CE/CS / EB/ EC /EE/ EI/IT/ ME/SE 401 ENGINEERING MATHEMATICS III

Module I

Complex Analytic functions and conformal mapping: curves and regions in the complex plane, complex functions, limit, derivative, analytic function, Cauchy - Riemann equations, Elementary complex functions such as powers, exponential function, logarithmic, trigonometric and hyperbolic functions.
Conformal mapping: Linear fractional transformations, mapping by elementary functions like Z^2, e^z, sin z, cos z, sin hz, and Cos hz, Z+1/Z.

Module II

Complex integration: Line integral, Cauchy's integral theorem, Cauchy's integral formula, Taylor's series, Laurent's series, residue theorem, evaluation of real integrals using integration around unit circle, around the semi circle, integrating contours having poles, on the real axis.

Module III

Partial differential equations: Formation of partial differential equations. Solutions of equations of the form F(p, q) = 0, F(x,p,q)=0, F(y,p,q)=0, F(z,p,q)=0, F1(x,p) = F2 (y,q), Lagrange's form Pp+Qq = R. Linear homogeneous partial differential equations with constant co-effients.

Module IV

Vibrating string : one dimensional wave equation, D'Alembert's solution, solution by the method of separation of variables ,One dimensional heat equation, solution of the equation by the method of separation of variables. Solutions of Laplace's equation over a rectangular region and a circular region by the method of separation of variables.

Text Books:

1. R.K.Jain, S.R.K.Iyengar, *Advanced Engineering Mathematics*, Narosa Publishers.
2. C.R.Wilie & L.C.Barrett ,*Advanced Engineering Mathematics*, Mc Graw Hill

References:

1. Ervin Kreyszig, *Advanced Engineering Mathematics*, Wiley Eastern
2. Churchill R.V, *Complex Variables & Applications*, Mc Graw Hill Publishers.
3. M.C.Potter, J.L.Goldberg, *Advanced Engineering Mathematics*, Oxford University Press

Type of questions for University Examination
Question 1 - 8 short answer questions of 5 marks each. 2 questions from each module
Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks

CS/EB/EC/EI 402 MICROPROCESSORS

Module I

Introduction to 8 bit microprocessor: Microcomputers and microprocessors, 8/ 16/ 32/ 64-bit microprocessor families; Internal architecture of Intel 8085 microprocessor: Block diagram, Registers, Internal Bus Organization, Functional details of pins, Control signals, External Address / Data bus multiplexing, Demultiplexing, I/ O mapped I/ O, and memory mapped I/ O techniques. Interrupts, Serial communication and DMA features

Module II

Assembly Language Programming: 8085 instruction set: Instructions, Classifications, Addressing modes, Stack and Subroutines, Delay routines, Counters etc. Programming examples.

Module III

Instruction Timing and Interrupts: Timing Diagrams (of various instructions): T- state, Machine cycle (Opcode fetch, Read / Write, Interrupt Acknowledge, Bus Idle, etc), Interrupts: -types (h/ w and s/ w), Maskable / Non maskable, their organization.

Module IV

Interfacing concepts and devices:
Memory interface: Concept of memory chip/ chips interface to 8085 with appropriate examples Programmable interfacing devices: - Programmable peripheral interface (Intel 8255), Programmable timer interface (Intel 8253/ 54), Programmable display / Keyboard interface (Intel 8279), Programmable serial communication interface (Intel 8251)-(their architecture, register organization, initialization, hard ware and software inter face to 8085.

Text Books:

1. Ghosh and Sridhar, *0000 to 8085 Microprocessors for Engineers and Scientists,* Prentice-Hall India, 2nd edition
2. Gaonkar , *Microprocesors, Architecture, Programming and Applications*, Wiley Eastern, 4th edition

References:

1. A.Nagoor Kani, *Microprocessors,architecture and programming,*RBA Publications
2. Douglas V.Hall , *Microprocessors,Interfacing and Peripherals,*Prentice Hall India

Type of questions for University Examination
Question 1 - 8 short answer questions of 5 marks each. 2 questions from each module
Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks

EC/EI 403 ELECTRONIC CIRCUITS II

Module I

Feedback amplifiers: Negative and positive feedback - Different types of negative feedback amplifier - voltage shunt-voltage series - current shunt - current series .Oscillators - Principle of sinusoidal oscillators - Bark Hausen criteria - RC oscillators - phase shift- Wienbridge - LC oscillators - Hartley , Colpitts -clapp oscillator, crystal oscillator.

ModuleII.

Power amplifiers -classification - class A , class B, Class AB, Class C and class D - Transformer coupled class AB Power amplifier - Transformerless class AB push-pull Power amplifier - complementary symmetry power amplifier - Harmonic distortion in Power amplifiers - Transistor rating -Heat sinks -Switching amplifiers

Module III

High frequency amplifier – Filter Design and Tuned amplifier - coupled circuit, unilateralisation of transistor, Q-factor, single tuned, double tuned and stagger tuned amplifier (analysis not required) - Wide band amplifier: Gain-bandwidth trade off. Wide band transistor configuration cascade emitter coupled - broad banding, bandwidth trade-off, wide band transistor configuration with negative feed back, frequency compensation - low frequency RC compensation High frequency compensation (analysis not required)

Module IV.

Differential amplifier:- Basic differential amplifier - dual input balanced output and unbalanced output- Internal block schematic of op amp - Biasing used in IC- Constant current source- Current mirror Circuits- Active Load – Level Shifters- Power amplifier stages. Power supply requirements.

Text Book:-

1. Sedra & Smith , *Microelectronic circuits*, Oxford University Press, 5th edition.

Reference :-

1. Millman & Halkias , *Electronic Devices & Circuits*, Tata Mc Graw Hill
2. Bapat K N , *Electronic Devices & Circuits* , Mc Graw Hill
3. Millman & Taub, *Pulse Digital and Switching Waveforms*, Tata Mc Graw Hill
4. Millman & Halkias , *Integrated Electronics*, Tata Mc Graw Hill
5. Boylestead & Neshelsky , *Electronic Devices & Circuits*, Pearson Education, 9th edition.
7. Schilling & Belove, *Electronic Circuits ,Discrete & Integrated* , Tata Mc Graw Hill
6. R.S.Moni, *Amplifiers*, Wiley Eastern
8. Gaykwad, *Op-amps and Linear integrated Circuits*, Pearson Education, 4th edition.

Type of questions for University Examination
Question 1 - 8 short answer questions of 5 marks each. 2 questions from each module
Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks

EC/EI 404 SIGNALS AND SYSTEMS

Module I

Continuous Time signals: Energy and Power signals, Exponential and sinusoidal signals, periodicity, Impulse and step signals. Continuous Time systems: Properties- Linearity, stability, causality, memory, invertibility, time invariance. Analysis of LTI System – impulse response- convolution-graphical analysis-properties of convolution, Differential equation representation.
Frequency analysis of CT systems - Fourier series Fourier Transform .Properties Convolution, multiplication,correlation,Parseval's relationship,Examples.Inverse relationship between time and frequency, Time- Bandwidth product, Signal Spectrum

Module II

Discrete Time signals: Energy and Power signals, Exponential and sinusoidal signals, periodicity, Impulse and step signals. Discrete Time systems: Properties:Linearity, stability,causality,memory,invertibility time invariance. Representation of systems- impulse response- convolution - Difference equation representation.
Frequency analysis of DT systems: Discrete Time Fourier Series Discrete Time Fourier Transforms, Z Transforms: Properties Analysis of LTI systems using Z transforms the inverse Z transform - System function. Sampling of CT and DT signals. Sampling Theorem Nyqust rate. Reconstruction -- ideal, zero order hold.

Module III

Random Signals and systems: Review of random variables and pdf. Random processes, statistical averages.Stationary processes, Ergodic processes. Random processes and LTI systems. Random processes in frequency domain Power spectrum of stochastic processes, variance Auto correlation and spectral densities - Properties Power spectral density. Gaussian , Rayleigh, Rice probability density-and White processes, band limited and band pass processes.

Module IV

Noise: .White noise, Narrow band noise, effective noise temperature and noise figure representation Sinewave contaminated with narrow band noise.Effect of noise in Systems; eg: Linear and angle modulation systems, threshold effect and threshold extension, pre-emphasis and de-emphasis filtering. Introduction to Detection and estimation, Matched filters

Text Books:

1. Openheim & Wilsky, *Signals & systems* , PHI/Pearson Education
2. Simon Haykin, *Communication Systems*, John Wiely
3. Proakis & Salehi , *Communication Systems* , Pearson Education, 2006

References :

1. A.Ambardar, *Analog & Digital Signal Processing*, Thomson Learning, 2nd Edition
2. B P Lathi , *Linear signal & Systems* ,Oxford University Press,2nd edition
3. C L Phillips .J M . Parr. E A Riskin , *Signals,Systems, And transforms* Pearson Education ,3rd Edition
4. R E Ziemer ,W H Tranter, D .R Fannin , *Signals and Systems* , Prentice Hall ,Fourth Edition
5. S S Soliman, M D Srinath, *Continuous and discrete signals and systems*, Prentice Hall India
6. Stark/Wood, *Probabilty and random process with application to Signal Processing*, Pearson Edu., 3rd ed.
7. Hwei-Hsu, *Analog & Digital Communication*, Schaums series, McGrawHill, 2nd edition

Type of questions for University Examination
Question 1 - 8 short answer questions of 5 marks each. 2 questions from each module
Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks

EC/EE 405 ANALOG COMMUNICATION

Module I.

Introduction–communication process, source of information, communication channels; Modulation – need, band width requirements – electromagnetic spectrum. Amplitude modulation – principles – visual concepts, modulation factor and percentage of modulation, mathematical relationship, component phasors, frequency spectrum, band selection. Amplitude modulators – ISB modulators – VSB modulation. AM transmitters – low level, high level – SSB systems – comparisons, mathematical analysis, SSB generation –SSB transmitters – filter method, phase shift method, third method. AM receivers – TRF receivers, Super heterodyne receiver, Double Super heterodyne receiver – SSB receiver – BFO, envelope detection, multi-channel Pilot carrier.

Module II.

Angle Modulation – mathematical analysis, principles, waveforms, frequency deviation, frequency analysis, bandwidth requirement, phasor representation–pre-emphasis, de-emphasis. FM modulators – direct, indirect, Phase modulators – direct. FM transmitters – direct FM, indirect FM; FM receivers-block diagram– demodulators – Tuned circuit frequency discriminators, slope detector, balanced slope detector, Foster-Seeley discriminators, ratio detectors – FM noise suppression; FM stereo broadcasting-stereo transmitter, stereo receiver (block level treatment only).

Module III.

Noise – external, internal – noise calculations, multiple noise sources, equivalent noise band width – Noise figure – Effective noise temperature, noise figure in terms of available gain – Noise in AM, angle modulation, pulse modulation – Performance of Communication systems – noise representation- Comparison of coded and uncoded systems - Characteristics of receivers – sensitivity, selectivity, double spotting, SNR – AGC circuitry – Performance of communication receivers – Comparison study of AM, FM and PM.

Module IV.

Telephony –Simple telephone communication, classification of switching systems, Basics of a switching system; Switches & Multiplexers, DTMF & Pulse signalling, Electronic switching – stored program control, centralized and distributed SPC, enhanced services, Time division, space division & combination switching, Signalling techniques; Traffic Engineering – Network traffic, load and parameters, grade of service, blocking probability, traffic congestion.

Text Books:

1. George Kennedy, *Electronic communication systems*, McGraw Hill ,4th edition
2. Thiagarajan-Viswanathan, *Telecommunication Switching Systems and Networks*, Prentice Hall, 2001

References:

3. Simon Haykin, *Communication Systems*, John Wiley & Sons, 2004.
4. Robert J Schoenbeck, *Electronic Communications Modulation & Transmission*, Prentice Hall, 2nd Ed.
5. Wayne Tomasi, *Electronic Communications Systems (Fundamentals through Advanced)* , Pearson Education 5th Ed.
6. B.P.Lathi, *Communication Systems*, B.S Publication, 2001
7. Taub & Schilling, *Principles of Communication Systems* ,Tata McGraw Hill, 1991
8. Roddy & Coolen, *Electronic Communications*, Pearson Education 4th Ed.
9. D.N.Krishnakumar, *Telecommunication & Switching*, Sanguine Publishers, 2006

Type of questions for University Examination
Question 1 - 8 short answer questions of 5 marks each. 2 questions from each module
Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks

EB/EC/EE/EI 406 INDUSTRIAL AND POWER ELECTRONICS

Module I.

Power transistors - Design of high power amplifier – switching transistors - Parallel operation of transistor - Power MOSFET - Operating principles - Structure and characteristics. Thyristors- Classification & Constructional Details. SCR - Working principle - turn on, turn off and V - I characteristics - gate characteristics, and rating: Series and parallel operation of SCR - TRIAC - characteristics, modes of operation, Trigger circuits - magnetic & solid state , half- wave and full-wave operation .

Module II.

Single phase controlled rectifiers - half-wave, full-wave, half-controlled and fully controlled - typical waveforms with R, RL, RL with diode and RL with voltage source - voltage and current equation for half-wave controlled rectifier. Three phase half-wave and full-wave controlled rectifier with R load, waveforms. DC motor speed control - various schemes - multiquardrant operation - simple circuits for speed control of series, PM and separately excited motors.

Module III.

Commutation schemes -(different classes) waveforms - single-phase invertors - series, parallel and bridge -PWM invertor - square wave and sin wave output. Chopper circuits using SCR transistor (detailed analysis not required) - Jones Chopper. A.C Motor speed control - various schemes - electronic control of speed of induction motors and synchronous motors.

Module IV.

Static switches: dc & ac switches-1φ and 3φ switches-design of static switches-Solid state relays.
Switching regulators - Basic concepts, analysis and design of Buck, Boost, Buck-Boost and derived converters .
UPS - Characteristics - Configuration – Application. Batteries: Characteristics and selection-charging circuits.
Thyristor protection - over current, over voltage, di/dt, dv/dt, gate protection.
Industrial applications: Timer circuits - Flasher circuits-Electronic ballast, dielectric heating, induction heating.

Text Book:

1. Muhammed H. Rashid, *Power Electronics – Circuits, Devices and Applications*, Prentice Hall of India , New Delhi, 1994.

References:-

2. *Power Electronics*, IMPACT Learning Material Series, Indian Society for Technical Education.
3. J. Michael Jacob, *Power Electronics: Principles & Applications*, Thomson, New Delhi, 2006
4. B. K. Bose, *Modern Power Electronics And AC Drives*, Pearson Education
5. Biswanth Paul, *Industrial Electronics and Control,* Prentice Hall of India, New Delhi, 2002
6. D W Hart, *Introduction to Power Electronics*, Pearson Education.
7. P C Sen, *Power Electronics*, Tata Mc Graw Hill
8. Singh & Khanchandani , *Power Electronics*, Tata Mc Graw Hill.
9. Asghar M syed , *Power Electronics* Prentice Hall of India
10. N Mohan, *Power Electronics* , John Wiely
11. Hays , *The art of Electronics* , Cambridge University Press

Type of questions for University Examination
Question 1 - 8 short answer questions of 5 marks each. 2 questions from each module
Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks

CS/EB/EC/EE/EI 407 DIGITAL ELECTRONICS LABORATORY

1. Half adder and full adder using NAND gates.
2. Code converters - Binary to Gray and gray to Binary using mode control
3. Binary addition and subtraction (a) 1's complement (b) 2's complement(using 7483)
4. BCD adder using 7483.
5. Study of MUX, DeMUX &Decoder Circuits and ICs
6. Set up R-S & JK flip flops using NAND Gates
7. Asynchronous UP / DOWN counter using JK Flip flops
8. Design and realization of sequence generators.
9. Study of shift registers and Implementation of Johnson and Ring counter using it.
10. Study of IC counters 7490, 7492, 7493 and 74192 or the CMOS equivalent.
11. Astable and monostable multi- vibrators using TTL gates.
12. Transfer characteristics and specifications of TTL gates

Note: 50% Marks is earmarked for continuous evaluation and 50% marks for end semester examination to be assessed by two examiners. A candidate shall secure a minimum of 50% marks separately for the two components to be eligible for a pass in that subject.

EC 408 ELECTRONICS CIRCUITS LABORATORY I

I Clipping and clamping circuits using diodes / transistors

II. Study of RC and RLC circuits - Frequency responses, pulse response, Filter characteristics,

III. Differentiating circuit and integrating circuit

IV Amplifying circuits

(i) Simple common emitter amplifier configuration - gain and bandwidth.

(ii)Common source amplifier

Functions of each component, gain measurement, frequency responses

V Feedback amplifier circuits - Current series and voltage shunt - gain and bandwidth..

VI Oscillators - RC phase shift. Wein Bridge, crystal oscillator

VII Multivibrators - Astable , Bistable,monostable.

VIII Switch& Sweep circuits - Simple transistor sweep, bootstrap sweep.

IX Power amplifiers

Note: 50% Marks is earmarked for continuous evaluation and 50% marks for end semester examination to be assessed by two examiners. A candidate shall secure a minimum of 50% marks separately for the two components to be eligible for a pass in that subject.