SUBJECT		Exam Duration	Contact Hours per Week			Credits	Max. Marks	Min Pass Marks
Code	Title		L	T	P			
EC-4401	Principle of Analog Communication	3 Hours	3	1	2	4 + 1	70	22

Unit-I

Basic tool for communication, Review of Fourier Transform and Its Properties, Convolution and Convolution with impulse Function, Energy and Power Signal, Energy and Power Spectral Density,Parsevals Relation, Impulse Response of LTI System Distortion less system and its impulse response, Types of Distortion in communication System, Hilbert Transform and its Properties.

Unit-II

Amplitude Modulation (AM) Spectrum of AM, Envelope Detection. Power Efficiency, modulation Index, Double Sideband Suppressed Carrier (DSB-SC) Modulation, Quadrature carrier multiplexing (QCM), Demodulation, Costas Receiver, Single Sideband Modulation (SSB), Complex Pre-envelope / Envelope.Demodulation of SSB.Vestigial Sideband modulation (VSB).Modulation index.Transmission efficiency.

Unit-III

Angle modulation, Frequency modulation (FM), Phase modulation (PM), Modulation Index, Instantaneous Frequency, Spectrum of FM Signals, Carsons Rule for FM Bandwidth, Narrowband FM Generation, Wideband FM Generation via Indirect Method, FM Demodulation : Foster seelay discriminator. Ratio Detector, pre-emphasis and De-emphasis circuits.

Unit IV

Noise, Sources and Types of noise and their power density, Multiple noise source for Linear system, Super Position of Power Spectrum, Bandwidth, Noise Figure, and Equivalent Noise temperature, their Relationship, Noise Performance of Communication System, Band Pass noise Representation in Terms of Low Pass, Figure of merit. Gaussian and white noise characteristics, Noise Performance in amplitude modulation systems, Noise in Frequency modulation system. Figure of Merit for FM.

Unit-V

Radio Transmitters and Receivers : AM Transmitters, SSB Transmitter, Comparisons of SSB, DSB and VSB, Directly Modulated FM Transmitter, Automatic Frequency Control, Effect of Heterodyning and Multiplication, Tuned Radio Receiver, Super heterodyne Receiver, Receiver Characteristics, AM Receivers, FM Receivers, Single and Double Tuned Vantage Amplifier, Frequency Mixer, Tracking, Automatic Gain Control.

BOOK AND REFERENCES :

1. Simon Haykin Communication System, IV edition. John Wilay& sons. Inc.
2. Fundamentals of wireless communication by DevidTse.
3. B.P Lathi Modern Analog and Digital Communication System. Wiley. Easten limited.
4. Taub and Schilling: Principles of communication System: TMH
5. Singh and Sapre. Communication Systém, TMH

List of Experiments :

1. To analyze double side band amplitude modulation generation and reception.
2. To study and analyse single side band amplitude modulation generation and reception.

1 Hour Lecture (L) = 1 Credit 1 Hour Tutorial (T) = 1 Credit 2 Hours Practical (P) = 1 Credit

Contd. … 2

3. To calculate modulation index of DSB wave of trapezoidal pattern.
4. To analyze frequency modulation using reactance modulation.
5. To analyze the operation of phase lock loop detector.
6. To study the operation of Ratio Detector.
7. To analyze the effect of different sampling frequency on the reconstructed signal.
8. To analyze the effect of 2^{nd} and 4^{th} order low pass filter (LPF) for reconstructed of the signal.
9. To analyze pulse amplitude modulation and modulation using flat top frequency.
10. To study time division multiplexing and De-multiplexing using pulse amplitude modulation.

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SUBJECT		Exam Duration	Contact Hours per Week			Credits	Max. Marks	Min Pass Marks
Code	Title		L	T	P			
EC-4402	Analog Circuits	3 Hours	3	1	2	4 + 1	70	22

UNIT - I :

Diode Circuits, Amplifier models: Voltage amplifier, current amplifier, trans-conductance amplifier and trans-resistance amplifier Basing schemes for BJT and FET amplifiers, bias stability, various configurations (such as CE/CS, CB/CG, CC CD) and their features, small signal analysis, low frequency transistor models, estimation of voltage gain, input resistance. Output resistance etc. design procedure for particular specifications.low frequency analysis of multistage amplifiers.

UNIT - II :

High frequency transistor models, frequency response of single stage and multistage amplifiers, cascode amplifier. Various classes of operation (Class A. B. AB. C etc. 1. then power efficiency and linearity issues: Feedback topologies: Voltage séries, current series, voltage shunt, current shunt, effect of feedback on gain, bandwidth etc., calculation with practical circuits, concept of stability, gain margin and phase margin.

UNIT - III :

Oscillators: Review of the basic concept. Barkhausen criterion. RC oscillators(phose shift.Wien bridge etc.). LC oscillators (Hartley, Colpitt. Clapp etc.), non-sinusoidal oscillatorsCurrent mirror: Basic topology and its variants. V-1 characteristics, output resistance and minimum sustainable voltage (VON), maximum usable load.Differential amplifier.Basic structure and principle of operation, calculation of differential gain.common mode gain. CMRR and ICMR. OP-AMP design: design of differential amplifier for a given specification. design of gam stages and output stages, compensation.

UNIT - IV :

OP-AMP applications: review of inverting and non-inverting amplifiers, integrator and differentiator, summing amplifier, precision rectifier. Schmitt trigger and its applications. Active filters: Low pass, high pass, band pass and band stop. design guidelines.

UNIT - V :

Digital-to-analog converters (DAC): Weighted resistor. R-2R ladder, resistorstring etc. Analog to-digital converters (ADC): Single slope, dual slope, successive approximation flash etc.Switched or circuits. Basic concept, practical configurations, application in amplifier.integrator, ADC etc.

Text/Reference Books:

1. J.V. Wait. LP. Huelsman and GA Korn, Introduction to Operational Amplifier theory and applications. McGraw Hill, 1992.
2. J. Millmon and A. Grabel, Microelectronics, 2nd edition. McGraw Hill, 1988.
3. P. Horowitz and W. Hill. The Art of Electronics, 2nd edition, Cambridge University Press. 1989
4. A.S. Sedra and K.C. Smith, Microelectronic Circuits. Saunder's College11 Publishing, Edition IV.
5. Paul R. Gray and Robert G.Meyer. Analysis and Design of Analog Integrated Circuits. John Wiley, 3rd Edition.

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Contd. … 2

List of Experiments :

1. To Plot and observed the I/O characteristics of FET amplifier.
2. To design a small signal voltage amplifier and plot its frequency response and also obtain its Band Width.
3. To Study of Class A, Class B and Class C amplifier.
4. To calculate and measure DC and AC voltage and calculate the efficiency for Class A Power amplifier.
5. To Design an RC phase shift oscillator using Op-amp for a given frequency of 1 KHz.
6. To design an Wien Bridge Oscillator.
7. To design and test Inverting and Non-inverting Amplifier.
8. To design and test Difference amplifier.
9. To Design and test Differentiator and integrator.
10. To Design and construct a schemit trigger using IC 741 op-amp.
11. To study of 4bit R-2R Ladder and Obtain Analog voltage from digital signal.
12. To Design Successive Approximation convertor circuit that converts Analog input signal to corresponding Binary output value.

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SUBJECT		Exam Duration	Contact Hours per Week			Credits	Max. Marks	Min Pass Marks
Code	Title		L	T	P			
EC-4403	Microcontroller and Microprocessor	3 Hours	3	1	4	4 + 2	70	22

UNIT - I :

Brief history of Microprocessor, system bus, Internal Block Diagram of 8086 – Execution Unit – Bus Interface Unit, Pin Configuration, Addressing Modes, Memory organization, Interrupts of 8086 – Dedicated interrupt types – Software interrupts – Hardware interrupts, priority of interrupts, instruction sets and programming.

UNIT - II :

Interfacing with peripherals – Programmable peripheral interface 8255, DMA controller 8257, programmable interval timer 8254/8254, programmable communication interface 8251, A/D and D/A converters.

UNIT - III :

Semiconductor memory, RAM, ROM, Memory Hierarchy, Cache Memory – organization and mapping, Associative memory, Virtual memory, Mapping techniques, memory interfacing.

UNIT - IV :

Advanced coprocessor Architectures 80826, 80486, Pentium processor ; microcontrollers ; 8051 Architecture, Pin configuration, Registers and Flages, memory organization of 8051.

UNIT - V :

Microcontrollers 8051 addressing modes, Instruction sets and programming, interrupts structure, stack and subroutine, application of 8051 microcontroller, RISC processors; ARM microcontrollers, interface designs, embedded processors, embedded system.

Text/Reference Books:

1. Morris Mano : Computer System Architecture, Phi.
2. Gaonakar : Microprocessor Architecture, Programming, Application with 8085 : Penram Int.
3. Williams Stallings : Computer Organization and Architecture, Phi.
4. Carter : Computer Architecture (Schaum) : TMH.
5. Carl Hamacher :Compure Organization, TMH.
6. Tanenbaum : Structured Computer Organization, Person Education.

List of Experiments :

1. To study Pin diagram of 8086 of Two 16 bit numbers.
2. Write a program for Addition of two 16 bit numbers.
3. Write a program for Subtraction of two 16 bit numbers.
4. Write a program for Multiplication of two 16 bit numbers.
5. Write a program for Addition of series of 16 bit numbers stored in consecutive memory locations.
6. Write a program to find out largest number among 16 bit numbers stored in consecutive memory locations.

1 Hour Lecture (L) = 1 Credit 1 Hour Tutorial (T) = 1 Credit 2 Hours Practical (P) = 1 Credit

Contd. … 2

7. Write a program to arrange 16 bit numbers in ascending and descending order stored in consecutive memory locations.
8. Write a program to perform binary to BCD conversion.
9. Write a program to perform BCD to Binary conversion.
10. Study of 8051 Microcontroller kit.

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ELX. & COMMUNICATION ENGINEERING, UEC, UJJAIN.

Syllabus for Four Years Bachelor of Technology Degree Course as per NEP-2020

July-2024

SUBJECT		Exam Duration	Contact Hours per Week			Credits	Max. Marks	Min Pass Marks
Code	Title		L	T	P			
EC-4404	Data Communication	3 Hours	3	1	0	4 + 0	70	22

UNIT - I :

Data Communication: Introduction, components, data representation, serial and parallel Transmission, Modes of data transmission, Line encoding, Unipolar, polar, Bipolar, analog and digital signals – Bit length, Digital Signal as a Composite analog signal, Transmission of Digital Signals, Data Rate Limits – noiseless channel, Noisy Channel, Topology.

UNIT - II :

OSI model, function of the layers, Protocols and standards, standards Organizations, Network Models, Transmission media : Guide media and unguided media, Transmission impairment performance, Switching : Circuit switching, Packet switching, Messages switching.

UNIT - III :

Introduction – Types of Errors, Redundancy, Detection Vs Correction Forward Error Correction Vs Retransmission, Modular Arithmetic. Block coding – Error Detection, Error Correction Hamming Distance, Minimum Hamming Distance. Linear Block codes, cyclic codes – cyclic Redundancy check, Hardware Implementation, polynomials, cyclic code analysis, Advantages. Checksum, Farming - Fixed and variable – size flow and Error control.

UNIT - IV :

Categories of Network : LAN, MAN, WAN, Interconnections of networks, Controlled Access – Reservation, Polling, Token passing. Channelization – Frequency – Division Multiple Access (FDMA), Time – Division Multiple Access (TDMA), Code – Division Multiple Access (CDMA)

UNIT - V :

Connecting LANs: Connecting Devices – Passive Hubs, Repeaters, Active Hubs, Bridges, Two – Layer Switches, Three – layer Switches, Gateway. Bus, Star Connecting Remote LANs, Logical addressing – Ipv4 Addresses – Address Space, Notation, Class full Addressing, Classes Addressing, and network Address Translation (NTA). IPv6 addresses – Structure and Address Space. Internetworking – Datagram Fragmentation, Checksum, options.

References :

1. B.A. Forouzan and Sophia Chung Fegan : Data Communication and Networking, 4 Ed, TMH.
2. W. Tomasi : Introduction to Data Communication and networking, Pearson Education.
3. A. S. Tanenbaum : Computer Networks, Pearson Education.
4. W. stalling : Data and Compute Communication, Pearson Education.
5. P. C. Gupta : Data Communications and Computer Networks, PHI.
6. A. Elahi and M. Elahi : Data network and internet – Communications Technology, Cengage Learning.
7. Duck : Data Communication and networking, Pearson Education.

1 Hour Lecture (L) = 1 Credit 1 Hour Tutorial (T) = 1 Credit 2 Hours Practical (P) = 1 Credit

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SUBJECT		Exam Duration	Contact Hours per Week			Credits	Max. Marks	Min Pass Marks
Code	Title		L	T	P			
HS-4405	Engineering Economics & Management	3 Hours	3	1	0	4 + 0	70	22

UNIT - I :

Introduction to Economics: Definitions, Nature, Scope, Difference between Microeconomics and Macroeconomics **Theory of Demand and Supply:** meaning, determinants, laws of demand, law of-supply, equilibrium between demand and supply. **Elasticity:** elasticity of demand, price elasticity, income elasticity, cross elasticity. **Markets:** meaning, types of market and their characteristics (perfect competition, monopoly, monopolistic completion, and oligopoly). **National income:** meaning, stock and flow concept, N1 at current price. NI at constant price, GNP, GDP, NNP, NDP, personal income, disposal incoine.

UNIT - II :

Basic economic problems: poverty meaning, absolute and relative poverty, causes, measure to reduce. **Unemployment:** meaning. types, causes, remedies. **Inflation:** meaning. types, causes. measure to control. **Money:** meaning, types, functions, monetary policy meaning. objectives, tools, fiscal policy meaning, objectives, tools. **Banking:** Meaning, types. functions, central bank- RBI; its function, concepts, CRR, bank rate, repo rate, reverse repo rate. SLR.

UNIT - III :

Introduction to management: definitions, nature, scope. Management and administration.skill. types and roles of managers. **Management principles**: scientific principles. administrative principles, Maslow's hierarchy of needs theory. **Functions of management:** planning, organizing, staffing, directing, controlling (meaning, nature and importance). **Organizational structures:** meaning, principles of organization, type s-formal and informal. line, line and staff, matrix. hybrid (explanation with merits and demerits), span of control. departmentalization.

UNIT - IV :

Theory of production: production function, meaning. f-actors of production (meaning and characteristics of land labor, Capital and entrepreneur), Law of variable proportion and law of return to scale. **Cost:** meaning, short run and long run cost, fixed cost, variable cost, total cost, average cost, marginal cost. opportunity cost. **Break even analysis:** meaning, explanation, numerical.**Introduction to production management:** definition, objectives, fish, plant layout. types and factors affecting it, plant location-factors affecting it.**Introduction to human resource of management:** definitions, objectives of manpower planning process. source of recruitment. process of selection.

UNIT - V :

Introduction to marketing management: marketing mix. concepts of marketing, deinand forecasting and methods, market segmentation. Introduction to finance management: meaning, scope, source, function. Introduction to corporate social responsibility, meaning. importance business ethics; meaning, importance.

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Contd. … 2

Text/Reference Books:

1. Engineering Economics, R. Paneerselvam. PHI publication
2. Fundamentals of Management: Essential concepts and Applications, Pearson Education. Robbins S.P. and Decenzo David A.
3. Economics: Principles of Economics, N Gregory Mankiw, Cengage Learning.
4. Principles and Practices of Management by L.M. Prasad
5. Principles of management by Tripathy and Reddy
6. Modem Economies Theory, by Dr. K.K. Dewett and M.H. Navalur" S. Chand publications.

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