EX- 601 – Signals & Systems

Unit I- Introduction to Signal & Systems: Signals, classification of signals, basic continuous time and discrete time signals, continuous LTI, discrete LTI systems , impulse and step functions, impulse response stability, linearity, stability, time invariance, eigen values and eigen functions, discrete convolution ,properties of discrete and continuous LTI systems ,systems described by difference and differential equations.

Unit II- Fourier Analysis of Continuous Time Signals and Systems: Fourier series, fourier series representation of continuous periodic signal & its properties, fourier transform and its properties, parseval's theorem, frequency response of LTI systems.

Unit III- Fourier Analysis of Discrete Time Signals & Systems: Discrete-time fourier series, discrete-time fourier transform (including DFT) and properties, frequency response of discrete time LTI systems, continuous time fourier transform for periodic and non-periodic signals, properties of CTFT.

Unit IV- Laplace & Z-Transform Transform: Laplace transform and its inverse: definition, existence conditions, region of convergence and properties, application of laplace transform for the analysis of continuous time LTI system, Z-Transform, properties of Z-transform inversion of Z-transform, two dimensional Z- transform, convergence of Z-transform, region of convergence and properties, application of Z-transform for the analysis of discrete time LTI systems, solving eq. using Z transform.

Unit V- State Space Analysis: Concept of state, state space representation discrete time LTI systems , state space representation of continuous time LTI systems ,solutions of state equation for discrete time LTI systems , solutions of state equation for continuous time LTI systems ,FFT.

Sampling: Sampling theorem, ideal & real sampling, reconstruction of signal from its samples, aliasing sampling in frequency domain, sampling of discrete-time signals.

References:

1. Alan V. Oppenheim, Alan S. Willsky and H. Nawab, Signals and Systems, Prentice Hall, 1997
2. Simon Haykin, Communication Systems, 3rd Edition, John Wiley, 1995.
3. Signals & Systems, 2nd Edition, by Alan Oppenheim, Alan Wilsky, S. Nawab. Prentice Hall, 1997.
4. Signals and Systems, by Simon Haykin and Barry Van Veen. Wiley, 1999.

EX-602 Power System - II

Unit-I Mechanical Features of Overhead Lines: Conductor material and types of conductor, conductor arrangements and spacing, calculation of sag and tension, supports at different levels, effect of wind and ice loading, stringing chart and sag template, conductor vibrations and vibration dampers.

Unit-II Parameters of Transmission Lines: Resistance, inductance and capacitance of overhead lines, effect of earth, line transposition, GMD and distance, inductance and capacitance of line with symmetrical and unsymmetrical spacing, inductance and capacitance of double circuit lines, skin and proximity effects, equivalent circuits & performance of short, medium and long transmission lines.

Unit-III I**nsulators**: Pin, shackle, suspension and strain insulators, voltage distribution across insulator string, grading and methods of improving string efficiency.

Unit-IV Underground Cables: Conductor, insulator, sheathing and armoring materials, types of cables, insulator resistance and capacitance calculation, electrostatic stresses and reduction of maximum stresses, causes of breakdown, thermal rating of cable, introduction to oil filled and gas filled cables.

Unit-V Economic Scheduling of Power Stations: Economic operation of power system, criteria of loading of power plants with and without transmission loss, load dispatching in power system, calculation of cost of generation, fixed charges, interest and depreciations methods of depreciation, power factor improvement.

References:

1. B. R. Gupta: Power System Analysis & Design, S. Chand Publishers. 2008
2. Soni, Gupta and Bhatnagar: A Course in Electrical Power, Dhanpat Rai. 1987
3. C. L. Wadhwa Electrical Power Systems, New Age. 2009
4. Nagrath Kothari: Modern Power System Analysis, MGH. 2011
5. J. J. Grainger & W. D. Stevenson: Power System Analysis, MGH. 2003
6. Kamaraju: Electrical Power Distribution Systems, MGH.

List of Experiment (Extendable):

1. Electrical design of transmission line.
2. Mechanical design of transmission line.
3. Drawing of Tower structure.
4. Drawing of insulators.
5. Drawing of cables.
6. Determination of transmission line parameters using MATLAB**.**

EX- 603 Control Systems

Unit I Introduction to Control System & Classification : Differential equations of systems, linear approximation, laplace transform and transfer function of linear system, model of physical system (electrical, mechanical and electromechanical), block diagram, signal flow graph, mason's gain formula, return difference and return ratio, error detectors, servomotor, tachogenerator, servo amplifier , magnetic amplifier, rotating amplifier.

Unit II Time Domain Analysis: Representation of deterministic signals, first order system response, s-plane root location and transient response, impulse and step response of second order systems, performance characteristics in the time domain, effects of derivative and integral control, steady state response, error constant, generalized definition of error coefficients, concepts of stability, Routh Hurtwitz criterion.

Unit III Frequency Domain Analysis: Frequency response bode plot, polar plot, nicol's chart, closed loop frequency response, frequency domain performance characteristics, and stability in the frequency domain, nyquist criterion.

Unit IV Root Locus Method: Basis theory and properties of root loci, procedure for the construction of root loci, complete root locus diagram, design and compensation of feed back control system, approaches to compensation, cascade compensation networks and their design in the frequency domain, simple design in s- plane.

Unit V State Variable Methods: Introduction to state variable concepts, state variable description of linear dynamic systems, representation in matrix forms, block diagram and signal flow graph representation of state equations – transfer matrix from state equations, transition matrix, general solution for linear time invariant state equations, basic principles of adaptive control systems.

References:

1. Ogata K, "Modern Control Engineering ", Prentice Hall
2. KUO B.C, "Automatic Control System", Prentice Hall
3. Nagarath & Gopal," Control System Engineering," Wiley Eastern
4. Bakshi & Goyal. Feedback control system, Technical publication.

List of Experiment (Extendable):

1. To determine speed torque characteristics of armature controlled D.C. servomotor.
2. To determine the speed torque characteristics and relationship between torque speed and control windings voltage by AC servomotor.
3. To obtain the step response transient characteristics of first order electric system and to measure system parameters.
4. To plot the nyquist plot of a given transformer function using matlab.
5. To plot the bode plot of a given transformer function using matlab.

EX 604- Microprocessor and Microcontrollers

Unit-I History of computers: Timing and control, memory devices: semiconductor memory organization, 8-bit microprocessor (8085): Architecture, types of instructions, instruction set, addressing modes, flag register of 8085, and memory segmentation.

Unit-II 16-bit Microprocessors (8086/8088): Architecture, physical address, flag registers, memory organization, bus cycle, addressing modes, instruction set difference between 8086 and 8088, introduction to 80186 and 80286, assembly language programming of 8086/8088

Unit –III Data Transfer Schemes: Introduction, types of transmission, 8257 (DMA), 8255 (PPI), serial data transfer (USART 8251), keyboard-display controller (8279), Programmable Priority Controller (8259)

Unit-IV Programmable Interval Timer/ Counter (8253/8254): Introduction, modes, interfacing of 8253, applications, ADC and DAC: Introduction, DAC converters, ADC converters, DAC and ADC interfacing and applications.

Unit -V Microcontroller (8051): Introduction, architecture, instruction set, addressing modes, registers, memory organization, timers/counters, interrupts, addressing modes, 8051 instruction set , applications of microcontrollers.

References:

1. Hall Douglas V.,Microprocessor and interfacing, Revised second edition 2006, Macmillan, McGraw Hill .
2. A.K. Ray & K.M.Bhurchandi, Advanced Microprocessors and peripherals- Architecture, Programming and Interfacing, Tata McGraw – Hill, 2009 TMH reprint.
3. Kenneth J. Ayala, The 8086 microprocessor: programming and interfacing the PC, Indian -edition, CENGAGE Learning.
4. Muhammad Ali Mazidi and Janice Gillespie Mazidi, The 8051 Microcontroller and Embedded Systems, Pearson education, 2005.
5. Kenneth J. Ayala, The 8051 Microcontroller Architecture, III edition, CENGAGE Learning.
6. Microprocessor Architecture, Programming and Applications with the 8085 6/e October 2013, Ramesh Gaonkar.

List of Experiment:

1. To study 8085 based microprocessor system.
2. To study 8086 based microprocessor system.
3. Write an Assembly Language Program to add two 16 bit numbers.
4. Write an Assembly Language Program to subtract two 16 bit numbers.
5. To develop and run a program for finding out the largest/smallest number from a given set of numbers.
6. To perform multiplication/division of given numbers.
7. To perform computation of square root of a given number.

EX-605 Principles of Management & Managerial Economics

Unit I - Management: Scientific management, principles of management, administration and organization, difference and relationship between organization management and administration, importance of management, characteristics of management.

Unit II – **Management Planning**: Management functions, meaning of planning, advantages of planning, organizing: organizing defined, process of organizing, principles of organizing, organizational structure, staffing process of management, levels of management, project management.

Unit III - Decision Making: Introduction and definition, types of decisions, techniques of decision making, decision making under risk.

Unit IV - Managerial Economics: Introduction, nature & scope of managerial economics application of economics in managerial decision making, micro and macro-economics, theory of the firm, theory of production function.

Unit V - Productivity: Input-Output analysis, micro-economics applied to plants and industrial undertakings, production and production system, productivity, factors affecting productivity, increasing productivity of resources.

References:

1. Peter Dracker, Harper and Row: The Practice of Management.
2. Koontz: Essentials of Management, PHI Learning.
3. Staner: Management, PHI Learning.
4. Daft: Principles of Management, Cengage Learning.
5. T. N. Chhabra: Principle and Practice of Management, Dhanpat Rai, New Delhi.
6. Hirschey: Managerial Economics, Cengage Learning.
7. T. R. Banga and S.C. Sharma: Industrial Organisation and Engineering Economics, Khanna Publishers
8. O.P. Khanna: Industrial Engineering and Management, Dhanpat Rai.
9. Joel Dean: Managerial Economics, PHI learning.
10. V. L. Mote, Samuel Paul and G.S. Gupta: Managerial Economics Concepts & Cases, TMH, New Delhi.
11. V. L. Mote: Managerial Economics, TMH, New Delhi

EX 606 - Minor Project

The selection of topic should be from the subjects the student has studied so far or any topic related to real life problem. He should do the literature survey, analyze the problem and propose some solution for the same. The analysis of the problem may be done with the help of some software or any hardware (which may be made by the student).Following points are important:

1. Presentation of project with the help of power point presentation at the end of the semester is compulsory.
2. A detailed report regarding the topic should be submitted before the internal examination