Haryana Engineering College, Jagadhri

Lesson Plan of Electronics & Comm. Engineering Deptt. 4th Semester

Subject : Applied & Computational Mathematics (BS-207A)

Objective of Course :

The objective of this course is to familiarize the prospective Engineers with ordinary and partial differential equations, Laplace Transform which allow deterministic mathematical formulations of phenomena in engineering processes and to study numerical methods for the approximation of their solution.

Day	Topic / Chapter Covered	Academic Activity	Test/Assignment
Day 1	Ordinary & Partial Differential Equations	Lecture	
Day 2	ODE: First order ordinary differential equations: Exact	Lecture	
Day 3	Linear and Bernoulli's equations	Lecture	
Day 4	Euler's equations	Lecture	
Day 5	Equations not of first degree: equations solvable for p	Lecture	
Day 6	Equations solvable for y, equations solvable for x	Lecture	
Day 7	Clairaut's type.	Lecture	
Day 8	Second order linear differential equations with constant coefficients.	Lecture	Assignment 1
Day 9	PDE: Formation of Partial Differential Equations	Lecture	
Day10	Solutions of first order linear and non-linear PDEs	Lecture	
Day11	Charpit's method	Lecture	
Day12	Solution to homogenous linear partial differential equations (with constant coefficients) by complimentary function Particular integral method	Lecture	
Day13	Advance Calculus	Lecture	
Day14	Multivariable Calculus: Multiple Integration	Lecture	
Day15	Double integrals (Cartesian), change of order of integration in double integrals	Lecture	
Day16	Change of variables (Cartesian to polar and)	Lecture	
Day17	Triple integrals (Cartesian)	Lecture	
Day18	Orthogonal curvilinear coordinates	Lecture	Assignment 2
Day19	Simple applications involving cubes, sphere .	Lecture	
Day20	Vector Calculus: Gradient, divergence	Lecture	
Day21	Curl and their properties	Lecture	

Day22	Directional derivative	Lecture	
Day23	Line integrals, surface integrals, volume integrals	Lecture	
Day24	Theorems of Green	Lecture	
Day25	Gauss and Stokes (without proof).	Lecture	
Day26	Laplace Transform	Lecture	
Day27	Laplace Transform, Laplace Transform of Elementary Functions	Lecture	Assignment 3
Day28	Basic properties of Laplace Transform	Lecture	
Day29	Laplace transform of periodic functions	Lecture	
Day30	Finding inverse Laplace transform by different methods	Lecture	
Day31	Convolution theorem	Lecture	
Day32	Solving ODEs by Laplace Transform method.	Lecture	
Day33	Numerical Techniques	Lecture	
Day34	Solution of polynomial and transcendental equations: Bisection method	Lecture	
Day35	Newton-Raphson method	Lecture	Assignment 4
Day36	Regula-Falsi method	Lecture	
Day37	Lagrange's formulae	Lecture	
Day38	Numerical Differentiation using Newton's forward and backward difference formulae	Lecture	
Day39	Numerical integration: Trapezoidal rule	Lecture	
Day40	Simpson's $1/3^{rd}$ rule	Lecture	
Day41	Taylor's series	Lecture	
Day42	Runge-Kutta method for solving first and second order equations	Lecture	

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Haryana Engineering College, Jagadhri

Lesson Plan of Electronics & Comm. Engineering Deptt. 4th Semester

Subject : Digital Communication (EC-202A)

Objective of Course :

1. To learn digitization of analog signal by pulse modulation system and analyze their system performance.
2. To analyze different baseband transmission schemes and their performance.
3. To learn and understand different digital modulation schemes and compute the bit error performance.
4. To analyze the different modulation tradeoffs and different equalization techniques.

Day	Topic / Chapter Covered	Academic Activity	Test/Assignment
Day 1	Pulse modulation	Lecture	
Day 2	Sampling process	Lecture	
Day 3	Pulse Amplitude	Lecture	
Day 4	Pulse code modulation (PCM)	Lecture	Assignment 1
Day 5	Differential pulse code modulation	Lecture	
Day 6	Delta modulation	Lecture	
Day 7	Noise considerations in PCM	Lecture	
Day 8	Time Division multiplexing	Lecture	Assignment 2
Day 9	Quantization noise in delta modulation	Lecture	
Day10	The O/P signal to quantization noise ratio in delta modulation	Lecture	
Day11	O/P signal to noise ratio in delta modulation	Lecture	
Day12	Varients of DM	Lecture	
Day13	Base Band Pulse Transmission	Lecture	Assignment 3
Day14	Matched filter and its properties	Lecture	
Day15	Average probability of symbol error in binary enclosed PCM receiver	Lecture	
Day16	Intersymbol interference	Lecture	
Day17	Nyquist criterion for distortionless base band binary transmission	Lecture	
Day18	Ideal Nyquist channel raised cosine spectrum	Lecture	Assignment 4
Day19	Correlative level coding Duo binary signaling	Lecture	
Day20	Tapped delay line equalization	Lecture	
Day21	Adaptive equalization	Lecture	
Day22	LMS algorithm	Lecture	
Day23	Eye pattern	Lecture	Assignment 5
Day24	Elements of Detection Theory	Lecture	
Day25	Optimum detection of signals in noise	Lecture	
Day26	Coherent communication with waveforms	Lecture	
Day27	Probability of Error evaluations	Lecture	Assignment 6

Day28	Pass band Digital Modulation schemes- ASK	Lecture	
Day29	Phase Shift Keying	Lecture	Assignment 7
Day30	Frequency Shift Keying	Lecture	
Day31	Quadrature Amplitude Modulation	Lecture	
Day32	Continuous Phase Modulation	Lecture	
Day33	Minimum Shift Keying	Lecture	
Day34	Signal space diagram and spectra of the above systems	Lecture	
Day35	Effect of intersymbol interference	Lecture	Assignment 8
Day36	Bit symbol error probabilities	Lecture	
Day37	Synchronization	Lecture	
Day38	Digital Modulation tradeoffs	Lecture	
Day39	Optimum demodulation of digital signals over band-limited channels	Lecture	
Day40	Maximum likelihood sequence detection (Viterbi receiver)	Lecture	
Day41	Equalization Techniques	Lecture	
Day42	Synchronization and Carrier Recovery for Digital modulation.	Lecture	

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Haryana Engineering College, Jagadhri

Lesson Plan of Electronics & Comm. Engineering Deptt. 4th Semester

Subject : Analog Circuits (EC-206A)

Objective of Course :

1. To make the students understand the analysis of various BJT and FET amplifiers using small signal models.
2. To teach the students the concept of describe the frequency response of multistage amplifiers and the detailed concept of feedback topologies.
3. To make the students learn various oscillator circuits using both Op-Amp and BJT.
4. To teach the students the various application circuits of Op-Amp and designing for a given specification.

Day	Topic / Chapter Covered	Academic Activity	Test/Assignment
Day 1	Amplifier Models	Lecture	
Day 2	Amplifier types: Voltage amplifier, current amplifier	Lecture	
Day 3	Trans-conductance amplifier and trans-resistance amplifier	Lecture	
Day 4	Comparison based on input impedance and output impedance	Lecture	Assignment 1
Day 5	Small signal analysis of BJT amplifiers	Lecture	
Day 6	CE, CB	Lecture	
Day 7	CC amplifiers using r_e model	Lecture	
Day 8	Small signal analysis of the CS JFET amplifiers	Lecture	
Day 9	Estimation of voltage gain, input resistance, output resistance etc.	Lecture	
Day10	Design procedure for particular specifications of amplifiers.	Lecture	
Day11	Transistor Frequency Response	Lecture	
Day12	Class A, class B	Lecture	
Day13	class C amplifiers	Lecture	Assignment 2
Day14	Calculation of maximum efficiency	Lecture	
Day15	Frequency response of the amplifiers: low frequency, mid-frequency and high frequency region	Lecture	
Day16	Effect of cascading of amplifiers on the frequency response	Lecture	
Day17	Cut-off frequencies	Lecture	
Day18	Bandwidth and voltage gain	Lecture	
Day19	Miller effect	Lecture	
Day20	Feedback in amplifiers: Voltage series, current series	Lecture	
Day21	Voltage shunt, current shunt, effect of feedback on gain	Lecture	
Day22	Bandwidth, input impedance, output impedance.	Lecture	

Day23	Oscillators	Lecture	Assignment 3
Day24	Barkhausen criterion for oscillators	Lecture	
Day25	Types of Oscillators	Lecture	
Day26	RC phase shift oscillator	Lecture	
Day27	Wien bridge oscillator	Lecture	
Day28	LC oscillators	Lecture	
Day29	Hartley oscillator	Lecture	
Day30	Collpit oscillator	Lecture	
Day31	Derivation of frequency of oscillation for BJT and Op-amp configurations	Lecture	
Day32	555 timer: operation as astable and monostable multivibrator	Lecture	
Day33	Op-Amp Applications	Lecture	
Day34	Simple op-amp circuits: adder, subtractor	Lecture	
Day35	Schmitt trigger	Lecture	Assignment 4
Day36	Differential amplifier: calculation of differential gain, common mode gain	Lecture	
Day37	CMRR	Lecture	
Day38	OP-AMP design	Lecture	
Day39	Design of differential amplifier for a given specification	Lecture	
Day40	Design of gain stages and output stages	Lecture	

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Haryana Engineering College, Jagadhri

Lesson Plan of Electronics & Comm. Engineering Deptt. 4th Semester

Subject : Microprocessors & Microcontrollers (EC-210A)

Objective of Course :

1. Acquired knowledge about the architecture of Microprocessors and Microcontrollers.
2. Acquired knowledge about instruction set and programming concept of Microprocessors and Microcontrollers in assembly and C language.
3. To understand peripheral interfacing with Microprocessors and Microcontrollers.
4. To design the systems /models based on Microprocessors and Microcontrollers

Day	Topic / Chapter Covered	Academic Activity	Test/Assignment
Day 1	Evolution of Microprocessor	Lecture	
Day 2	Introduction to 8-bit Microprocessor 8085 architecture	Lecture	
Day 3	Pin Details 8085 Microprocessor	Lecture	
Day 4	8086 Architecture description of data registers, address registers; pointer and index registers	Lecture	Assignment 1
Day 5	PSW, Queue	Lecture	
Day 6	BIU and EU	Lecture	
Day 7	8086 Pin diagram descriptions	Lecture	
Day 8	Generating 8086 CLK and reset signals using 8284	Lecture	Assignment 2
Day 9	WAIT state generation	Lecture	
Day10	Microprocessor BUS types and buffering techniques	Lecture	
Day11	8086 minimum mode and maximum mode CPU module	Lecture	
Day12	8086 CPU Read/Write timing diagrams in minimum mode and maximum mode.	Lecture	
Day13	8051 Architecture	Lecture	
Day14	On-chip memory organization – general purpose registers	Lecture	
Day15	SFR registers	Lecture	
Day16	Internal RAM and ROM	Lecture	
Day17	Oscillator and Clock circuits	Lecture	
Day18	Pin Diagram of 8051	Lecture	Assignment 3
Day19	I/O Pins, Port	Lecture	
Day20	Connecting external memory	Lecture	
Day21	Counters and Timers	Lecture	
Day22	Purpose of TCON & TMOD registers	Lecture	
Day23	Serial data transmission/reception and transmission modes	Lecture	
Day24	Purpose of SCON & PCON registers	Lecture	
Day25	Different Types of Interrupts	Lecture	

Day26	Purpose of Time Delays	Lecture	
Day27	8051 addressing modes	Lecture	Assignment 4
Day28	8086 Instruction format, addressing modes	Lecture	
Day29	Data transfer instructions, string instructions, logical instructions, arithmetic instructions	Lecture	
Day30	Transfer of control instructions	Lecture	
Day31	Process control instructions	Lecture	
Day32	8051 Data transfer instructions	Lecture	
Day33	Arithmetic and logical instructions	Lecture	
Day34	Jump and Call instructions	Lecture	
Day35	I/O port	Lecture	Assignment 5
Day36	Timer and Counter programming	Lecture	
Day37	Serial port and Interrupt programming	Lecture	
Day38	Assembly language programs	Lecture	
Day39	Memory devices	Lecture	
Day40	Address decoding techniques	Lecture	
Day41	Interfacing SRAMS; ROMS/PROMS	Lecture	
Day42	8086 Interrupt mechanism; interrupt types and interrupt vector table	Lecture	
Day43	Intel's 8255 - description and interfacing with 8086	Lecture	
Day44	ADCs and DACs, - types operation and interfacing with 8086.	Lecture	
Day45	Interfacing of Matrix Keyboards	Lecture	
Day46	ADC, DAC	Lecture	
Day47	Temperature Sensor	Lecture	Assignment 6
Day48	Stepper Motor with 8051	Lecture	

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Haryana Engineering College, Jagadhri

Lesson Plan of Electronics & Comm. Engineering Deptt. 4th Semester

Subject : Electromagnetic Field Theory (EC-214A)

Objective of Course :

The objective of this course is to familiarize the prospective Engineers with Electromagnetic Fields and their Theories.

Day	Topic / Chapter Covered	Academic Activity	Test/Assignment
Day 1	Vector analysis in all the three coordinate system, line, surface	Lecture	
Day 2	Volume integrals, gradient	Lecture	
Day 3	Divergence & curl of a vector & their physical significance	Lecture	
Day 4	Gauss Divergence theorem	Lecture	Assignment 1
Day 5	Stokes theorem	Lecture	
Day 6	Gauss law in electrostatics & its applications	Lecture	
Day 7	Uniform line	Lecture	
Day 8	Surface & volume charge distributions	Lecture	Assignment 2
Day 9	Concepts of electric field & electric potentials	Lecture	
Day10	Electric field & potential due to a linear dipole	Lecture	
Day11	Method of images	Lecture	
Day12	Biot Savart's law	Lecture	
Day13	Amperes circuital law & its applications	Lecture	Assignment 3
Day14	Boundary conditions for both the electric & magnetic fields at the interface of various types of media	Lecture	
Day15	Laplace	Lecture	
Day16	Poisson's equation & continuity equation	Lecture	
Day17	Faraday's & Lenz's laws	Lecture	
Day18	How Maxwell fixed Ampere’s law	Lecture	Assignment 4
Day19	Maxwell's equations in differential & integral forms & their physical significance in circuit theory	Lecture	
Day20	Retarded potentials	Lecture	
Day21	Plane & uniform plane waves and their properties	Lecture	
Day22	Waves equations in various media	Lecture	
Day23	Polarisation & its types	Lecture	Assignment 5
Day24	Intrinsic impedance	Lecture	
Day25	Propagation constant	Lecture	
Day26	Reflection & refraction of uniform plane waves at the interface of conductor- dielectric & dielectric - dielectric (both normal and oblique	Lecture	

	incidence)		
Day27	Relaxation time ,skin effect	Lecture	Assignment 6
Day28	Skin depth & surface impedance	Lecture	
Day29	Poynting vector theorem & its physical significance.	Lecture	Assignment 7
Day30	Distributed parameters, circuit parameters	Lecture	
Day31	Concepts of voltage & current flow on a transmission line	Lecture	
Day32	Transmission line equations, characteristic impedance	Lecture	
Day33	Reflection of transmission line	Lecture	
Day34	Maxima & minima	Lecture	
Day35	Standing wave ratio of a transmission line	Lecture	Assignment 8
Day36	Impedance matching	Lecture	
Day37	Smith's chart & its computational applications	Lecture	
Day38	Concept of Wave Guide and TE, TM	Lecture	
Day39	TEM modes in rectangular and circular wave guide	Lecture	
Day40	Cut off and guide wave length	Lecture	

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Haryana Engineering College, Jagadhri

Lesson Plan of Electronics & Comm. Engineering Deptt. 4th Semester

Subject : Basics of Analog Communication (ES-208A)

Objective of Course :

1. Describe different types of noise and predict its effect on various analog communication systems.
2. Understand and analyze various Amplitude modulation and demodulation methods.
3. Understand and analyze Angle modulation and demodulation methods.
4. Understand the concepts of Transmitters and Receivers and their circuits.

Day	Topic / Chapter Covered	Academic Activity	Test/Assignment
Day 1	Communication system and Noise: Constituents of communication system	Lecture	
Day 2	Modulation, Bandwidth requirement	Lecture	
Day 3	Noise, Classification of noise, Resistor noise	Lecture	
Day 4	Multiple resistor noise sources	Lecture	Assignment 1
Day 5	Noise Temperature, Noise bandwidth, Noise figure, its calculation and measurement	Lecture	
Day 6	Bandpass noise representation	Lecture	
Day 7	Noise calculation in Communication Systems: Noise in Amplitude Modulated System	Lecture	
Day 8	Noise in angle modulated systems.	Lecture	Assignment 2
Day 9	Analog Modulation Techniques: Theory of amplitude modulation, AM power calculations	Lecture	
Day10	AM modulation with a complex wave, Concepts of angle modulation	Lecture	
Day11	Theory of frequency modulation, Mathematical analysis of FM	Lecture	
Day12	Spectra of FM signals, Narrow band FM, Wide band FM	Lecture	
Day13	Phase modulation, Phase modulation obtained from frequency modulation	Lecture	Assignment 3
Day14	Comparison of AM, FM & PM.	Lecture	
Day15	AM Transmission: Generation of Amplitude Modulation	Lecture	
Day16	Low level and high level modulation, Basic principle of AM generation	Lecture	
Day17	Square law modulation, Vander bijl modulation	Lecture	
Day18	Suppressed carrier AM generation	Lecture	Assignment 4

	(Balanced Modulator) ring Modulator.		
Day19	AM Reception: Tuned Ratio Frequency (TRF) Receiver	Lecture	
Day20	Super heterodyne Receiver, RF Amplifier	Lecture	
Day21	Image Frequency Rejection, Cascade RF Amplifier	Lecture	
Day22	Frequency Conversion and Mixers	Lecture	
Day23	Tracking & and Alignment, IF Amplifier	Lecture	Assignment 5
Day24	AM detectors, Distortion in diode detectors, AM receiver characteristics	Lecture	
Day25	FM Transmission: FM allocation standards	Lecture	
Day26	Generation of FM by direct method, Varactor diode Modulator	Lecture	
Day27	Indirect generation of FM	Lecture	Assignment 6
Day28	The Armstrong method RC phase shift method	Lecture	
Day29	Frequency stabilized reactance FM transmitter, FM stereo transmitter, Noise triangle.	Lecture	Assignment 7
Day30	FM Reception: Direct methods of Frequency demodulation	Lecture	
Day31	Frequency discrimination (Balanced slope detector)	Lecture	
Day32	Foster seelay of phase discriminator, Ratio detector	Lecture	
Day33	Indirect method of FM demodulation, FM detector using PLL	Lecture	
Day34	Pre-emphasis / de-emphasis, FM receiver, FM stereo receiver.	Lecture	
Day35	SSB Transmission: Introduction, Advantages of SSB Transmission	Lecture	Assignment 8
Day36	Generation of SSB, The Filter method The Phase Shift Method	Lecture	
Day37	The Third Method, Pilot Carrier SSB	Lecture	
Day38	Vestigial Side-band Modulation (VSB), VSB-SC	Lecture	
Day39	Application of AM and FM in TV transmission.	Lecture	
Day40	SSB Reception: SSB Product Demodulator	Lecture	
Day41	Balanced Modulator as SSB Demodulator, Pilot Carrier SSB Receiver	Lecture	
Day42	Modern Communication Receiver.	Lecture	
Day43	Analog Pulse Modulation: Introduction, Pulse amplitude	Lecture	Assignment 9

	modulation (PAM), PAM Modulator Circuit, Demodulation of PAM Signals		
Day44	Pulse Time Modulation (PTM): Pulse Width Modulation (PWM)	Lecture	
Day45	Pulse Position Modulation (PPM), PWM and PPM Demodulator	Lecture	

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