WITH EFFECT FROM THE ACADEMIC YEAR 2012 - 2013

SCHEME OF INSTRUCTION & EXAMINATION

B.E. IIIrd YEAR
(ELECTRONICS & COMMUNICATION ENGINEERING)

SEMESTER - I

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EC 301
LINEAR INTEGRATED CIRCUITS AND APPLICATIONS

Instruction | 4 Periods per week
Duration of University Examination | 3 Hours
University Examination | 75 Marks
Sessional | 25 Marks

Unit-I
**Differential Amplifiers**: Classification, DC and AC analysis of single/dual input Balanced and unbalanced output Configurations using BJTs. Level Translator.


Unit-II

Unit-III

Active Filters: Introduction, Butterworth 1st order, 2nd order low pass and high pass filters. Wide and Narrow Band-pass, Band-reject and All-pass filters.

Unit-IV
**Timer**: Introduction to 555 timer and its functional diagram, Monostable, Astable and Schmitt Trigger applications.
IC Function Generator: Analysis and Design of Function Generators using IC 8038 Voltage Controlled Oscillator: Operation and Applications using IC 566.

Phase Locked Loops: Introduction, Principles, Block Schematic and Description of IC 565, Applications of PLL: Frequency multiplication and frequency synthesis.

Unit-V
IC Regulators: Introduction, Analysis and design of regulators using 78XX and 723 monolithic ICs, Current limiting and Current foldback techniques using IC 723.

Data Converters: Introduction, basic Digital to Analog Converter techniques, Weighted Resistor DAC, Inverted R-2R Ladder DAC. Analog to Digital Converter: Types; Parallel Comparator ADC, Successive Approximation ADC and Dual Slope ADC. DAC and ADC specifications.

Suggested Reading:

EC 302
DIGITAL INTEGRATED CIRCUITS AND APPLICATIONS

Instruction 4 Periods per week
Duration of University Examination 3 Hours
University Examination 75 Marks
Sessional 25 Marks

Unit-I
Manufacturer’s designations for integrated circuits, Development of integrated circuits, Integrated circuit package types, Pin identifications and temperature ranges, IC characteristics, Introduction to diode and transistor logic families. TTL logic family, TTL series, Output configurations, Open Collector, Totem pole, Tri State logic.

Unit-II
Concept of negative logic, ECL logic family, MOS logic family (pMOS and nMOS) CMOS logic family and its characteristics, CMOS transmission gate (bilateral switch), and its applications, CMOS open drain and high impedance outputs. Dynamic MOS logic family, dynamic MOS inverter, dynamic NAND and NOR gates. Comparison of various logic families. Interfacing of CMOS and TTL driving CMOS ECL driving TTL and TTL driving ECL.

Unit-III
Design using TTL-74XX and CMOS 40XX series: Demultiplexers, drivers for LED and LCD displays, Multiplexers and their applications, Parity generators and Checker circuits, Digital Comparator and Digital. Parallel and serial binary adder/subtractor circuits using 2’s compliment, Multiplier, Decimal adder, look- ahead adder.

Unit-IV
Flip-flops and their conversions, Design of Synchronous and Asynchronous counters, Decade Counters, Cascading of BCD counters, application of counters, Shift register and applications, Familiarity with 74 XX and CMOS 40XX series of IC Counters. Sequence detector.
Unit-V
ROM, MROM, EPROM, EEPROM, RAM, Types, Architecture’s, operation and applications, NVRAM, Flash memory, CCD. Expanding word size and capacity. ASICs, Introduction to PLD’s, Architectures of PAL, PLA with operation.

Suggested Reading:
Unit-IV

Unit-V

Suggested Reading:

EC 304
AUTOMATIC CONTROL SYSTEMS
Instruction 4 Periods per week
Duration of University Examination 3 Hours
University Examination 75 Marks
Sessional 25 Marks

Unit-I
Control System fundamentals and Components: Classification of control systems, Open and Closed loop systems, Error sensing devices – potentiometers and syncros. AC and DC servo motors. Mathematical modeling of mechanical systems and their conversion into electrical systems. Block diagram reduction and Signal flow graphs.

Unit-II

Root locus techniques: Analysis of typical systems using root locus techniques. Effect of location of roots on system response.

Unit-III

Compensation: Cascade and feedback compensation using Bode plots. Phase lag, lead, lag-lead compensators. PID controller.

Unit-IV
**Unit-V**

**Suggested Reading:**

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**EC 305**

**MICROPROCESSORS AND MICROCONTROLLERS**

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<th>Periods per week</th>
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**Unit-I**

**8086/8088 Architecture and Instruction set:** Minimum and Maximum mode operations, 8086 control signal interfacing under minimum mode system, control signal interfacing under maximum mode using multiprocessing systems. Addressing modes, Interrupt structure, Instruction formats, Instruction execution timings. Evaluation of x86 series microprocessors.

**Unit-II**

**8086 Assembly Language programming:** Assembler directives and operators, programs using data transfer, arithmetic, logical, Branching and ASCII instructions. String processing, Procedures, Macros and stack, Basic programs using DOS functions. Introduction to assemblers and debugging tools.

**Unit-III**

**8086 Interfacing:** Memory interfacing using standard RAM, EPROM IC Chips, 8255 PPI, 8253/8254 programmable interval timers, need for DMA and interfacing with DMA controller (8257 IC), Keyboard & display controller (8279) interfacing, programmable communication interface (8251). Serial and parallel data transmission formats, USART interfacing.

**Unit-IV**

**8051 Microcontroller:** Classification, Internal architecture of 8051 and its pin configuration, Memory organization and expansion. 8051 instruction set, addressing modes and bit addressable features. Data transfer, arithmetic, logical and branching groups. Interrupt and I/O port structures and their operations. Assembly language Programming with 8051. 8051 timer and counter and its programming.
Unit-V

**Interfacing and Applications:** 8051 Serial data communication and interrupt programming. 8051 Interfacing with external memory, expansion of I/O ports. A/D converter, D/A converter, Seven-segment display, LCD module, Keyboard and Stepper Motor interfacing with 8051.

**Suggested Reading:**

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**EC 331**

**INTEGRATED CIRCUITS LAB**

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**Lab Experiments:**

**Part-A**

7. IC Regulators and current boosting.
8. Applications of 555 Timer.

**Part-B**

1. Measurement of propagation delay, fan-out, Noise margin and transfer Characteristics of TTL and CMOS IC gates and open collector / drain gates.
2. Designing code converters using logic gates and standard code converters. Parity generator and checker circuit.
3. Flip-Flop conversions and latches using gates and ICs.
4. Designing Synchronous, Asynchronous up/down counters
5. Shift registers and ring counters using IC Flip-Flops & Standards IC counters.
6. Full adders, subtractors using logic gates and multiple bits IC Adder/Subtractor and arithmetic Circuits.
7. Mux - Demux applications.
8. Interfacing counters with 7-segment LED/LCD display units.

General Note:
1. At least 5 experiments from each part.
2. A total of not less than 10 experiments must be carried out during the semester.
3. Analysis and design of circuits, wherever possible, should be carried out using SPICE tools.

EC 333
MICROPROCESSORS AND MICROCONTROLLERS LAB

Instruction 3 Periods per week
Duration of University Examination 3 Hours
University Examination 50 Marks
Sessional 25 Marks

PART-A

[Experiments on assembly language programming for 8086 using Assembler]

1. Study and use of 8086 microprocessor trainer kit and execution of programs.
2. Programs using different addressing modes.
3. Multiplication and division.
4. Single byte, multi byte binary and BCD addition and Subtraction.
5. Code conversions.
6. String Searching and Sorting
7. Generation of waveforms and gating applications using 8253/8254 timers.

PART-B

[Experiments on assembly language programming for 8051 using Assembler]

10. Familiarity and use of 8051/8031 Microcontroller trainer kit, and execution of programs.
11. Programs using different addressing modes.
12. Timer and counter programming.
13. Interfacing for D/A applications.
15. Interfacing traffic signal control.
16. Program to control stepper motor.
17. 7-segment display/LCD display interfacing.

**General Note:**
1. At least 5 experiments from each part.
2. A total of not less than 10 experiments must be carried out during the semester.
3. Analysis and design of circuits, wherever possible should be carried out using SPICE tools.

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**WITH EFFECT FROM THE ACADEMIC YEAR 2012 - 2013**

**SCHEME OF INSTRUCTION & EXAMINATION**

**B.E. IIIrd YEAR**

**(ELECTRONICS & COMMUNICATION ENGINEERING)**

**SEMESTER - II**

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EC 351

DIGITAL COMMUNICATION

Instruction 4 Periods per week
Duration of University Examination 3 Hours
University Examination 75 Marks
Sessional 25 Marks

Unit-I

Unit-II
Uncertainty, Information and entropy. Source coding, Shannon – Fano algorithm and Huffman coding. Discrete memoryless channels, Probability relations in a channel, priori & posteriori entropies, cascaded channels, mutual information, Channel capacity, information rate and information capacity. Rate distortion.

Unit-III

Unit-IV
Base band digital data transmission, error probability, matched filter, correlation receiver, coherent and non-coherent ASK, FSK, PSK, DPSK and QPSK, and error probability. Need for MSK Modulation, Comparison of digital carrier modulation schemes. M-ary signaling methods.

Unit-V
Need for spreading a code, generation and characteristics of PN sequences. Direct Sequence Spread Spectrum and Frequency hopping spread spectrum systems and their applications. Acquisition schemes for spread spectrum receivers, Tracking of FH and DS signals.

Suggested Reading:
EC 352

DIGITAL SIGNAL PROCESSING

Instruction: 4 Periods per week
Duration of University Examination: 3 Hours
University Examination: 75 Marks
Sessional: 25 Marks

Unit-I
Fast Fourier Transform: Overview of Discrete time Fourier Transform (DTFT), Discrete Fourier transform (DFT), – Efficient computation of DFT- Properties of DFT.
FFT algorithms – Radix-2 FFT algorithms – Decimation in Time – Decimation in Frequency algorithms - in place computation- bit reversal- Use of FFT algorithms in Linear Filtering and Correlation.

Unit-II

Unit-III

Unit-IV
Multirate Digital Signal Processing: Introduction - Decimation by a Factor D- Interpolation by a Factor I- Sampling Rate Conversion by a Rational Factor I/D- Implementation of Sampling Rate Conversion Multistage implementation of Sampling Rate Conversion- Sampling Rate Conversion by an Arbitrary factor- Application of Multirate Signal Processing.

Unit-V
Introduction to DSP Processors: Difference between DSP and other microprocessors architectures- their comparison and need for ASP, RISC and CPU- General purpose DSP processors- TMS 320C 54XX processors, architecture, addressing modes-instruction set.

Suggested Reading:
EC 353
ANTENNAS AND WAVE PROPAGATION

Instruction 4 Periods per week
Duration of University Examination 3 Hours
University Examination 75 Marks
Sessional 25 Marks

Unit-I
Principles of radiation, retarded potential and isotropic radiator, Basic antenna parameters: patterns, radiation intensity, far field, near field, Gain and directivity, Antenna Polarization, effective aperture, aperture efficiency. Point sources, Current distribution, infinitesimal dipole.

Unit-II
Half-wave dipole, quarter wave monopole, Effect of earth on vertical patterns, Loop antenna, Far field pattern of circular loop with uniform current. Helical Antennas: Axial mode pattern, wideband characteristics, radiation efficiency, Q, Bandwidth, S/N ratio.

Unit-III
Arrays of point sources, two element array with equal and unequal amplitudes, different phases. Linear array with uniform distribution, binomial array, principle of pattern multiplication. Broadside and End fire arrays, effect of inter element phase shift on beam scanning.

Unit-IV
VHF, UHF turnstile antennas, Rhombic Antenna, Yagi - Uda Array, Log periodic Antenna, Horn, Parabolic Reflector, Lens antennas. Microstrip antennas: different types, advantages and disadvantages of Microstrip antennas (Working principle and characteristics only). Antenna Measurements: Antenna Test Site, impedance, radiation pattern and gain measurement techniques, Antenna temperature.

Unit-V
Ground wave propagation, Space and Surface waves, Tropospheric refraction and reflection, Duct propagation, Sky wave propagation, Regular and irregular variations in ionosphere. Friis transmission formula, Line of sight propagation.

Suggested Reading:
EC 354

COMPUTER ORGANIZATION AND ARCHITECTURE

Instruction 4 Periods per week
Duration of University Examination 3 Hours
University Examination 75 Marks
Sessional 25 Marks

Unit-I
Data representation and Computer arithmetic: Introduction to Computer Systems, Organization and architecture, evolution and computer generations; Fixed point representation of numbers, digital arithmetic algorithms for Addition, Subtraction, Multiplication using Booth’s algorithm and Division using restoring and non restoring algorithms. Floating point representation with IEEE standards and its arithmetic operations.

Unit-II
Basic Computer organization and Design: Instruction codes, stored program organization, computer registers and common bus system, computer instructions, timing and control, instruction cycle: Fetch and Decode, Register reference instructions; Memory reference instructions. Input, output and Interrupt: configuration, instructions, Program interrupt, Interrupt cycle, Micro programmed Control organization, address sequencing, micro instruction format and microprogram sequencer.

Unit-III
Central Processing Unit: General register organization, stack organization, instruction formats, addressing modes, Data transfer and manipulation, Program control. CISC and RISC: features and comparison. Pipeline and vector Processing, Parallel Processing, Pipelining, Instruction Pipeline, Basics of vector processing and Array Processors.

Unit-IV

Unit-V
Memory organization: Memory hierarchy, Primary memory, Auxiliary memory, Associative memory, Cache memory: mapping functions, Virtual memory: address mapping using pages, Memory management.

Suggested Reading:
WITH EFFECT FROM THE ACADEMIC YEAR 2012 - 2013

EC 355

ELECTRONIC INSTRUMENTATION

Instruction 4 Periods per week
Duration of University Examination 3 Hours
University Examination 75 Marks
Sessional 25 Marks

Unit-I

Unit-II
Transducers: classification, factors for selection of a transducer, transducers for measurement of velocity, acceleration, force, radio activity, Hot wire anemometer. Passive electrical transducers- Strain gauges and strain measurement, LVDT and displacement measurement, capacitive transducer and thickness measurement. Active electrical transducers: Piezo electric, photo conductive, photo voltaic and photo emissive transducers.

Unit-III
Characteristics of sound, pressure, power and loudness measurement. Microphones and their types. Temperature measurement, resistance wire thermometers, semiconductor thermometers and thermocouples. Humidity measurement, resistive capacitive, aluminum oxide and crystal Hygrometer types.

Unit-IV
Block diagram, specification and design considerations of different types of DVMs. Digital LCR meters, Spectrum analyzers. The IEEE488 or GPIB Interface and protocol.
Delayed time base oscilloscope, Digital storage oscilloscope, and mixed signal oscilloscope. Introduction to virtual instrumentation, SCADA. Data acquisition system block diagram.

Unit-V
Biomedical Instrumentation: Human physiological systems and related concepts. Bio-potential electrodes Bio-potential recorders - ECG, EEG, EMG, X-ray machines and CT scanners, magnetic resonance and imaging systems, Ultrasonic Imaging systems.

Suggested Reading:
CM 371
MANAGERIAL ECONOMICS AND ACCOUNTANCY

Instruction 4 Periods per week
Duration of University Examination 3 Hours
University Examination 75 Marks
Sessional 25 Marks

UNIT-I

UNIT-II
Consumer Behaviour: Law of Demand, Determinants, Kinds; Elasticity of Demand (Price, Income and Cross-Elasticity); Demand Forecasting, Law of Supply, Concept of Equilibrium. (Theory questions and small numerical problems can be asked).

UNIT-III
Theory of Production and Markets: Production Function, Law of Variable Proportion, ISO quants, Economics of Scale, Cost of Production (Types and their measurement), Concept of Opportunity Cost, Concept of Revenue, Cost-Output relationship, Break-Even Analysis, Price – Output determination under Perfect Competition and Monopoly (theory and problems can be asked).

UNIT-IV
Capital Management: Its significance, determination and estimation of fixed and working capital requirements, sources of capital, Introduction to capital budgeting, methods of payback and discounted cash flow methods with problems. (Theory questions are numerical problems on estimating working capital requirements and evaluation of capital budgeting opportunities can be asked).

UNIT-V

Suggested Reading:
EC 381

DIGITAL COMMUNICATION LAB

Instruction 3 Periods per week
Duration of University Examination 3 Hours
University Examination 50 Marks
Sessional 25 Marks

1. PCM generation and detection
2. Error control coding
3. Data formats / channel encoding and decoding.
4. Linear Delta Modulation and Demodulation.
6. ASK generation and Detection.
7. FSK generation and Detection.
8. BPSK generation and detection
9. QPSK generation and detection
10. Minimum Shift Keying generation & detection
11. Optical Fibre measurements:
    Numerical aperture, Attenuation, E-O and O-E characteristics
12. Digital Fibre Optic Multiplexed Link
13. Modem characteristics.
14. Wavelength Division Multiplexing

General Note: At least 10 experiments are to be conducted.

EC 382

DIGITAL SIGNAL PROCESSING LAB

Instruction 3 Periods per week
Duration of University Examination 3 Hours
University Examination 50 Marks
Sessional 25 Marks

(A) Experiments on DSK and CCS
1. Solutions of difference equations
2. Impulse Response
3. Linear Convolution.
4. Circular Convolution
5. Study of procedure to work in real-time.
6. Fast Fourier Transform Algorithms: (DIT, DIF)
7. Design of FIR (LP/HP) using windows, (a) Rectangular, (b) Triangular
   (c) Hamming window
8. Design of IIR (HP/LP) filters.

(B) Experiments on signal processing.
1. DFT and FFT algorithm
2. Linear Convolutions
3. Circular Convolutions
4. FIR filter design using different data windows
5. IIR filter design: Butter worth, chebysheve type 1 and 2 and Bilinear transformation Methods.
6. Interpolation and Decimation.

Note:
1. Minimum of 5 from Part A and 5 from Part B is mandatory.
2. For section ‘B’, MATLAB with different toolboxes like Signal Processing, Signal Processing block set, and SIMULINK/ Mathematica/ any popular software can be used.
EC 383

INDUSTRIAL VISIT / STUDY

Atleast 3 days in Semester  3 x 8 = 24 hours
Sessional / Examination  Grade*

Students are expected to visit at least two industries during the semester and submit a detailed technical report about the industrial visit/study. The department should evaluate the reports through a committee consisting of i) Head of the department ii) two faculty members to award the Grade.

*Excellent / Good / Very Good / Satisfactory / Unsatisfactory

* * *