate instructions, directives and operators, programming examples.

SECTION – B

UNIT 4: Interfacing Device & DMA : 8255 Programmable peripheral interface, interfacing keyboard and seven segment display, 8254 (8253) programmable interval timer, 8259A programmable interrupt controller. Direct Memory Access and 8237 DMA controller and its interfacing.

UNIT 5: Introduction Of 80186 And 80286 Microprocessor

80186 and 80286, 16 bit microprocessors: 80186/80188 architecture, Pin-out of 80186 microprocessor, 80186/80188 Timing (Read / Write cycles) , 80186 programmable interrupt controller and DMA Controller , Internal Architecture of 80286

UNIT 6: Introduction Of 80386 And 80486 Microprocessor

80386/80486 Microprocessors: Introduction to 80386 microprocessor, Special 80386 registers, Memory management, Memory paging mechanism, Introduction to 80486 and Pentium Processor.

Text Books:

1. Advanced microprocessors and peripherals, A.K.Ray & K.M.Bhurchandi, Tata McGraw Hill publications co.ltd, New Delhi Twentieth reprint-2006
2. The INTEL Microprocessors , Barry B Bray,& C.R.Sarma, Pearson Education Ltd, New Delhi, First Indian reprint-2005

Reference Books:

1. Advanced Microprocessors and Interfacing : Badri Ram; TMH
2. Microprocessor Architecture, Programming & Applications with 8085 : Ramesh S Gaonkar; Wiley Eastern Ltd.
3. The Intel Microprocessors 8086- Pentium processor : Brey; PHI
4. The Intel microprocessors 8088/80186,80188,80286,80386, 80486,Pentium and Pentium- pro processor Architecture ,Programming and Interface by Barray B.Berry, 4th Edition, PHI
5. Microprocessors and interfacing Programming and Applications by Douglas V.Hall, Mc Graw Hill.

Note: At least ten experiments are to be performed during the semester. At least eight experiments should be performed from the list of experiments. Two experiments may either be performed from the given list of experiments or may be designed by the concern faculty in consultation with H.O.D as per the scope of syllabus.

List of Experiments:

1. Write a program using 8085 for Hexadecimal addition & subtraction of two numbers.
2. Write a program using 8085 Microprocessor for addition and subtraction of two BCD numbers
3. Write a program to perform multiplication and division of two 8 bit numbers using 8085
4. Write a program using 8086 for division of a defined double word (stored in a data segment) by another double Word division and verify.
5. Write a program using 8086 for finding the square root of a given number and verify.
6. Write a program using 8086 to copy 12 bytes of data from source to destination & verify.
7. Write a program to find maximum and minimum from series using 8086.
8. Write a program to initiate 8251 and to check the transmission and reception of character.
9. Write a program to interface ADC & DAC with 8085 & demonstrate generation of square wave.
10. Write a program to control the operation of stepper motor using 8085/8086 and 8255 PPI.
11. Write a program to interface 8X8 LED Matrix Display using 8085/8086 microprocessors and 8255 PPI.
12. Write a program to control the traffic light system using 8085/8086 and 8255 PPI.
13. Write a program to control simulated elevator 8085/8086 microprocessors and 8255 PPI.

ECL 321	COMMUNICATION TECHNIQUES	L T P	Cr
		3 1 2	5

Objective: The objective of the course is to introduce the fundamentals of modern communication systems, different types of modulations, data transmission system, standards in data communication and in-depth understanding of security in communication systems.

THEORY:

Note: Question No 1 is compulsory and will be of short answer type from entire syllabus. Two questions are to be attempted out of three questions from each Section A & B.

SECTION – A

UNIT 1: Communication System Components:

Introduction to Communication: Definition & means of communications; Digital and analog signals: sign waves, square waves; Properties of signals: amplitude, frequency, phase; Fourier analysis: Fourier series and Fourier Transform (property, ESD, PSD and Raleigh) effect of limited bandwidth on digital signal.

UNIT 2: Information Theory :

Introduction to information and entropy, channel capacity for discrete and continuous channels, Shannon's Theorem, Shannon-Hartley Theorem, Noisy channels, coding theory : Shannon-Fano coding, minimum redundancy coding, maximization of entropy of a continuous message transmission rate, effect of medium on the information, selection of channels ,effect of noise and its minimization.

UNIT 3: Data Transmission System:

Physical connections: modulation, amplitude-, frequency-, phase- modulation; Data encoding: binary encoding (NRZ), Manchester encoding, differential Manchester encoding.

SECTION – B

UNIT 4: Digital Modulation Techniques:

ASK, FSK, BPSK, QPSK, M-ary PSK. PC-PC data Communication Introduction to Noise: External noise, Internal noise, S/N ratio, noise figure.

UNIT 5: Error Control Coding:

Types of codes, linear block codes, cycle codes, convolution codes, Maximum-likelihood decoding of convolution codes trellis codes.

UNIT 6: Data Network:

Communication network, circuit switching Store and forward switching layered architecture Packet network, multiple access communication, spread spectrum modulation, direct sequence and frequency hoped spread spectrum modulation.

Text Books:

7. Principles of Communication Systems : Taub Schiling; TMH
8. Digital Communications, J.G. Proakiss, 4th Ed., MGH

Reference Books:

1. Communication Systems : Singh and Sapre ; TMH
9. Communication Systems : A Bruce Carlson; TMH
10. Data Communications and Networking, Behrouz A. Forouzan, 2003, 2nd Edition, T.M.H

Note: At least ten experiments are to be performed during the semester. At least eight experiments should be performed from the list of experiments. Two experiments may either be performed from the given list of experiments or may be designed by the concern faculty in consultation with H.O.D as per the scope of syllabus.

List of Experiments:

1. Generation of DSB-SC AM signal using balanced modulator.
2. Generation of SSB AM signal
3. To study envelop detector for demodulation of AM signal and observe diagonal peak clipping effect.
4. Frequency modulation using voltage controlled oscillator.
5. To generate a FM Signal using Varactor & reactance modulation.
6. Detection of FM Signal using PLL & foster seelay method..
7. To Study Super heterodyne AM receiver and measurement of receiver parameters viz. sensitivity, selectivity & fidelity.
8. To study the circuit of PAM/PWM/PPM modulator & Demodulator
9. Study of Frequency Division Multiplexing/ Demultiplexing with sinusoidal & audio inputs.
10. Generation & study of Analog TDM at least 4 channels.
11. Study of 4 channel Time Division Multiplexing system.
12. Study of pulse code modulation and demodulation with parity & Hamming code.
13. Study pulse data coding & Decoding techniques for various formats.
14. Study of ASK, FSK modulator and demodulator.
15. Study of PSK & QPSK modulator and demodulator.