ELECC-05

Consumer Electronics and Environmental Impact

1. **Hand Tools and their uses** Commonly used instruments and hand tools in Electronic Labs, Identification and use of screw drivers, pliers, tweezers, sense, wire stripper etc. Different types of soldering guns related to temperature and wattage, types of tips, solder materials, flux and other materials, soldering and desoldering stations. Different types of switches, electronic components-specifications and uses.

2. **AC and DC Measurements** Basic terms of AC and DC, Identification of meters for measuring, AC and DC parameters, use of multimeter, use of CRO, function generation, signal analyzer, spectrum analyzer

3. **Electronic Gadgets and Domestic Appliances** MICROWAVE OVENS – Microwaves (Range used in Microwave ovens), Microwave oven block diagram, Working and Safety instructions, Washing machines controller-Various types, Washing machines, Home security system, CCTV, Digital cable TV – Video on demand, Electronic toy industry and its stakeholders, DIGITAL ACCESS DEVICES – Digital computer-Internet access –functions and servicths – barcode scanner and decoder – Electronic Fund Transfer – Automated Teller Machine(ATMs), Mobile phones –GPRS & Bluetooth, GPS Navigation system,Audio systems, PC Mother bload/mg. Digital India for higher education-steps taken and future, cyber security and cyber policy

4. **E-waste** Composition of e-waste and its generation, e-waste management and its effect on health and society, Life cycle Analysis, role of e-waste management in this area of environment including Swachch Bharat Mission, Smart Cities etc.,

5. **Electromagnetic pollution** Causes of electropollution, ionizing and non-ionizing radiation, electromagnetic waves and its effect on biological tissues, growth and use of radio waves, radio wave analysis, diagram of electromagnetic waves, radio wave pollution due to mobile phones, tower, home/office appliances such as computers, Wi-Fi, consequences of energy pollution, electro-pollution exposure management.

Books recommended:

"Industrial Electronics and Control" Including Progr... Intelligent Controller,... Madhuri A. Joshi

"Consumer Electronics" ...Bali S. P.

"Semiconductor devices and circuits" T..... ...... Paynter

Electromagnetism and the Foundation of Life
by Robert O. Becker & G. Selden

"Cross, Gender and Medical Aspects of Electromagnetic Fields (Handbook of Biological Effects of Electromagnetic Fields)

Microprocessor and Microcontroller

1. **Microprocessor Architecture:** Basic microcomputer architecture, evolution, organization and application of microprocessors, Pin description and their functions, Architecture of 8085 – ALU, Timing and control units branches and Dataflow, Timing Diagram, Memory Read and Memory Write machine cycles, I/O Read and I/O Write machine cycles, CISC and RISC Processors.

2. **Instruction Set and programming of 8085:** Introduction to Instruction set, Data manipulating instructions, Date transfer instructions, Arithmetic and Logical instruction, Program control instructions, Special instructions, Flag status, Addressing modes – Direct, Indirect, Register, Immediate and Implicit and addressing modes, of 8085, 8-Bit addition and subtraction, 16-Bit addition and subtraction, Date timer operation, Time Delay and code conversion, Microprocessor based system design.

3. **Interfacing and Peripheral Devices:** Memory interfacing, I/O interfacing, Special purpose interfacing chips- 8155 (memory + I/O + timer), 8255 (I/O), 8251 (USART), 8253 (timer/storage), 8257 (DMA controller), 8259 (interrupt controller), 8279 (keyboard/display controller), Programmable controller, Microprocessor based data acquisition system, ADC 0800, ADC 0802 series, ADC 0804/0809

4. **8086 microprocessor:** Introduction, register organization, operating modes of 8086, memory addressing, addressing modes and interrupts of, programming of 8086, interrupts of 8086

5. **Microcontroller:** Introduction to 8-bit microcontrollers- 8051/8051

Books recommended:

1. Ram B. - Fundamentals of Microprocessoh and Micro Computers, Dhanpat Pub., N.D.
2. Singh R.P. - Microprocessor's Micro Controllers - A complete text, Galotia Pub., N.D.
3. Microprocessor 8085 - B S Gaonkar, Pensurie
4. Microprocessor 8085 - B Ram, Dhanpat Rai
5. Microprocessor 8086 – 80688 - Barry B Brey, PHI
6. Microcontrollers - Ayala, PHI
7. 8051 Microcontrollers - Mazidi, pearson

Advanced Analog and Digital Electronics

1. **Differential amplifier and OP-Amp:** Circuit design and performance characteristics. Adder, Timer and PLL, Comparator, Log and Antilog Amplifiers, Analog multiplier, Voltage follower, VCO, Constant Voltage source, Integrator, Differentiator, Inductor Simulation, Analog comparators, Generation of Square waves& Triangular sales, Low pass, High pass, Band pass, All pass filters, Notch, Switched – capacitor filter

2. **Combinational circuit design** Half adder & full adder, half subtractor& full subtractor, adder &subtractor, multiplexer, demultiplexer:decoder, encoder, priority encoder, comparator

3. **Analog and digital converters:**Design of DAC – Weighed-resistor DAC, Ladder DAC. Design of ADC- Ramp type, successive approximation type, dual-slope type, flash type converters

4. **Sequential circuit design:**Shift registers:SISO, SIPO, PISO, PIPO and universal shift register. Design of binary counters:asynchronous (ripple) counters, synchronous counters, Ring counters Johnson counter

5. **Memories:**Memory organization, Static and dynamic memory cells, RAM using shift registers, ROM, PROM, EPROM, and EEPROM, CD-ROM, Hard Disk, Flash memory

Books recommended:-

1. Malvino A.P. - Digital Principales and Application, Mc – Graw – Hill pub. N.Y.
2. Jain R.P. - Modern Digital Electronics, Tata McGraw-Hill pub. N.D.
3. Singh B. PandSingh R. - Advance Microprocessors and Microcontrollers, New Age Pub.
4. Nagrath I.J. - Electronic Analog and Digital Prentice Hall Publ.
5. Malbino and Brown Digital computer electronics, Tata Mc-Graw-Hill publ. N.Y.
6. Nagrath I.J - Electronic Analog and Digital Prentice Hall Pub.
7. SinghB.P.and Singh R. - Advance Microprocessor and Microcontrollers, New Age Pub.
8. Ramavan - Functional Electronics.
9. Operational Amplifiers: Theory and Design Hardcover – 7 Mar 2016by Johan H. Huljsing

ELECC-03

Signals and Systems

1. **Signal analysis:**Introduction,Basic continuous time signals, Basic discrete time signals, properties, properties of systems, Representation of signals in terms of impulses, continuous time system, convolution integral, properties of LTI system, Digital signal processing and its benefits, Discrete time (LTI) systems, Convolution sum.

2. **Fundamentals of discrete time system** Basic definitions, important sequence, Linear and time invariant system, impulse response, stalling, convolution, stability, Linear constant coefficient differences equations, FIR, IIR systems, illustrations of the above concepts using MATLAB, frequency domain analysis.

3. **Fourier analysis** Fourier Serisde Fourier transform(FT), properties, Inverse FT, convolution of continuous time signal, Nyquist rate and aliasing problem, Interpolation formula, frequency response of rectangular window, recovery of signal.

4. **Discrete Fourier Transform** DFT and its computation, properties, circular and linear convolution, FFT, Time and frequency discretization, IDFT, computation of DFT using FFT methodology, UNIT-IV-Z-transform, Z-transform, properties, calculation of IZT, Application to the solution of difference equation, System functions of a digital filter, convolution of filter using matrices, implementation of digital filter using system function. Design of digital filters.

5. **Basics of biomedical signal processing**Introduction, biopotential, cardio-vascular systems, Pressure pulses in the cardiac chamber, ECG, EEG & EMG, Blood pressure measurement.

Books recommended:

1. Fundamentals of Signals & Systems – A.J. Roberts (TMH)
2. Theory and Problems of Signals and Systems-Schaum Series
3. Fundamentals of Digital Signal Processing – B.C. Ludeman, Harper & Row
4. Introduction to Digital Signal Processing- Roman Kut, MGH
5. Introduction of Digital Signal Processing – J. G. Proskis, D. G. Manolakis
6. Digital Signal Processing – A.V. Oppenhann, R.W. Schafer, Prentice Hall
7. Theory and applications of digital Signal Processing-R.L. Rabiner, B. Gold, PHI
8. Introduction of Digital Signal Processing – J. R. Johnson, PHI

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