KANNUR UNIVERSITY
(Abstract)

MSc Electronics Programme - under Credit Based Semester System (CBSS) in Affiliated Colleges - Revised Scheme, Syllabus and Model Question Papers- Implemented with effect from ***2014 admission - Orders Issued.***

ACADEMIC BRANCH

No. Acad/C2/8542/2014 **Dated, Civil Station P.O, 16- 07-2014**

Read: 1.U.O No. Acad/C1/11460/2013 dated 12-03-2014
2. Minutes of the meeting of the Board of Studies in Electronics (Cd) held on 09-10-2013.
3. Minutes of the meeting of the Faculty of Science held 25-03-2014
4. Letter dated 07.07.2014 from the Chairman, BOS in Electronics (Cd)

ORDER

1. The Revised Regulations for PG Programme under Credit Based Semester System (CBSS) were implemented in this University with effect from 2014 admission as per paper read (1) above.

2. As per paper read (2) above the Board of Studies in Electronics (Cd) finalized the Scheme , Syllabus & model Question Papers of MSc Electronics programme to be implemented with effect from 2014 admission..

3. As per read (3) above the Faculty of Science held on 25-03-2014 approved Scheme, syllabus & model question papers of MSc Electronics programme to be implemented with effect from 2014 admission.

4. The Chairman, Board of Studies in Electronics (Cd) vide paper read (4) above has submitted the finalized copy of Scheme, syllabus & Model question papers of MSc Electronics programme for implementation with effect from 2014 admission.

5. The Vice Chancellor, after examining the matter in detail, and in exercise of the powers of the Academic Council as per section 11(1) of Kannur University Act 1996 and all other enabling provisions read together with, has accorded sanction to implement the revised scheme, syllabus& model question papers of MSc Electronics Programme with effect from 2014 admission.

6. Orders, are therefore issued implementing the revised scheme, syllabus & model question papers of MSc Electronics programme under Credit Based Semester System (CBSS) with effect from 2014 admission subject to report to Academic Council

7. Implemented revised Scheme, Syllabus & Model Question Papers are appended.

Sd/-
DEPUTY REGISTRAR (ACADEMIC)
FOR REGISTRAR

To

1. The Principals of Affiliated Colleges offering M.Sc Electronics Programme.
2. The Examination Branch (through PA to CE)

Contd.....2

Copy To:

1. The Chairman, BOS Electronics (Cd)
2. PS to VC/PA to PVC/PA to Registrar
3. DR/AR I Academic
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Forwarded/ By Order

Section Officer

KANNUR UNIVERSITY
KANNUR
PIN-670567
Date:.....
MANGATTUPARA

❖ ***For more details log on to www.kannur university.ac.in***

KANNUR UNIVERSITY

RESTRUCTURED CURRICULUM
FOR
POSTGRADUATE PROGRAMME
IN
ELECTRONICS

w. e. f. 2014 ADMISSION

SCHEME OF MSc ELECTRONICS

HOUR AND CREDIT DISTRIBUTION OF M.Sc ELECTRONICS

SEMESTER	NO OF THEO	NO PRACTICAL	THEORY		PRACTI		SEMINAR		VIVA		PROJE		TOTA Cr	TOTAL Hr	Total Marks
			Hr	Cr	Hr	Cr	Hr	Cr	Hr	Cr	Hr	Cr			
I	4	2	16	16	8	0	1	0	0	0	0	0	16	25	240
II	4	2	16	16	8	3+3	1	1	0	0	0	0	23	25	460
III	4	2	16	16	4	0	1	0	0	0	4	0	16	25	240
IV	4	1	16	16	4	3	1	1	0	2	4	3	25	25	560
Total				64		9		2		2		3	80	100	1500

No: of Courses

Courses	**No of papers**	**Credit**
Core-Theory	13	52
Core- Practical	3	9
Seminar	2	2
Elective	3	12
Viva	1	2
Project	1	3
Total	**23**	**80**

COURSE STRUCTURE

SEM	COURSE	TITLE OFTHE COURSE	MARK INTERNAL	MARK EXTERNAL	TOTAL	CREDIT
I	ELE1C01	APPLIED MATHEMATICS	12	48	60	4
	ELE1C02	DIGITAL SYSTEM DESIGN	12	48	60	4
	ELE1C03	ELECTRONIC INSTRUMENTATION	12	48	60	4
	ELE1C04	DIGITAL COMMUNICATION TECHNIQUES	12	48	60	4
Total					240	16

SEM	COURSE		TITLE OF COURSE	INTERNAL	EXTERNAL	TOTAL	CREDIT
II	ELE2C05		POWER ELECTRONICS	12	48	60	4
	ELE2C06		DIGITAL SIGNAL PROCESSING	12	48	60	4
	ELE2C07		MICROCONTROLLERS AND APPLICATIONS	12	48	60	4
	Elective-1	ELE2E01	MICROWAVE TECHNIQUES AND DEVICES	12	48	60	4
		ELE2E02	VIRTUAL INSTRUMENTATION				
		ELE2E03	MEDICAL ELECTRONICS				
	ELE2P01		DIGITAL AND COMMUNICATION LAB	20	80	100	3
	ELE2P02		DSP AND 8051 MICROCONTROLLER LAB	20	80	100	3
	ELE2C08		SEMINAR	20	------	20	1
Total						460	23

Elective-1

1. ELE2E01- MICROWAVE TECHNIQUES AND DEVICES
2. ELE2E02- VIRTUAL INSTRUMENTATION
3. ELE2E03- MEDICAL ELECRONCS

SEM	COURSE		TITLE OF THE COURSE	INTERNAL	EXTERNAL	TOTAL	CREDIT
III	ELE3C09		FUNDAMENTALS OF HDL	12	48	60	4
	ELE3C10		WIRELESS COMMUNICATIONS	12	48	60	4
	ELE3C11		EMBEDDED SYSTEM DESIGN	12	48	60	4
	Elective-2	ELE3E04	CRYPTOGRAPHY AND NETWORK SECURITY	12	48	60	4
		ELE3E05	INDUSTRIAL ELECTRONICS				
		ELE3E06	DIGITAL IMAGE PROCESSING				
Total						240	16

Elective-2

1. ELE3E04-CRYPTOGRAPHY AND NETWORK SECURITY
2. ELE3E05-INDUSTRIAL ELECTRONICS
3. ELE3E06-DIGITAL IMAGE PROCESSING

SEM	COURSE		TITLE OF THE COURSE	INTERNAL MARK	EXTERNAL	TOTAL	CREDIT
IV	ELE4C12		HIGH PERFORMANCE COMMUNICATION NETWORKS	12	48	60	4
	ELE4C13		VLSI DESIGN	12	48	60	4
	ELE4C14		ADVANCED CONTROL SYSTEMS	12	48	60	4
	Elective-3	ELE4E07	SATELLITE COMMUNICATION	12	48	60	4
		ELE4E08	REAL TIME SYSTEMS				
		ELE4E09	ARTFICIAL NEURAL NETWORKS				
	ELE4P03		VLSI AND PIC MICROCONTROLLER LAB	20	80	100	3
	ELEPR		PROJECT	20	80	100	3
	ELE4C15		VIVA VOCE		100	100	2
	ELE4C16		SEMINAR	20		20	1
Total						360	25

Elective-3

1. ELE4E07- SATELLITE COMMUNICATION
2. ELE4E08-REAL TIME SYSTEM
3. ELE4E09-ARTFICIAL NEURAL NETWORK

ELE 1C01 APPLIED MATHEMATICS

Module-1: NUMERICAL METHODS

Solution of algebraic and transcendental equations, Bisection method- secant method-Newton Raphson method. Solution of simultaneous algebraic equations, Gauss elimination method-Gauss Jordan method- Gauss method. Numerical solution of boundary value problem-Laplace's equation.

Module-2: THE WAVE EQUATIONS

Solution of initial and boundary value problems- characteristics- D'Alembert's solution-Significance of characteristic curves – Laplace transform solution for displacement in a long string – a long string under its weight – a bar with prescribed force on one end –free vibrations of a string.

Module-3: SPECIAL FUNCTIONS

Series solution – Bessel equations-Bessel functions- Legendre's equation- Legendre polynomial – Rodrigues formula- recurrence relations – generating functions and orthogonal property for functions of the first kind .

Module-4: PROBABILITY AND RANDOM VARIABLES

Probability concepts –random variables – Moment generation function – standard distributions – two dimensional random variables – Transformation of random variables – Correlation – regression system – queuing applications.

Module- 5: QUEUING THEORY

Single and multiple server Markovian queuing models – customer impatience – Priority queues – M/G/I queuing system – queuing applications.

Books for Study:

1. Sankara Rao k – Introduction to partial differential equations PHI,1995
2. Taha. H.A Operations research – An introduction 6th edition PHI,1995
3. S.Narayanan, T.K Manickvachagam pillay and R. Ramanaiah – Advanced mathematics for engineering studens- Vol.2, S.Viswanathan Pvt Ltd,1986

ELE 1C02 DIGITAL SYSTEM DESIGN

Module-1: ADVANCED TOPICS IN BOOLEAN ALGEBRA

INHIBIT/INCLUSION/AOI/Driver/Buffer gates, canonical forms, duality, Shannon's expansion theorem, Consensus theorem, Reed-Muller expansion

Mc. Cluskey decomposition method, Synthesis of multiple output combinational logic circuits byproduct map method.Hazards in logic circuits,design of static and dynamic hazard free logic circuits.

Module-2:SYMMETRIC FUNCTIONS AND THRESHOLD LOGIC

Symmetric functions-Totally symmetric, partially symmetric and elementary symmetric functions, Unity ratio symmetric functions,Unate functions.Threshold logic circuits- threshold function,linear seperability,representation and properties of threshold functions, various theorems in threshold logic, synthesis of threshold network.

Module-3:SEQUENTAIL LOGIC CIRCUITS

Introduction to digital systems, Mealy and Moore models, State machine-state diagram, state table, transition table, excitation table and realization. Design and analysis of synchronous sequential circuits-construction of state diagrams, state reduction and state assignment techniques, Algorithmic state machines(ASM).Asynchronous sequential circuits- Fundamental and pulse mode sequential machines,analysis,flow tables, state assignment and design problems.

Module-4:PROGRAMMABLE LOGIC DEVICES

Basic concepts, programmable logic devices- programmable array logic(PAL),programmable logic array(PLA),design examples, Complex PLD(CPLD),Field programmable gate arrays-types of FPGA,Xilinx XC3000 and XC 4000, configurable logic blocks(CLB),Input/output block(IOB), programmable interconnect points(PIP)

Suggested Books:

1. Abraham Kapndel- Foundation of Digital Logic Design
2. N.N. Biswas- Logic design theory
3. John.M. Yarbrough- Digital Logic Applications and Design
4. William J Fletcher- An Engineering Approach to digital design
5. Donald G. Givone, "Digital principles and Design", Tata McGraw Hill 2002.
6. Stephen Brown and Zvonk Vranesic, "Fundamentals of Digital Logic with VHDL Deisgn", Tata McGraw Hill, 2002
7. Mark Zwolinski, "Digital System Design with VHDL", Pearson Education, 2004
8. Parag K Lala, "Digital System design using PLD", BS Publications, 2003

ELE 1C03 ELECTRONIC INSTRUMENTATION

Module-1:Building blocks of Instrumentation System and Transducers
Block diagram of instrumentation system- performance characteristics of instruments – accuracy, precision, sensitivity, linearity, resolution, hysteresis, errors. Electrical transducers- classification- basic requirement of a transducer – displacement transducer- variable resistor, variable inductance – RVDT-LVDT- Variable capacitance – Hall effect- digital- piezo electric , pressure and temperature transducers- flow meter and photosensitive transducers.

Module-2: Signal Processing and Conditioning
Transducer bridges – instrumentation amplifier –isolation amplifier – logarithmic amplifier – , voltage and current amplifier – integrator and differentiator. Phase sensitive detector- peak detector – sample and hold circuit- RMS count-comparator linearization- V to F , F to V convertors – filters.

Module-3: Data Acquisition
Single channel, multi channel data conversion- A/D, D/A convertors – multiplexers- PID controller- application of micro processors: temperature control – control of petrol engine. Firing angle control of SCR- atmospheric data acquisition.

Module-4: Electronic instruments, recorders and displays
Standard lab equipments- signal generator – pulse generator – CRO- VTVM- wave analyze recorders- XY recorders- stripe chart recorder- oscilloscope recorder – digital recorder – digital read out CRO – digi tape recorder – digital displays.

Module-5: general purpose Electronic Instruments
Digital voltmeters and multimeters - electronic counters- AC millivoltmeters- wave analyzers and spectrum analyzers - frequency synthesizers – lock in amplifiers – frequency response analyzer phase meter.

Suggested Books:

1. C.S . Rangan, G.R Sharma and V.S.V Mani- Instrumentation – Devices and systems TMH 1983
2. W.D. Cooper, A.D Helfix- Electronic instrumentation and measuring techniques PHI 1988
3. D. Patranabis- Principles of industrial instrumentation
4. A.K sawney, Dhanpath Rai and sons- Electrical and electronic measurements and instrumentation.

ELE 1C04 DIGITAL COMMUNICATION TECHNIQUES

Module-1: : INFORMATION THEORY

Discrete massage, concept of amount of information, average information entropy, information rate, shanon's theorem, channel capacity of a gussian channel, bandwidth - s/n trade off, switching techniques.

Module-2: PULSE MODULATION

Sampling theory, sample and hold circuits. Time division (TDM) and frequency division (FDM) multiplexing, pulse amplitude modulation (PAM), pulse width modulation(PWM),pulse position modulation(PPM),pulse code modulation-Quantization: Uniform and Non-uniform Quantization, Compading Characteristics, Encoding, differential pulse code modulation (DPCM), Delta modulation (DM) ,inter symbol interference,correlative coding,eye pattern

Module-3:DIGITAL MODULATION TECHNIQUES

Digital Modulation formats, Coherent binary modulation techniques, Generation and Detection of Amplitude Shift Keying (ASK), frequency Shift keying (FSK), Phase Shift Keying(PSK) and Quadri Phase Shift Keying (QPSK),M-array PSK,Minimum shift keying(MSK), Non-coherent binary modulation techniques-DPSK

Module-4:SPREAD SPECTRUM MODULATION

Spread spectrum,pseudo noise sequence, Properties of PN codes, Theory of Spread Spectrum Modulation, Model of Spread Spectrum Digital Communication System, Direct-Sequence Spread Spectrum (DSSS), Frequency HopSpread-Spectrum (FHSS),applications-CDMA,Multipath suppression

Module-5:DATA NETWORKS

LAN,MAN,WAN, layered architecture, protocol hierarchies, design issues for the layers,interfaces and services,connection oriented and connectionless services,ISO-OSI reference model,TCP/IP model.

Suggested Books:

1. Simon Haykin, Digital Communication, John Wiley& Sons, 2005
2. Simon Haykin, Communication Systems, John Wiley& Sons , 2004
3. Taub & Schilling, Principles of Communication Systems, Tata Mc Graw Hill, 199
4. A.S.Tanenbaum,Computer networks.

ELE2P01: Digital and Communication Lab

PART A: DIGITAL LAB

1. Realization of parallel adder/Subtractors using 7483 chip
2. Binary to Gray code conversion and vice versa
3. MUX/DEMUX – use of 74151, 74138 for arithmetic circuits and code converter
4. Two bit comparator and study of 7485 magnitude comparator.
5. Encoder and Decoder.
6. D/A converter
7. A/D converter
8. Flip- Flops- JK Master slave, T type and D type.
9. Shift Registers- Serial/Parallel – input/output, Shift counters
10. Ripple Counters using FFs
11. Synchronous Counters using FFs
12. Sequence generators
13. Memory circuits- RAM, ROM
14. ALU- 74181 – Truth display
15. Parity Generator/Checker

PART B: COMMUNICATION LAB

1. Introduction to Simulink
2. Amplitude Modulation and Demodulation- AM-DSB/SC
3. Single Sideband Modulation and Demodulation and the Hilbert Transform
4. Frequency Modulation
5. Verification of Sampling theorem
6. Phase Locked Loops
7. Pulse Modulation- PAM,PPM,PWM
8. Digital Modulation
    - ASK
    - FSK
    - PSK
    - QPSK
    - DPSK
9. ISI and Eye pattern
10. Familiarization of Optical Fiber Trainer Kit and fundamentals of Fiber Optic Communication.

ELE 2C05 POWER ELECTRONICS

Module -1: Theory and Operation of SCR,UJT and TRIAC
Characteristics- design of relaxation oscillator using UJT- UJT in SCR and TRIAC triggering circuits – PUTs- SILCON bilateral switch- speed control of DC shunt motor using thyristors – single phase half wave speed control system- reversible control system.

Module-2 : Thyristor Commutation techniques
Introduction – natural commutation- forced commutation – self commutation – impulse commutation – response- pulse commutation – external pulse commutation – load side commutation and line side commutation- complementary commutation . Controlled rectifiers- introduction – principle of phase controlled converter – single phase semi converter – single phase series converter.

Module -3: Static Switches
Introduction- single phase AC switches, Three phase AC switches- three phase reversing switches- AC switches for bus transfer – DC switches- solid stste relays. AC voltage controller- introduction – principle of ON- OFF control – principle of phase control – single phase bidirectional controllers with resistive loads and inductive loads – cycle converters –single phase cycle converters.

Module-4 : DC Choppers
Introduction – principle of step down operation – step down with RL load – principle of step up operation- switch mode regulator – buck regulator – boost regulator – buck- Boost regulator – CUK regulator.

Module-5 : Inverters and Power Supplies
Introduction – principle of operation – single phase bridge inverters – three phase inverters – voltage control of single phase inverters. Introduction to power supply- AC and DC power supply – switched mode DC power supplies – resonant DC power supplies – Bi- Directional power supplies- AC power supplies.

Suggested Books:

1. M.H . Rashid- Power Electronics – Circuits, Devices and Applications, Prentice Hall
2. SEN- Power Electronics.

ELE 2C06 DIGITAL SIGNAL PROCESSING

Module-1:
Discrete time signals and systems-Linear time invariant system,static and dynamic system,causal and noncausal syatem,stable and unstable systems,FIR and IIF systems,Impulse response, Linear Convolution,Difference equation and its relationship with system function,impulse response and frequency response,Z-transform-definition, properties and inverse z-transforms,.

Module-2:
Discrete fourier transforms(DFT)-properties, Discrete Hilbert transforms, Fast Fourier transforms(FFT)-DIT and DIF algorithms,data shufflingand bit reversal,Digital filters-IIR filters,impulse invariant method and bilinear transformation-FIR filters, windowing,Effects of finite word length effects in digital filters- rounding and truncation error,quantization effects,coefficient quantization and limit cycle oscillations.

Module-3:
Architecture of digital signal processors-Introduction, Basic Architectural Features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities,Digital touch tone receiver,digital time division multiplexing-frequency division multiplexing,digital frequency synthesizer.

Module-4:
Applications of digital signal processing to speech,introduction,model of speech production,overall system,channel vocoder,vocoder analyzers and synthesizers, pitch detection, voiced and unvoiced decisions, homomorphic processing of speech, speech synthesizer and computer voice response system.

Module-5:
Applications to radar- introduction,parameter consideration,digital matched filter for radar signals, radar for air trafiic control, long range demonstration radar(LRDR), Digital matched filter for high performance radar.

Suggested Books:

1. Salivahanan-Digital signal processing,TMH publishing company.
2. Ramesh Babu- Digital signal processing
3. L.R Rabiner and B gold- Theory and application of digital signal processing.
4. B Venkataramani, M Bhaskar -Digital Signal Processors: Architecture, Programming and Application 2 Edition

ELE 2C07 MICROCONTROLLERS AND APPLICATIONS

MODULE-1:
INTEL 8051 : Architecture of 8051 - Memory organisation - Register Banks - Bit addressable area - SFR area – Addressing modes – Instruction set - Programming examples.

8051 Interrupt structure -Timer modules - Serial features - Port structure - Power saving modes - MCS51 Family features: 8031/8051/8751.

Module-2:
ARM PROCESSORS: ARM Programmer's Model – Registers – Processor Modes – State of the processor – Condition Flags – ARM Pipelines – Exception Vector Table – ARM Processor Families – Introduction to ARM Memory Management Unit.
ARM Addressing Modes – ARM Instruction Set Overview – Thumb Instruction Set Overview – LPC210X ARM Processor Features.

Module-3:
PIC MICROCONTROLLERS: Program memory – CPU registers – Register File Structure – Block diagram of PIC 16C74 – I/O ports.
Timer 0, 1 and 2 features – Interrupt logic – Serial peripheral interface – I^2 C Bus – ADC – UART – PIC Family parts.

Module-4:
PROGRAMMING CONCEPTS AND EMBEDDED PROGRAMMING
IN C: Software programming in assembly language (ALP) and in high level language 'C', 'C' programming elements: header and source files and preprocessor directives, program elements : macros and functions, Program elements : data types, data structures, modifiers, statements, loops and pointers

TYPICAL APPLICATIONS: Stepper Motor Control - DC Motor Control - AC Power Control - Introduction to micro controller development tools.

REFERENCES:
1. "8-bit Embedded Controllers", Intel Corporation, 1990.
2. John Peatman, "Design with Microcontrollers", McGraw Hill, Singapore, 1988.
3. John B Peatman, "Design with PIC Microcontrollers", Pearson Education Inc, India, 2005.
4. ARM System Developer's Guide", Andrew Sloss, Morgan Kaufmann Publishers, 2005
5. Steve Furber, "ARM System-on-Chip Architecture", Pearson Education, 2005
6. "LPC210x ARM Processor Datasheet" Rev. 5, Philips Electronics, 2004
7. "ARM7TDMI Technical Reference Manual", ARM Ltd., UK, 2004

ELE 2E01 MICRO WAVE TECHNIQUES AND DEVICES

Module-1:

Introduction-Frequency range, significance, applications; Guided waves- TE,TM,TEM waves, velocities of propagation; Transmission line theory: lumped element circuit model, transmission line parameters, transmission line equations, characteristic impedance, input impedance of lossless line, short circuited and open circuited ,lines, standing waves, reflection coefficient, VSWR , impedance matching devices- Quarter wave transformer, stub matching, Smith chart and its applications; Wave guides- rectangular wave guides: TE,TM waves, dominant and degenerate modes, impossibility of TEM waves in wave guides; Excitation of modes in rectangular waveguides, Planar transmission lines: strip lines, micro strip lines slot lines and coplanar lines.

Module -2:

Scattering matrix- Concept of N port scattering matrix representation- properties of s matrix, formulation of 2-port junction; Micro wave passive devices- Tee junction, E-plane Tee, H-plane Tee, Magic Tee, rat race, two hole directional coupler, isolator, circulator, phase shifter, attenuator, power divider, S matrix of E-plane, H-plane and magic Tee, directional coupler, and circulator. Micro wave resonators- transmission line resonator, $\lambda/2$ and $\lambda/4$ resonators, rectangular and circular cavity resonators, resonant frequency and Q factor, cavity excitation and tuning, coupled cavities; Micro strip resonators- disc and ring resonator.

Module-3:

Micro wave filters- filter implementation at micro wave frequencies, low pass Butterworth and Chebyshev filter design by insertion loss discrete components and stepped impedance. Micro wave measurements and application – measurement of power, VSWR, frequency, wavelength, insertion loss, impedance and attenuation; Basic concept of network analyzer and Anechoic chamber; Applications- ISM applications, micro wave radiation hazards.

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Module-4:

Solid state micro wave devices- Diodes- principle of operation and application of crystal diode, PIN diode, varactor diode, Tunnel diode, Gunn diode and Avalanche transit time devices; Basic principle of operation of parametric amplifiers, Manley-Rowe power relations, Negative resistance amplifier; Micro wave tubes- high frequency limitations- structure and principle of operation of two cavity Klystron, reflex Klystron, TWT, Magnetron, characteristics of micro wave transistors.

TEXT BOOKS:

1. "Micro wave engineering", David M Pozar, John Wiley 2/e 2003,
2. "Micro wave devices and circuits", Samuel Y Liaor, Pearson Education,3/e 2003
3." Micro wave engineering" – Annapurna Das and Sisir K Das Tata McGraw Hill, 2/e 2009

ELE2E02-VIRTUAL INSTRUMENTATION

Module-1:

INTRODUCTION: General Functional description of a digital instrument - Block diagram of a Virtual Instrument - Physical quantities and Analog interfaces - Hardware and Software - User interfaces - Advantages of Virtual instruments over conventional instruments - Architecture of a Virtual instrument and its relation to the operating system.

Module-2:

SOFTWARE OVERVIEW: LabVIEW - Graphical user interfaces - Controls and Indicators - 'G' programming - Data types - Data flow programming - Editing - Debugging and Running a Virtual instrument - Graphical programming pallets - Front panel objects - Controls, Indicators, Object properties and their configuration – Typical examples.

Module-3:

PROGRAMMING STRUCTURE: FOR loops, WHILE loop, CASE structure, formula node, Sequence structures - Arrays and Clusters - Array operations - Bundle - Bundle/Unbundle by name, graphs and charts - String and file I/O - High level and Low level file I/O's - Attribute modes Local and Global variables.

Module-4;

HARDWARE ASPECTS: Installing hardware, installing drivers - Configuring the hardware - Addressing the hardware in LabVIEW - Digital and Analog I/O function - Data Acquisition - Buffered I/O - Real time Data Acquisition.

Module-5:

LABVIEW APPLICATIONS: Motion Control: General Applications - Feedback devices, Motor Drives – Machine vision – LabVIEW IMAQ vision – Machine vision Techniques – Configuration of IMAQ DAQ Card - Instrument Connectivity - GPIB, Serial Communication - General, GPIB Hardware & Software specifications - PXI / PCI: Controller and Chassis Configuration and Installation.

REFERENCES:

1. Garry W Johnson, "LabView Graphical Programming", Tata McGraw Hill, 3rd Edition, 2001.
2. Sanjay Gupta and Joseph John, “Virtual Instrumentation Using LabVIEW”, Tata McGraw-Hill, Ist Edition, 2008.
3. LabView: Basics I & II Manual, National Instruments, 2006
4. Barry Paron, "Sensors, Transducers and LabVIEW", Prentice Hall , 2000.
5. William Buchanan and Bill Buchanan, “Computer Basics”, CRC Press, 2000

ELE2E03: MEDICAL ELECTRONICS

Unit 1: ACTION POTENTIAL AND TRANSDUCERS

Electrical activity in cells, tissues, and nervous systems-transducers-types and Characteristics-physiological transducers- pressure transducers – transducers for body Temperature measurement- Pulse sensors – respiratory sensors

Unit II : BIOSIGNAL ACQUISITION

Physiological signal amplifiers-isolation, amplifiers-medical pre-amplifier design –bridge Amplifiers – line driving amplifier –current amplifier –chopper amplifier-biosignal analysis – signal recovery and data acquisition- drift compensation in operational amplifiers- pattern recognition physiological assist devices

Unit III :BIOPOTENTIAL RECORDERS

Characteristics of recoding system- electro cardio grapy (ECG) – electro encephalography(EEG) –electro myography (EMG) –electroetinography (ERG)-electroculography (EOG) -recorders with high accuracy –recorders for OFF line analysis

Unit IV: SPECIALISED MEDICAL EQUIPMENTS

Digital thermometer –audio meter-X-ray machines –radiography and flowscopy –angiography – elements of bio –telemetry system - design of bio – telemetry system – radio telemetry system – pace makers – lung machine – kidney machine

Unit V :ADVANCED BIOMEDICAL INSTRUMENTATION

Computers in medicine – lasers in medicine – basic principles of endoscopes –nuclear imaging techniques – computer tomography (CT) , Scanning _ Ultrasonic imaging system-construction propagation and delay – magnetic resonance imaging (MRI).

TEXT BOOKS

1 BIOMEDICAL INSTRUMENTATION AND MEASUREMENTS- L.CROMWELL,

F.J.WEIBELL and E.A. PFEIFFER

2 BIOMEDICAL INSTRUMENTATION – M.Arumugham- Anuradha Publication

3.HANDBOOK OF BIOMEDICAL INSTRUMENTS –R.S.Khanddpur

ELE2P02: DSP and 8051 Micro controller lab

PART A: DSP LAB

1. Introduction to MATLAB
2. Discrete time Signals and Systems
3. Impulse Response
4. LTI System Convolution- Linear/Circular
5. DFT/IDFT
6. Finding response of the LTI system described by the difference equation
7. Auto/Cross Correlation
8. Z- transform and Inverse Z- transform
9. FIR Filter Design
10. IIR filter design
11. Image processing – Fundamental Experiments
12. Familiarization of DSP Trainer kit.

PART B: 8051 MICROCONTROLLER LAB

1. Arithmetic and Logical Operations
2. Largest and Smallest number in array
3. Sorting in Ascending and Descending order
4. Counters- Hex up/down, BCD up/down
5. Code converters
6. Real time clock
7. Study of Interrupt structure of 8051/8031 micro controllers
8. Program to show the use of INT0 and INT1
9. LED interfacing.
10. Seven segment display interfacing
11. LCD interfacing
12. Stepper motor interfacing
13. ADC/DAC interfacing
14. Traffic light control system
15. Temperature control system
16. Serial communication between controllers, between controller and PC

ELE 3C09 FUNDAMENTALS OF HDL

Module-1 :
Introduction: Why HDL? , A Brief History of HDL, Structure of HDL Module, Operators, Data types, Types of Descriptions, simulation and synthesis, Brief comparison of VHDL and Verilog

Module-2 :
Data –Flow Descriptions: Highlights of Data-Flow Descriptions, Structure of Data-Flow Description, Data Type – Vectors.
Behavioral Descriptions: Behavioral Description highlights, structure of HDL behavioral Description, The VHDL variable –Assignment Statement, sequential statements.

Module-3:
Structural Descriptions: Highlights of structural Description, Organization of the structural Descriptions, Binding, state Machines, Generate, Generic, and Parameter statements.
Procedures, Tasks, and Functions: Highlights of Procedures, tasks, and Functions, Procedures and tasks, Functions.
Advanced HDL Descriptions: File Processing, Examples of File Processing

Module-4:
Mixed –Language Descriptions: Highlights of Mixed-Language Description, How to invoke One language from the Other, Mixed-language Description Examples, Limitations of Mixed-Language Description.

Module-5:
Synthesis Basics: Highlights of Synthesis, Synthesis information from Entity and Module, Mapping Process and Always in the Hardware Domain.

TEXT BOOKS:
1. HDL Programming (VHDL and Verilog)- Nazeih M.Botros- John Weily India Pvt. Ltd. 2008.

REFERENCE BOOKS:
1. Fundamentals of HDL – Cyril P.R. Pearson/Sanguin 2010.
2. VHDL -Douglas perry-Tata McGraw-Hill.
3. A Verilog HDL Primer- J.Bhaskar – BS Publications
4. Circuit Design with VHDL-Volnei A.Pedroni-PHI.

ELE 3C10 WIRELESS COMMUNICATIONS

Module-1: Introduction to Wireless Communication Systems
Evolution of mobile radio communications, examples of wireless comm. systems, paging systems, Cordless telephone systems, comparison of various wireless systems. Modern Wireless Communication Systems: Second generation cellular networks, third generation wireless networks, wireless in local loop, wireless local area networks, Blue tooth and Personal Area networks.

Module-2: Introduction to Cellular Mobile Systems
Spectrum Allocation, basic Cellular Systems, performance Criteria, Operation of cellular systems, analog cellular systems, digital Cellular Systems. Cellular System Design Fundamentals: Frequency Reuse, channel assignment strategies, handoff Strategies, Interference and system capacity, tracking and grade off service, improving coverage and capacity.

Module-3: Multiple Access Techniques For Wireless Communication
Introduction to Multiple Access, FDMA, TDMA, Spread Spectrum multiple Access, space division multiple access, packet ratio, capacity of a cellular systems.

Module-4:. Wireless Networking
Difference between wireless and fixed telephone networks, development of wireless networks, fixed network transmission hierarchy, traffic routing in wireless networks, wireless data services, common channel signaling, ISDN (Integrated Services digital Networks), advanced intelligent networks.

Module-5: Intelligent cell concept and application
Intelligent cell concept, applications of intelligent micro-cell Systems, in-Building Communication, CDMA cellular Radio Networks.

Text Books:
1. Wireless Communications: Theodore S. Rappaport; Pearsons.
2. Mobile Cellular Telecommunication: W.C.Y.Lee; McGraw Hill

Reference Book:
1. Mobile Communications: Jochen Schiller; Pearson

ELE 3C11 EMBEDDED SYSTEMS DESIGN

Module-1:

INTRODUCTION : Introduction – Characteristics of Embedded Computing Applications – Challenges in Embedded Computing Design – The Design Process : Requirements – Specification – Architecture Design – Designing Hardware and Software Components – System Integration and Testing – Structural Description – Behavioral Description.

Module-2:

THE EMBEDDED COMPUTING PLATFORM : The CPU Bus – Memory Devices – I/O Devices – Component Interfacing – Development and Debugging – Testing – Design Example : Alarm Clock.

Module-3:

PROGRAM DESIGN AND ANALYSIS : Introduction – Design Patterns – Data Flow Graphs – Control/Data Flow Graphs – Assembly and Linking – Basic Compilation Techniques – Analysis and Optimization of Execution Time, Energy, Power and Program Size – Program Validation and Testing – Design Example : Software Modem.

Module-4:

SYSTEM DESIGN TECHNIQUES : Introduction – Design Methodologies – Requirements Analysis – Specifications – System Analysis and Architecture Design – Quality Assurance – Design Examples : Telephone PBX – Ink Jet Printer – Personal Digital Assistant – Set-Top Boxes.

SOFTWARE DEVELOPMENT AND TOOLS : Cross-Compilers, Cross-Assemblers, Linker/Locator, Debugger and Simulator. Introduction to KEIL Software: Simple Programs using KEIL Software. Getting Embedded Software into Target System: Up-loaders, ROM Emulators, In-Circuit Emulators. Introduction to JTAG

Module-5:

Real-Time Kernels and Operating Systems: Tasks and Things, Programs and Processes, The CPU is a resource, Threads – Lightweight and heavyweight, Sharing Resources, Foreground/Background Systems, The operating System, The real time operating system (RTOS), OS architecture, Tasks and Task control blocks, memory management revisited.

REFERENCES :

1. Wayne Wolf, "Computer as Components – Principles of Embedded Computing System Design", Harcourt India Pvt. Ltd., 2001.
2. David E Simon, "An Embedded Software Primer", Pearson Education, 2004.
3. Frank Vahid and Tony Givargis, "Embedded Systems Design : A Unified Hardware/Software Introduction", John Wiley, 2005.
4. Embedded Systems: Architecture and Programming, Raj Kamal, TMH. 2008.
5. Steve Heath, "Embedded Systems Design", Elsevier Science, 2003.

Arnold Berger, "Embedded Systems Design : An Introduction to Processes

ELE 3E04: CRYPTOGRAPHY AND NETWORK SECURITY

Module-1:
Services, mechanisms and attacks, The OSI security architecture, A model for network security.

Module- 2
SYMMETRIC CIPHERS: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Simplified DES, Data encryption standard (DES), The strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles and Modes of Operation, Evaluation Criteria for Advanced Encryption Standard, The AES Cipher.

Module - 3
Principles of Public-Key Cryptosystems, The RSA algorithm, Key Management, Diffie - Hellman Key Exchange, Elliptic Curve Arithmetic, Authentication functions, Hash Functions.

Module - 4
Digital signatures, Authentication Protocols, Digital Signature Standard. Web Security Consideration, Security socket layer (SSL) and Transport layer security, Secure Electronic Transaction.

Module-5
Intruders, Intrusion Detection, Password Management. Firewalls Design Principles, Trusted Systems.

TEXT BOOK:
1. Cryptography and Network Security, William Stalling, Pearson Education, 2003.

REFERENCE BOOKS:
1. Cryptography and Network Security, Behrouz A. Forouzan, TMH, 2007.

ELE 3E05: INDUSTRIAL ELECTRONICS

Module 1: OPTO ELECTRONIC AND OTHER ELECTRONIC DEVICES

Opto- electronics-Photo electric theory- Energy of photo electrons –Photo devices photo emissive cells – Photo conductive cells – photo Voltaic cells – photo multipliers – photo activated SCR –Photo FETs –photo resistive devices – LEDs- liquid crystal displays-optically coupled resonators Other Devices : static circuit breakers –Over voltage protection – automatic battery charges –AC and Dc switches, flashers

Module 2: REGULATED POWER SUPPLIES

DC voltage regulators – Different types of series Voltage regulators- polyphase rectifiers – Voltage and current regulations-Transformer utility factors – Rectifier performance

Module 3 : CONTROL OF MOTORS AND GENERATORS

DC motor characteristics-Automatic regulation of speed and over load contol by SCR and Miscellaneous methods – Electronic contol for reversing motors-Instability of AC motors – Variable speed induction motors – Torque – speed characteristics – Inverters for driving the motor- Speed control of AC motors –Synchronous motor control

Module 4 : RESIRTANCE WELDING AND INDUCTION HEATING

Resistance welding process –Circuit for AC welding –Types of resistance welding -Control processes Linear contractor –Thyratron – Heat control - Sequence timer Synchronous weld control-Energy storage welding - polyphase welding –Induction heating :Principle and theory of induction heating –merits and applications –High frequency power source for induction heating

Module 5: MEASUREMENT OF NON ELECTRICAL QUANTITIES

Pressure measurements- Mechanical pressure transducer –Measurements of displacement –level , flow, vacuum ,PH and thermal conductivity –Chromatography-Leak detection -Measurement of thickness and humidity

BOOKS FOR STUDY AND REFERENCE:

1 INDUSTRIAL AND POWER ELECTRONICS Haigh C Rai ,UMESH PUBLICATIONS NEW DELHI: IV EDITION 1992
2 INDUSTRIAL ELECTRONICS ,G.K.MITHAL,KHANNA PUBLISHERS, New Delhi 14 edition 1992
3 INDUSTIAL ELECTRONICS ,NOEL MORRIES TMH SECOND EDITION 1991
4 MODERN INDUSTRIAL ELECTRONICS ,Schuler & MC Name MACMILLAN International edition 1993

ELE 3E06: DIGITAL IMAGE PROCESSING

Module - 1
DIGITAL IMAGE FUNDAMENTALS: What is Digital Image Processing. fundamental Steps in Digital Image Processing, Components of an Image processing system, elements of Visual Perception. Image Sensing and Acquisition, Image Sampling and Quantization, Some Basic Relationships between Pixels, Linear and Nonlinear Operations.

Module - 2
IMAGE TRANSFORMS: Two-dimensional orthogonal & unitary transforms, properties of unitary transforms, two dimensional discrete Fourier transform. Discrete cosine transform, sine transform, Hadamard transform, Haar transform, Slant transform, KL transform.

Module-3
IMAGE ENHANCEMENT: Image Enhancement in Spatial domain, Some Basic Gray Level Trans -formations, Histogram Processing, Enhancement Using Arithmetic/Logic Operations.

Module-4
Basics of Spatial Filtering Image enhancement in the Frequency Domain filters, Smoothing Frequency Domain filters, Sharpening Frequency Domain filters, homomorphic filtering.

Module-5
Model of image degradation/restoration process, noise models, Restoration in the Presence of Noise, Only-Spatial Filtering Periodic Noise Reduction by Frequency Domain Filtering, Linear Position-Invariant Degradations, inverse filtering, minimum mean square error (Weiner) Filtering,

TEXT BOOK:
1. “Digital Image Processing”, Rafael C.Gonzalez, Richard E. Woods, etl , TMH , 2nd Edition 2010.

REFERENCE BOOKS:
1. “Fundamentals of Digital Image Processing”, Anil K. Jain, Pearson Education, 2001.
2. “Digital Image Processing and Analysis”, B. Chanda and D. Dutta Majumdar, PHI, 2003.

ELE 4P03: VLSI Lab

Experiments using XILINX Schematic Editor

1. Design of Half/Full adder, Half/Full subtractor
2. Design of 3:8 decoders
3. Design of 4:1 MUX
4. Design of 2-bit comparators
5. Design of 7-bit Odd parity generator
6. Design of circuit that gives square of 3-bit number
7. Design of 2's complement for 4-bit binary number
8. Design of 4-bit binary to Gray code conversion
9. Design of controllable Gray to binary/ Binary to Gray

Experiments using Concurrent VHDL constructs

1. Design of all logic gates
2. Design of Half/Full adder, Half/Full subtractor using logical operator
3. Design of 4:1 MUX
4. Design of 3:8 decoders with active high Enable input and active low outputs
5. Design of an optimized 4-bit BCD to Excees-3 code converter
6. Design of a 4-bit Adder with Sum and Carry outputs, Use arithmetic and concatenation operators
7. Design of full adder using 3:8 decoders
8. Design of 4:8 decoders

Experiments using Structural modeling

1. Design of a 4-bit Full adder , Use Half adder and single bit full adder as basic components
2. Design of 5:32 decoder using 3:8 decoder and 2:4 decoder as basic components
3. Design of a 4- bit comparator using single bit comparator as a basic component
4. Design of a 4-bit loadable decade up/down counter
5. Design of an edge triggered D type flip-flop with three state outputs
6. Design of an octal transparent latches with three state output

ELE 4C12 HIGH PERFORMANCE COMMUNICATION NETWORKS

Module-1:
Basics of networks – physical structure – topologies – LAN, MAN, WAN , protocols and standards, layered architechure, OSI model, TCP/IP protocol suite, addressing, switching techniques , repeaters, hubs , bridges , switches , routers and gateways.

Module-2:
Local area networks – Ethernet(IEEE802.3), CSMA/CD, binary back off algorithm , logical link control , token ring, token bus, FDDI, DQDB, SMPS, Wireless LAN-802.11, Bluetooth.

Module-3:
Virtual circuit networks- frame relay X.25, architecture , layers, Asynchronous transfer mode(ATM) – architecture, ATM layers, ATM LANs.

Module- 4:
Integrated service digital network(ISDN)- architecture, channels, ISDN interfaces, functional grouping, ISDN protocol architecture, B-ISDN
SONET/SDH- architecture, layers, frames, STS multiplexing

Module-5:
Internet- IP address, IPv6, internet protocols- ARP,RARP,ICMP and IGMP
Transport protocols- TCP, services , features, TCP segment header format, TCP connection. UDP- user datagram, checksum, UDP operations and use of UDP

Books for Study:

1. Behrouz A Forouzan- Data communications and networking, McGrawHill
2. Ulyless Black- Computer networks- Protocols, Standards and interface, Prentice Hall
3. Andew S Tanenbaum- Computer networks, Pearson education India
4. Achyast S Godbole – Data communication and networks.

ELE4C13 VLSI DESIGN

Module-1:OVERVIEW OF VLSI DESIGN METHODOLOGY: VLSI design process - Architectural design - Logical design - Physical design - Layout styles - Full custom - Semicustom approaches.
BASIC ELECTRICAL PROPERTIES OF MOS AND CMOS CIRCUITS : MOS transistor - Threshold voltage - Threshold voltage equations - MOS device equations - Basic DC equations - Second order effects - MOS models - Small signal AC characteristics - NMOS inverter - Depletion mode and enhancement mode pull ups – CMOS inverter - DC characteristics - Inverter delay - Pass transistor - Transmission gate – Power consumption in CMOS gates – Static dissipation – Dynamic Dissipation.

Module-2:VLSI FABRICATION TECHNIQUES : An overview of wafer fabrication – Wafer processing - Oxidation - Patterning - Diffusion - Ion implantation - Deposition – Silicon gate NMOS process - CMOS processes - NWell - PWell - Twintub - Silicon on insulator - CMOS process enhancements - Interconnect - Circuit elements- Latch up - Latchup prevention techniques.

Module-3:LAYOUT DESIGN RULES : Need for design rules - Mead Conway design rules for the silicon gate NMOS process - CMOS based design rules -Simple layout examples - Sheet resistance - Area capacitance - Wiring capacitance - Driving large capacitive loads.

Module-4:LOGIC DESIGN : Switch logic - Pass transistor and transmission gate based design - Gate logic - Inverter - Two input NAND gate - NOR gate - Other forms of CMOS logic – Dynamic CMOS logic - Clocked CMOS logic - Precharged domino CMOS logic - Structured design - Simple combinational logic design examples - Parity generator - Multiplexers – Clocked sequential circuits - Two phase clocking - Charge storage - Dynamic register element - NMOS and CMOS - Dynamic shift register - Semistatic register - JK flip flop circuit.

Module-5:SUBSYSTEM Design Process : General arrangement of a 4-bit arithmetic processor - Design of a 4bit shifter - Design of a ALU subsystem - Implementing ALU functions with an adder - Carry look ahead adders - Multipliers - Serial parallel multipliers – Pipelined multiplier array – Modified Booth's algorithm - Incrementer / Decrementer -Two phase non-overlapping clock generator.

REFERENCES:

1.Kamran Eshraghian, Douglas A Pucknell and Sholeh Eshraghian, “Essentials of VLSI Circuits and Systems,”Prentice Hall of India, New Delhi, 2005.
2.Neil H E West and Kamran Eshranghian, "Principles of CMOS VLSI Design: A system Perspective", Addision-Wesley, 2nd Edition, 2004.
3. Sung-Mo Kang and Yusuf Leblebici,” CMOS Digital Integrated Circuits”,Tata McGraw-Hill,3rd Edition, New Delhi,2008.
4. Jan M Rabaey, Chandrasekaran A and Nikolic B, “Digital Integrated Circuits,” Pearson Education,3rd Edition, 2004.
5. Amar Mukherjee, "Introduction to nMOS and CMOS VLSI System Design", Prentice Hall,
6. WayneWolf," Modern VLSI Design: Systems on Chip Design" , Pearson Education Inc., 3nd Edition , Indian Reprint, 2007.

ELE4C14 ADVANCED CONTROL SYSTEMS

Module-1:
Introduction- open and closed loop systems- transfer functions- block diagram rreduction algebra- signal flow graph – mason's gain formula
Stability analysis- Concept of stability – necessary conditions for stability – Routh stability criteria – relative stability analysis – Routh Hurwitz stability analysis.

Module-2:
State space analysis- Introduction- solving the time variant state equation s- solutions for homogeneous state equations –, Transfer function from state variable model - state transition matrix - Laplace transform approach to the solution of non homogeneous state equations- Controllability and observability of state variable model.

Module-3:
Introduction to digital control systems-: Advantages of digital control systems - Basic concepts of sampled data control systems - Basic discrete time signals - Time domain models for discrete time systems.

Module-4:
Stability analysis of digital control systems-: Mapping between S-plane and Z-plane - Jury stability test - Bilinear transformation and Extended Routh array - Root locus method - Liapunov stability analysis of discrete time systems- Multi-rate sampled data system and stability.

Module-5
DESIGN OF DIGITAL CONTROL SYSTEM: Z-plane specifications of control system design - Digital compensator design -Frequency response method, Root locus method - state feedback - pole placement design - state observers – compensator design by separation principle- deadbeat control – deadbeat observers - Kalman's filter.

Suggested Books:
1. Gopal M , Digital Control and State Variable Methods , TMH PUBLN
2. Kuo , B C , Digital control systems , PUBLN
3. Slotine J E & Li W P , Applied Non-Linear Control , Prentice Hall , U

ELE4E07: SATELLITE COMMUNICATION

Module 1:

Kepler's Laws, Newton's law, orbital parameters, orbital perturbations, station keeping, geo stationary and non Geo-stationary orbits – Look Angle Determination- Limits of visibility – eclipse-Sub satellite point –Sun transit outage-Launching Procedures - launch vehicles and propulsion.

Module 2:

Spacecraft Technology- Structure, Primary power, Attitude and Orbit control, Thermal control and Propulsion, communication Payload and supporting subsystems, Telemetry, Tracking and command. Satellite uplink and downlink Analysis and Design, link budget, E/N calculation- performance impairments-system noise, inter modulation and interference, Propagation Characteristics and Frequency considerations- System reliability and design lifetime.

Module 3:

Modulation and Multiplexing: Voice, Data, Video, Analog – digital transmission system, Digital video Brocast, multiple access: FDMA, TDMA, CDMA, Assignment Methods, Spread Spectrum communication, compression – encryption

Module 4:

Earth Station Technology-- Terrestrial Interface, Transmitter and Receiver, Antenna Systems TVRO, MATV, CATV, Test Equipment Measurements on G/T, C/No, EIRP, Antenna Gain.

Module 5:

INTELSAT Series, INSAT, VSAT, Mobile satellite services: GSM, GPS, INMARSAT, LEO, MEO, Satellite Navigational System. Direct Broadcast satellites (DBS)- Direct to home Broadcast (DTH), Digital audio broadcast (DAB)- Worldspace services, Business TV(BTV), GRAMSAT, Specialized services – E –mail, Video conferencing, Internet

TEXT BOOKS:

1. Dennis Roddy, 'Satellite Communication', McGraw Hill International, 4th Edition, 2006.
2. Wilbur L. Pritchard, Hendri G. Suyderhoud, Robert A. Nelson, 'Satellite Communication Systems Engineering', Prentice Hall/Pearson, 2007.

REFERENCES:

1. N.Agarwal, 'Design of Geosynchronous Space Craft, Prentice Hall, 1986.
2. Bruce R. Elbert, 'The Satellite Communication Applications' Hand Book, Artech House Bostan London, 1997.
3. Tri T. Ha, 'Digital Satellite Communication', II edition, 1990.
4. Emanuel Fthenakis, 'Manual of Satellite Communications', McGraw Hill Book Co., 1984.

ELE4E08- REAL-TIME SYSTEMS

Module-1:
INTRODUCTION TO REAL-TIME SYSTEMS: Historical background, RTS Definition, Classification of Real-time Systems, Time constraints,
Classification of Programs.
CONCEPTS OF COMPUTER CONTROL: Introduction, Sequence Control, Loop control, Supervisory control, Centralised computer control, Distributed system, Human-computer interface, Benefits of computer control systems.

Module-2:
COMPUTER HARDWARE REQUIREMENTS FOR RTS: Introduction, General purpose computer, Single chip microcontroller, Specialized processors, Process-related Interfaces, Data transfer techniques, Communications, Standard Interface.

Module-3:
LANGUAGES FOR REAL-TIME APPLICATIONS: Introduction, Syntax layout and readability, Declaration and Initialization of Variables and Constants, Modularity and Variables, Compilation, Data types, Control Structure, Exception Handling, Low-level facilities, Co routines, Interrupts and Device handling, Concurrency, Real-time support, Overview of real-time languages.

Module-4:
OPERATING SYSTEMS: Introduction, Real-time multi-tasking OS, Scheduling strategies, Priority Structures, Task management, Scheduler and real-time clock interrupt handles, Memory Management, Code sharing, Resource control, Task co-operation and communication, Mutual exclusion, Data transfer, Liveness, Minimum OS kernel, Examples.

Module-5:
DESIGN OF RTSS – GENERAL INTRODUCTION: Introduction, Specification documentation, Preliminary design, Single-program approach, Foreground/background, Multi-tasking approach, Mutual exclusion,
Monitors.
RTS DEVELOPMENT METHODOLOGIES: Introduction, Yourdon Methodology, Requirement definition for Drying Oven, Ward and Mellor Method, Hately and Pirbhai Method.

TEXT BOOKS:
1. Real - Time Computer Control- An Introduction, Stuart Bennet, 2nd Edn. Pearson Education. 2005.

REFERENCE BOOKS:
1. Real-Time Systems Design and Analysis, Phillip. A. Laplante, second edition, PHI, 2005.
2. Real-Time Systems Development, Rob Williams, Elsevier. 2006.
3. Embedded Systems, Raj Kamal, Tata Mc Graw Hill, India, 2005.

ELE4E09- ARTIFICIAL NEURAL NETWORKS

Module- 1
Introduction, history, structure and function of single neuron, neural net architectures, neural learning, use of neural networks. Supervised learning, single layer networks, perceptions, linear separability,
perceptions training algorithm, guarantees of success, modifications.

Module-2:
Multiclass networks-I, multilevel discrimination, preliminaries, back propagation, setting parameter values, theoretical results.

Module-3:
Accelerating learning process, application, mandaline, adaptive multilayer networks.
Prediction networks, radial basis functions, polynomial networks, regularization, unsupervised learning, winner take all networks.

Module-4:
Learning vector quantizing, counter propagation networks, adaptive resonance theorem, toplogically organized networks, distance based learning, neo-cognition. Associative models, hop field networks, brain state networks, Boltzmann machines, hetero associations.

Module-5:
Optimization using hop filed networks, simulated annealing, random search, evolutionary computation. 7 Hours

TEXT BOOK:
1. Elements of Artificial Neural Networks, Kishan Mehrotra, C. K.
Mohan, Sanjay Ranka, Penram, 1997.

REFERENCE BOOKS:
1. Artificial Neural Networks, R. Schalkoff, MGH, 1997.
2. Introduction to Artificial Neural Systems, J. Zurada, Jaico, 2003.
3. Neural Networks, Haykins, Pearson Edu., 1999.

ELE4P03: PIC MICROCONTROLLER LAB

1. LED sequencing
2. Seven segment display interfacing
3. LCD interfacing
4. Decade/Hex up/down counters
5. Stepper motor interfacing
6. ADC/DAC
7. DC motor speed control
8. Elevator interfacing
9. Simple calculator using 7 segment/LCD display and keyboard
10. Matrix keyboard interfacing
11. Digital clock
12. Temperature measurement and display
13. USB programming
14. Serial communication between controllers.

First Semester M.Sc Electronics Degree Examination
ELE 1C01 APPLIED MATHEMATICS

Time : 3 Hours Maximum Marks:48

Section-A(Answer All. Each carries 6 marks)

1 a).Explain Newton-Raphson method to find an approximate value of a root of the equation f(x)=0. Use the method to evaluate $\sqrt{\pi}$

OR

b) Obtain the solution of wave equation using D'Alembert's equation

2 a). Find the solution of the differentialequation $\frac{4xd2y}{dx2} + \frac{2dy}{dx} + y = 0$

OR

b) Derive the probability function of Poisson distribution as a limiting case of binomial distribution. Find its mean and variance (2x6)

Section -B (Answer any 6. Each carries 6 marks.1 mark for part a, 2 marks for part b, 3 marks for part c)

3 a) Define ordinary point

b) Describe Gauss elimination method of solving a system of n linear equations in n unknowns.

c) Find the root of the equation $x^3 - 3x - 5 = 0$ using bisection method

4 a) State the orthogonality property of Bessel function.

b) Find an iterative formula to find the reciprocal of a given number N.

c) If the mean and variance of a binomial distribution are 5 and 10/3 respectively. Find P(x=3).

5 a) Define random variable

b) Find the Laplace transform of $e^{-4t}\ sin3t$

c) Find the series solution of the differential equation y''+xy=0

6 a) Find the Binomial distribution with mean=6 and variance =2

b) If m<n, show that $\int_{-1}^{1} x^m P_n(n)dx = 0$

c) Express $x^3+2x^2-x=3$ in terms of Legendre polynomials.

7 a) How do you interpret the sign of the coefficient correlation.

b) Derive Rodrigues formula for $P_n(x)$.

c) Express $J_{5/2}(x)$ in finite form.

8 a) Show that the probability of an event lies between 0 and 1

b) If A and B are independent events, show that $P(A \cap B) = P(A).P(B)$

c) The probability of a bomb hitting a target is 1/5. Two bombs are enough to destroy a bridge. If 16 bombs are aimed at the bridge ,find the probability that the bridge is destroyed.

9 a) Write down the equation of lines of regression

b) Explain the steady state measures of performance of a queuing system

c) A string of length 2l is fastened at both ends. The mid-point of the string is taken to a height h and then released from rest. Find the displacement of the string at any time.

10 a) What are single server queuing models?

b) Write a note on normal curve

c) Describe normal distribution. (6x6)

First Semester M.Sc Electronics Degree Examination
ELE 1C02 DIGITAL SYSTEM DESIGN

Time : 3 Hours Maximum Marks:48

Section-A(Answer All. Each carries 6 marks)

1 a.)What are hazards? Explain in detail.

OR

b) Discuss various theorems in threshold logic.

2 a). Explain the design procedure of a synchronous sequential circuit

OR

b) With a neat diagram explain Xilinx XC3000 FPGA (2x6)

Section -B (Answer any 6. Each carries 6 marks.1 mark for part a, 2 marks for part b, 3 marks for part c)

3 a) Define AOI gate

b) What are the advantages of Mc. Cluskey method..

c) Minimize the function using Mc. Cluskey method $F(A,B,C)=\sum m(0,1,2,3,5,7)$

4 a) State Consensus theorem

b) Write a note on symmetric functions.

c) Design a hazard free logic circuit.

5 a) What is meant by threshold logic?

b) Explain linear seperability.

c) Explain the synthesis of threshold network.

6 a) What do you mean by dual comparability?

b) Explain state diagram and state table.

c) Differentiate between Mealy and Moore machine.

7 a) Define state equivalency .

b) What is an algorithmic state machine.).

c) Design a synchronous state machine to count the sequence 0,1,3,0,1,3,0,1,……...

8 a) What is fundamental mode sequential machine?

b) Explain the design issues for testability.

c) Design a multiplexer to check the parity of 4-bit digital word. Assume odd parity.

9 a) List various types of PLDs.

b) Differentiate between PLA and PAL

c) Explain how PLA can be used to implement combinational logic circuits.

10 a) What is a CLB?

b) Write a note on CPLD

c) Implement the following using PAL

f1=AB+A'B'CD

f2=AB'+C+A'BD

f3=AB+AC'+A'B'D (6x6)

First Semester M.Sc Electronics Degree Examination
ELE 1C03 ELECTRONIC INSTRUMENTATION
Time : 3 Hours **Maximum Marks:48**

Section-A(Answer All. Each carries 6 marks)

1 a.)Draw the block diagram of an instrumentation system. Explain each block.

OR

b) Draw the circuit of an analog to digital converter and explain its working.

2 a). With the help of block diagram , explain the working of CRO

OR

b) Explain the operation of a spectrum analyser. (2x6)

Section -B (Answer any 6. Each carries 6 marks.1 mark for part a, 2 marks for part b, 3 marks for part c)

3 a) What is a transducer?

b) Give the classification of transducers.

c) Explain the working of LVDT

4 a) List the performance characteristics of measuring instruments.

b) Write a note on Hall effect.

c) The expected value of current in a series circuit is 38A. But the instrument measures the value as 41a. Calculate the percentage error..

5 a) What is a VTVM?

b) What is the purpose of sample and hold circuit with ADCs.

c) Draw the circuit of a logarithmic amplifier and derive the expression for the output.

6 a) List various types of ADCs

b) What are the special features of an instrumentation amplifier?

c) Explain the working of a pulse generator.

7 a) What is the function of a frequency synthesizer?

b) What are the applications of logarithmic amplifier?

c) Explain how CRO can be used for measuring the phase difference between two sinusoidal signals? Write the necessary steps.

8 a) What are the applications of XY recorder?

b) What is the purpose of using multiplexer in data acquisition system?

c) Explain V to F converter.

9 a) what is piezo electric effect?.

b) What are the main elements of a data acquisition system?

c) Explain wave analyzer with neat diagram

10 a) What is the principle of operation of a phase meter?

b) What is resolution of DAC?

c) Explain the working of electronic counter with a neat diagram (6x6)

First Semester M.Sc Electronics Degree Examination
ELE 1C04 DIGITAL COMMUNICATION TECHNIQUES

Time : 3 Hours **Maximum Marks:48**

Section-A(Answer All. Each carries 6 marks)

1 a.)Explain different switching techniques.

OR

b) With a neat diagram explain PCM transimitter.

2 a). With the help of block diagram , explain the generation and reception of BFSK

OR

b) Explain the functions of each layers in ISO-OSI model. (2x6)

Section -B (Answer any 6. Each carries 6 marks.1 mark for part a, 2 marks for part b, 3 marks for part c)

3 a) Define entropy.

b) Explain Shannon's channel capacity theorem.

c) A noiseless communication channel has a bandwidth of 6MHz and signal to noise ratio of 40dB. Calculate the maximum data rate achieved.

4 a) Differentiate between baseband and passband signal.

b) Explain sample and hold circuit.

c) State and prove sampling theorem.

5 a) What is a multiplexing?

b) Explain PAM.

c) Explain how ISI arises?.

6 a) What is meant by coherent detection?

b) Explain the generation of binary ASK.

c) Explain Delta modulation.

7 a) Draw the signal space diagram of QPSK.

b) Compare the bandwidth requirements of BPSK and BFSK.

c) Explain m- array PSK signaling scheme.

8 a) Define spread spectrum.

b) Write two properties of PN codes.

c) Explain direct sequence spread spectrum.

9 a) What is frequency hopping?

b) What are the functions of data link layer?

c) What are the design issues for the layers in layered architecture?

10 a) Give three examples for application layer protocols.

b) Differentiate between connection oriented and connectionless serices.

c) Explain TCP/IP reference model. (6x6)