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SHIVAJI UNIVERSITY, KOLHAPUR.

Revised Syllabus of

(B.E. Electronics Engineering Sem –VII & VIII)

To be introduced from the academic year 2010-11
(i.e. from June 2010) Onwards

(Subject to the modifications will be made from time to time)

SEMESTER – VII

Sr. No.	Name of subject	Teaching scheme (Hrs)				Examination scheme				
		L	T	P	Total	Theory	TW	POE	OE	Total
1	Embedded System Design	4	-	2	6	100	25	50	-	175
2	Power Electronics and Drives	4	-	2	6	100	25		-	125
3	Video Engineering	4	-	2	6	100	25	50	-	175
4	Information Theory & Coding	3	1	-	4	100	25	-	-	125
5	Elective-I	3	1	-	4	100	25	-	-	125
6	Project-I.	-	-	4	4		50	-	25	75
	Total	**18**	**2**	**10**	**30**	**500**	**175**	**100**	**25**	**800**

SEMESTER – VIII

Sr. No.	Name of subject	Teaching scheme (Hrs)				Examination scheme				
		L	T	P	Total	Theory	TW	POE	OE	Total
1	Computer network	4	-	2	6	100	25	-	50	175
2	Operating system	4	-	2	6	100	25	-	50	175
3	Microwave Engg.	4	-	2	6	100	25	-	-	125
4	Elective-II	3	1	-	4	100	25	-	-	125
5	Project-II.	-	-	8	8	100	25	-	100	200
	Total	**15**	**1**	**14**	**30**	**400**	**200**	**-**	**200**	**800**

***LIST OF ELECTIVE SUBJECTS:**

[Note :- Examination scheme and term work marks strictly as per above structure]

Sr.No.	Elective-I (GROUP-I)	Sr.No.	Elective-II (GROUP-II)
1	Fiber Optic Communication	**1**	Broad-band Communication
2	Satellite Communication	**2**	Wireless Communication Network
3	Biomedical Instrumentation	**3**	Biomedical Control & Instrumentation
4	Low Power VLSI Design	**4**	CMOS VLSI Design
5	High Speed Digital Design	**5**	
6	Digital Image Processing	**6**	Advanced Digital Signal Processors
7	Real Time Systems	**7**	System On Chip
8	Robotics	**8**	Mechatronics
9	Advance Control Engineering	**9**	Process Instrumentation
10	Fuzzy Logic & Applications	**10**	Neural Network & Applications

A) Term Work Assessment Scheme

The term work of concerned subjects shall be assessed on the basis of Tutorials (if applicable), assignments, class tests and practical performance of the student.

B) Guidelines for Nature of Question Paper for B.E. (Electronics) Part-I & II.

1. There shall be total six questions in each paper, all being compulsory with internal options.
2. Each question paper shall consists of two sections (Section I & Section II).
3. Duration of each paper shall be of Three Hours Carrying of Maximum 100 Marks.

***NOTE: The students are allowed to choose their Electives in Horizontal pair only from the above mentioned Group-I and Group-II.**

[Note :- Examination scheme and term work marks strictly as per above structure]

Shivaji University, Kolhapur.

Revised Syllabus w.e.f. Academic Year 2010-11

B.E. (Electronics Engineering)

Semester –VII

EMBEDDED SYSTEM DESIGN

Teaching Scheme		**Examination Scheme**	
Lectures	: 4 Hours/week	Theory	:100 marks
Practical	: 2 Hours/week	Term work	: 25 marks
		POE	: 50 marks

SECTION-I

UNIT I : **(7 Hrs.)**

ARM7TDMI architecture: Programmer's model: Memory organization, operating modes, Registers, status register, pipeline, architecture revisions, core extensions, ARM processor families

UNIT II : **(6 Hrs.)**

ARM instruction set: Data processing instruction, Branch, Load, store, software interrupt instruction, program status register instruction, loading constants, conditional execution.

Thumb instruction set: Thumb register usage, ARM Thumb Interworking, branch instructions, Data processing, single register load-store, multiple register load-stores, stack instructions, software interrupt instruction.

UNIT III : **(5 Hrs.)**

Exception and interrupt handling: Exception handling, Interrupts, Interrupt handling schemes.

SECTION-II

UNIT IV : **(8 Hrs.)**

ARM7TDMI-S microcontroller LPC 21XX: Memory map, system control block, Memory acceleration module, Vectored interrupt controller, UART, I2C, SPI, Timers, PWM, Real time clock, Watchdog

UNIT V : **(5 Hrs.)**

Embedded C programming 8 bit: Key words, memory models, memory types, data types, bit types, pointers, functions, interrupt functions, reentrant functions.

UNIT VI : (5 Hrs.)

Embedded C programming 32bit: Basic C data types, C looping instructions, Register allocation, Function calls, Pointer aliasing, structure arrangements, Bit-fields, unaligned data and endianness, division, floating point, inline functions and assembly, portability issues

TEXT BOOK :

1. Sloss, Symes, Wright ,"**ARM system developers guide**" Morgan Kaufman (Elsevier) publication.

REFERENCE BOOKS :

1. Willam Hohel ,"**ARM assembly language: fundamentals and Technique**"
2. ARM Architecture Reference Manual By: ARM
3. ARM7TDMI Technical Reference Manual Revision: r4p1 By: ARM
4. LPC2106/2105/2104 USER MANUAL By Philips/ NXP semiconductor
5. C51 compiler user guide By: Keil software

TERM WORK : LIST OF PRACTICALS (Minimum 8 Experiments)

Minimum Eight experiments on 8 bit and 16/32 bit microcontroller (LPC21xx) using embedded C.

The experiments should demonstrate usage of on chip resources like timers, counters, ADCs, serial communication and off chip resources like LCD, serial EEPROM, RAM, DAC etc.

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B.E. (Electronics Engineering)

Semester –VII

POWER ELECTRONICS & DRIVES

Teaching Scheme		**Examination Scheme**	
Lectures	: 4 hours/week	Theory	:100 marks
Practical	: 2 hour/week	Term work	: 25 marks

SECTION- I

UNIT I : 3-PHASE CONVERTERS. (10 Hrs.)

Concepts of 3-phase, half wave controlled rectifier with R, RL load, bridge converters: half controlled and full controlled rectifier with R, RL load, effect of source inductance on performance of 3-phase converters, mathematical analysis and numerical are expected**.**

UNIT II : DIGITAL FIRING SCHEMES. (6 Hrs.)

Micro-processor and micro-controller based firing scheme for 1-phase and 3-phase converters, need of isolation, types of isolation , Cosine based firing circuit.

UNIT III : CYCLOCONVERTERS. (8 Hrs.)

Introduction to cyclo-converters, 1-phase to 1-phase, 3-phase to 1-phase, 3-phase to 3-phase: bridge configuration and circulating and non-circulating mode of operation. Harmonic reduction techniques.

SECTION II

UNIT IV : INVERTERS. (10 Hrs.)

Concept of inverter, types of inverters.

Thyristorised inverters: series inverter, parallel inverter, mac-murray half bridge inverter, mac-murray bed ford half bridge inverter, source current representation using fourier series for contineous load current.

IGBT based inverters: 1-phase half and full bridge inverter. 3-phase bridge inverter (120 and 180 mode of conduction)

Voltage control of 1-phase and 3-phase inverter, harmonic reduction techniques.

UNIT V : D C MOTOR DRIVES. (7 Hrs.)

Single phase fully controlled and half controlled rectifier control of separately excited dc motor, Three phase fully controlled and half controlled rectifier control of

separately excited dc motor, multiquadrant operation of separately excited dc motor, chopper controlled dc drives, close loop control of dc drives

Armature control method of speed control, Numerical are expected

UNIT VI : AC MOTOR DRIVES. (7 Hrs.)

Speed control of single phase induction motors .three phase induction motor control: Stator voltage control, variable voltage frequency control from voltage sources, voltage source inverter control, closed loop control, rotor resistance control, slip power recovery,. Close loop control of Induction motor: vector control direct & indirect.

TEXT / REFERENCE BOOKS:

1. P.C.Sen ,"Power Electronics" TMH Publication
2. V.R.Moorthi,"Power Electronics" Oxford University press.
3. M.H.Rashid, "Power Electronics' PHI, Publication
4. Randall Shaffer," Fundamentals of Power electronics with Matlab",.
5. M.D.Singh & K.B. khanchandani," Power Electronics", TMH Publication
6. J.P.Agrawal," Power Electronic Systems Theory & Design",

TERM WORK: LIST OF PRACTICALS (Minimum 8 Experiments)

A] Pspice/Matlab Based Experiments:

1. Simulating inverter in Matlab.
2. Harmonic analysis of output of PWM Inverter (hormonic analysis by changing pulse width, harmonic analysis by Multiple commutation in each half cycle)
3. Simulation model of 3 phase to single phase cyclo-converter using Matlab.

B] Experiments Based On Practical Set Up:

1. Study of 3 phase converter.
2. Study of Cyclo-converter.
3. Study of inverter.
4. Study of PWM inverter using IGBT.
5. Dc motor control using bridge converter.
6. 1 phase speed control of ac motor using IGBT bridge inverter.
7. Study of 500 VA UPS system. (study of driving waveforms ,study of protections: over voltage ,over load, short circuit)
8. Microcontroller based firing circuits for 1 phase converters.
9. Speed control of 3 phase ac motor using IGBT bridge inverter.

Note: pspice/matlab based experiments are compulsory and any five from experiments based on practical set up.

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B.E. (Electronics Engineering)

Semester –VII

VIDEO ENGINEERING

Teaching Scheme		**Examination Scheme**	
Lectures	: 4 hours/week	Theory	:100 marks
Practical	: 2 hour/week	Term work	: 25 marks
		POE	: 50 marks

SECTION - I

UNIT I : ELEMENTS OF A TELEVISION SYSTEM (6 Hrs.)
Picture and sound transmission and reception, CCIR-B standards ,aspect ratio, horizontal and vertical resolution, video bandwidth and interlaced scanning , composite video, signal, H & V sync details, VSB transmission and channel bandwidth: Modulation of picture and sound signals, positive and negative modulation.

UNIT II : TV CAMERAC AND PICTURE TUBES (8 Hrs.)
Principle of camera tubes, camcoder,. image orthicon, vidicon, plumbicon, solid-state image scanners, elements of a picture tube, focusing and deflection, EHT ,HOT picture tube controls , Delta gun, PIL, Trinitron , color camera & picture tubes purity & convergence ,automatic degaussing

UNIT III : COLOUR SIGNAL TRANSMISSION AND RECEPTION (8 Hrs.)
Composite color signals, compatibility considerations, frequency interleaving process, Low level IF modulated color TV transmitter block diagram & Color TV receiver , color mixing theory, luminance, hue and saturation, color difference signals, chromaticity diagram , color signal transmission- bandwidth and modulation of color difference signals, coder and decoder of NTSC , PAL – D & SECAM

SECTION- II

UNIT IV : DIGITAL TELEVISION (6 Hrs.)
Merits of Digital technology, Digital TV signals , Digitized video parameters ,digital transmission and reception, codec Functions ,codec MAA2100 ,Video processor, Audio processor.

UNIT V : HIGH DEFINITION TV (7 Hrs.)
Component coding ,MAC signals ,MAC encoding format ,scanning frequencies D2-MAC Packet Signal ,Duo-binary Coding ,HDTV Standards & compatibility ,colorimetric characteristics & parameters of HDTV systems

UNIT VI : ADVANCED TV SYSTEM (9 Hrs.)

LCD TV System : LCD Technology , LCD Matrix types & operations , LCD screen for TV LCD color Receiver

Plasma TV System : Plasma & conduction of charge ,Plasma TV screen ,Signal processing in Plasma TV, Plasma color Receiver

Satellite TV, DTH Receiver System ,CCTV, CATV, working of block converter,: IR Remote control

TEXT & REFERENCE BOOKS :

1. R.R. Gulati,**"Modern Television Practice – Principles, Technology and Service",** New Age International Publication, III rd Edition.
2. R.R. Gulati,**"Monochrome and Color TV"**, New Age International Publication.
3. S.P. Bali,**" Color Television Theory and Practice"**, Tata mc-Graw Hill Publication.
4. A.M. Dhake,**"Television and Video Engineering"**, II nd Edition.Tata mc-Graw Hill Publication.
5. B. Grob and C.E. Herndon,**"Basic Television and Video Systems"**, McGraw Hill Publication.

TERM WORK : LIST OF PRACTICALS :

(Minimum 12 Experiment based on following TV Sections)

1. Study of circuit diagram of color TV receiver
2. CCVS for different test patterns
3. RF tuner
4. Video IF & detector
5. Video Amplifier
6. Sync separators (V & H)
7. Sound IF
8. Horizontal section
9. Vertical section
10. Trouble shooting of color TV
11.DTH
12.Plasma TV
13. LCD TV
14.CCTV
15.CATV

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B.E. (Electronics Engineering)

Semester –VII

INFORMATION THEORY AND CODING

Teaching Scheme		**Examination Scheme**	
Lectures	:3 hours/week	Theory	:100 marks
Tutorial	:1 hour/week	Term work	: 25 marks

SECTION-I

UNIT I : INFORMATION THEORY (5Hrs.)

Introduction, Concept of amount of information, Entropy-Definition and Properties, Marginal, Joint and Conditional entropies, relation among entropies, information rate, Mutual Information and properties.

UNIT II : CHANNAL CAPACITY AND NOISY CODING (7 Hrs.)

Channel Capacity, Redundancy and Efficiency of channel, Discrete memory less channel – Classification of channels :Noise free channel, Symmetric channel, Binary Symmetric Channel (BSC), Cascaded Channels and Binary Erasure Channel (BEC), Calculation of channel capacity, Shannon's fundamental theorem, Capacity of a band limited Gaussian channel, Shannon-Hartley Theorem, Trade of between Bandwidth and Signal to Noise ratio.

Shannon Fano Coding, Huffman's Coding, Coding Efficiency Calculations

UNIT III : LINEAR BLOCK CODES (6 Hrs.)

Introduction : Need of Error Control Coding, Classification ,Error Detection and Error Correction Techniques, Coding Terminology, Matrix Description of Linear Block Code, Generator and Parity Check Matrices, Hamming Codes, Encoder and Syndrome decoder for (n, k) block Code, other Linear Block codes –Single Parity check bit code, Hadamard Code, Extended codes, dual code.

SECTION-II

UNIT IV : CYCLIC CODES (7 Hrs.)

Algebraic structure, Properties,Generator Polynomial,Generation of Code Vector in Nonsystematic and Systematic form,Generator and Parity check matrices, Encoding of Cyclic Code, Syndrome decoding for Cyclic code, Hardware Representation of (n,k) cyclic code. BCH Codes, RS codes, Golay codes, Burst error correcting codes,

UNIT V : CONVOLUTIONAL CODES (7 Hrs.)

Introduction, Encoding of Convolutional Codes, Time Domain Approach, Transform Domain Approach, Graphical Approach – Code Tree, State diagram and Trellis Diagram, Decoding of Codes : Maximum Likelihood Decoding-Viterbi Algorithm, Sequential Decoding . Turbo Codes.

UNIT VI : CODING FOR SECURE COMMUNICATION (4 Hrs.)

Introduction to Cryptography, Encryption Techniques ,Operations used by Encryption Algorithms, Symmetric (Secret key) Cryptography, Data Encryption Standard (DES), International data Encryption Algorithms(IDEA),RC Ciphers, asymmetric algorithms, RSA Algorithms, One way hashing.

TEXT BOOKS:

1. Simon Haykin, **"Communication Systems ",** John Wiley & Sons, Inc, IVth Edition,
2. R.P Singh & S.D. Sapre ,**" Communication Systems Analog & Digital "**,Mc-Graw Hill, 2nd Edition,2001.
3. Ranjan Bose " **Information Theory Coding & Cryptography "**, Tata McGraw-Hill Publishing Company Ltd.

REFERENCE BOOKS:

1.Richard B. Wells " **Applied Coding & Information Theory for Engineers"** Pearson Education,2009
2. John G.Proakias ,**" Digital Communication "**Mcgraw Hill,Singapore, IVth Edition,2001.
3. Sam Shanmugam **" Digital and Analog Communication Systems "** John Wiley Publication , 2005.
4. B.P.Lathi **" Modern Analog and Digital Communication"** Oxford reprint, 3rd Edition, 2004
5. H. Taub and D. Schilling **"Principles of Communication Systems"** Tata McGraw-Hill Publishing Company Ltd , 2003
6. Martin Roden **" Analog & Digital Communication Systems"** Prentice Hall India,IIIrd Edition.

TERM WORK : (Minimum 8 tutorials)

Minimum 8 tutorials / assignments based on above syllabus covering all units.

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B.E. (Electronics Engineering)

Semester –VII

FIBER OPTICAL COMMUNICATION

(Elective – I)

Teaching Scheme		**Examination Scheme**	
Lectures	:3 hours/week	Theory	:100 marks
Tutorial	:1 hour/week	Term work	: 25 marks

SECTION -I

UNIT I : OVERVIEW OF OPTICAL FIBER COMMUNICATION (4 Hrs.)
Motivations for light wave communication, optical spectrum bands, fundamental data communication concept, network information rates, key elements of optical fiber communication system.

UNIT II : STRUCTURES AND WAVEGUIDING (8 Hrs.)
Nature of light, basic optical laws and definition, optical fiber modes and configurations, Mode theory for circular waveguides, Single mode fibers, Graded index fiber, Fiber Material, Fiber fabrication, Fiber optical cables.

UNIT III : ATTENAUTION AND DISPERSION (6 Hrs.)
Attenuation, Signal Distortion in Fibers, Characteristics of Single Mode fiber**,** Dispersion in Single Mode Fibers, Fiber Losses, Non linear Optical Effects.

SECTION - II

UNIT IV : OPTICAL TRANSMITTER (5 Hrs.)
Basic Concepts, Light Emitting Diodes, Semiconductor Laser, Laser Diodes, Line Coding, Laser Characteristics.

UNIT V : OPTICAL RECEIVER (6 Hrs.)
Detector responsivity, Rise time and Bandwidth, P-N Photo Diode, P-I-N Photo Diode, Avalanche Photo Diode, Receiver Noise, Receiver Sensitivity.

UNIT VI : WDM CONCEPTS AND COMPONENTS (7 Hrs.)
WDM Concept, WDM Light wave Systems, WDM Components, System Performance Issues, Time Division Multiplexing, Sub Carrier Multiplexing, Code Division Multiplexing.

TEXT / REFERENCE BOOKS:

1. Gerd Keiser,**" Optical Fiber Communications "** TMH Publication,IVth Edition
2. Govind P. Agrawal ,**"Fiber – Optic Communication Systems "** Wiley Publication IIIrd Edition
3. John M. Senior,**" Optical Fiber Communications Principles and Practices"** PHI Publication, II nd Edition

TERM WORK : (Minimum 8 tutorials)

Minimum 8 tutorials/ assignments based on above syllabus covering all units.

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Semester –VII

SATELLITE COMMUNICATION

(Elective-I)

Teaching Scheme		**Examination Scheme**	
Lectures	:3 hours/week	Theory	:100 marks
Tutorial	:1 hour/week	Term work	: 25 marks

SECTION-I

UNIT I : INTRODUCTION (4 Hrs.)

Origin of Satellite Communications, Historical Back-ground, Basic Concepts of Satellite Communications, Frequency allocations for Satellite Services, Applications, Future Trends of Satellite Communications.

UNIT II : ORBITAL MECHANICS AND LAUNCHERS (5 Hrs.)

Orbital Mechanics, Look Angle determination, Orbital perturbations, Orbit determination, launches and launch vehicles, Orbital effects in communication systems performance.

UNIT III: SATELLITE SYSTEMS (6 Hrs.)

Attitude and orbit control system, telemetry, tracking, Command and monitoring, power systems, communication subsystems, Satellite antenna Equipment reliability and Space qualification.

UNIT IV: SATELLITE LINK DESIGN (5 Hrs.)

Basic transmission theory, system noise temperature and G/T ratio, Design of down links, up link design, Design of satellite links for specified C/N, System design example.

SECTION-II

UNIT V : MULTIPLE ACCESS (6 Hrs.)

Frequency division multiple access (FDMA) Intermodulation, Calculation of C/N. Time division Multiple Access (TDMA) Frame structure, Examples. Satellite Switched TDMA Onboard processing, DAMA, Code Division Multiple access (CDMA),Spread spectrum transmission and reception

.UNIT VI : EARTH STATION TECHNOLOGY (4 Hrs.)

Introduction, Transmitters, Receivers, Antennas, Tracking systems, Terrestrial interface, Primary power test methods.

UNIT VII : LOW EARTH ORBITAND GEO-STATIONARY SATELLITE SYSTEMS (5 Hrs.)

Orbit consideration, coverage and frequency considerations, Delay & Throughput considerations, System considerations, Operational NGSO constellation Designs

UNIT VIII : SATELLITE NAVIAGATION AND THE GLOBLE POSITIONING SYSTEM (5 Hrs.)

Radio and Satellite Navigation, GPS Position Location principles, GPS Receivers and codes, Satellite signal acquisition, GPS Navigation Message, GPS signal levels, GPS receiver operation, GPS C/A code accuracy, Differential GPS.

TEXT BOOKS :

1. Timothy Pratt, Charles Bostian and Jeremy Allnutt, **" SatelliteCommunications",** Wiley publications, IInd Edition, 2003.
2. Wilbur L. Pritchard, Robert A Nelson and Henri G.Suyderhoud,**" Satellite Communications Engineering"**, Pearson Publications, IInd Edition, 2003.

REFERENCES BOOKS :

1. M. Richharia,**"Satellite Communications : Design Principles"**, BS Publications, IInd Edition, 2003.
2. D.C Agarwal,**" Satellite Communication", Khanna Publications**, Vth Edition.
3. K.N. Raja Rao,**" Fundamentals of Satellite Communications"**, PHI, 2004
4. Dennis Roddy, **"Satellite Communications"**, McGraw Hill, IInd Edition, 1996

TERM WORK : (Minimum 8 tutorials)

Minimum 8 tutorials / assignments based on above syllabus covering all units

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B.E. (Electronics Engineering)

Semester –VII

BIOMEDICAL INSTRUMENTATION

(Elective- I)

Teaching Scheme		**Examination Scheme**	
Lectures	:3 hours/week	Theory	:100 marks
Tutorial	:1 hour/week	Term work	: 25 marks

UNIT I : ANATOMY AND PHYSIOLOGY (5 Hrs.)
Elementary ideas of cell structure, heart and circulatory system, control nervous system, Musclo-skeletal system, Respiratory system Body temperature and reproduction system.

UNIT II : CLASSIFICATION OF BIOMEDICAL EQUIPMENT (3 Hrs.)
Diagnostic, therapeutic and clinical laboratory equipment

UNIT III : BIOELECTRIC SIGNALS AND THEIR RECORDING (7 Hrs.)
Bioelectric signals (ECG, EMG, ECG, EOG & ERG) and their characteristics, Bioelectrodes,electrodes tissue interface, contact impedance, effects of high contact impedance, types of electrodes, electrodes for ECG, EEG and EMG.

UNIT IV : TRANSDUCERS FOR BIOMEDICAL APPLICATION (9 Hrs.)
Resistive transducers - Muscle force and Stress (Strain guge), spirometry (Potentiont) , humidity, (Gamstrers), Respiration (Thermistor)
Inductive Transducers - Flow measurements, muscle movement (LVDT)
Capacitive Transducers - Heart sound measurement, Pulse pick up
Photoelectric Transducers - Pulse transducers, Blood pressure, oxygen Analyses
Piezoelectric Transducers - Pulse pickup, ultrasonic blood flowmeter
Chemcial Transducer - Ag-Agfallas (Electrodes, PH electrode

SECTION-II

UNIT V : BIO-ELECTRIC SIGNAL RECORDING MACHINES (8 Hrs.)
Physiological pre-amplifier and specialized amplifiers, ECG lead systems details of ECG, EMG, and EEG machines

UNIT VI : PATIENT MONTORING SYSTEM (6 Hrs.)
Heart rate measurement pulse rate measurement, respiration, rate measurement, blood pressure measurement, microprocessor applications in patient monitoring

UNIT VII : X- RAY MACHINE (6 Hrs.)

Basic X-Ray components and circuits, types of X-ray machines e.g. general purpose, dental image intensifier system, table shooting and maintenance of X- Ray machine

UNIT VIII : SAFETY ASPECTS OF MEDICAL (4 Hrs.)

Gross current, Micro Current shock, safety standards rays and considerations, safety testing instruments, biological effects of X-rays and precautions

TEXT/ REFERENCE BOOKS :

1. John. G. Webster,**" Medical Instrumentation"** John Wiley publication.
2. Goddes & Baker,**" Principles of Applied Biomedical Instrumentation"** John Wiley publication.
3. Carr & Brown," **Biomedical Instrumentation & Measurement"** Pearson Education
4. Cromwell, " **Biomedical Instrument"** Prentice Hall of India, New Delhi
5. R.S. Khandpur, " **Hand book of Medical instruments**" TMH, New Delhi
6. Sanjay Guha ,**"Medical Electronics and Instrumentation"** University press Publication
7. Edwand J. Bukstein," **Introduction to Biomedical electronics"**sane and Co. Inc. USA

TERM WORK : (Minimum 8 tutorials)

Minimum 8 tutorials / assignments based on above syllabus covering all units.

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Semester –VII

LOW POWER VLSI DESIGN

(Elective-I)

Teaching Scheme		**Examination Scheme**	
Lectures	:3 hours/week	Theory	:100 marks
Tutorial	:1 hour/week	Term work	: 25 marks

SECTION-I

UNIT I : **(8 Hrs.)**

LOW POWER DESIGN, AN OVER VIEW: Introduction to low- voltage low power design, limitations

MOS/BiCMOS PROCESSES: Bi-CMOS processes, Integration and Isolation considerations, Integrated Analog/Digital CMOS Process.

UNIT II : **(8 Hrs.)**

LOW-VOLTAGE/LOW POWER CMOS/ BICMOS PROCESSES: Deep submicron processes, SOI CMOS, lateral BJT on SOI, future trends and directions of CMOS/Bi-CMOS processes.

UNIT III : **(4 Hrs.)**

CMOS AND Bi-CMOS LOGIC GATES: Conventional CMOS and Bi-CMOS logic gates, Performance Evaluation.

SECTION – II

UNIT IV : **(8 Hrs.)**

LOW POWER LATCHES AND FLIP FLOPS: Evolution of Latches and Flip flops-quality measures for latches and Flip flops, Design perspective.

UNIT V : **(8 Hrs.)**

SPECIAL TECHNIQUES: Power Reduction in Clock Networks, CMOS Floating Node, Low Power Bus, Delay Balancing, Low Power Techniques for SRAM.

UNIT VI : **(4Hrs.)**

Case study of PLL, $\Sigma\tilde{}\,\Delta$ A/D and D/A Converter design for low power applications

TEXT BOOKS:

1.Yeo Rofail/ Gohl(3 Authors), **"CMOS/BiCMOS ULSI low voltage, low power"**, Pearson Education Asia Ist Indian reprint,2002.
2.Gary K. Yeap,**"Practical Low Power Digital VLSI Design"**, KAP, 2002.

REFERENCE BOOKS :

1. Douglas A.Pucknell & Kamran Eshraghian, **"Basic VLSI Design"**, IIIrd edition PHI Publication.
2. J.Rabaey, **"Digital Integrated circuits"**, PHI. Publication
3. Sung-mo Kang and yusuf leblebici, **"CMOS Digital ICs"**, IIIrd edition TMH 2003 .

TERM WORK : (Minimum 8 Tutorials)

Minimum 8 tutorials / assignments based on above syllabus covering all units.

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B.E. (Electronics Engineering)

Semester –VII

HIGH SPEED DIGITAL DESIGN

(Elective-I)

Teaching Scheme		**Examination Scheme**	
Lectures	:3 hours/week	Theory	:100 marks
Tutorial	:1 hour/week	Term work	: 25 marks

SECTION-I

UNIT I : **(8 Hrs.)**

Introduction to high-speed digital design - frequency, time and distance - capacitance and inductance effects - high speed properties of logic gates - speed and power – measurement techniques - rise time and bandwidth of oscilloscope probes - self inductance, signal pickup and loading effects of probes - observing crosstalk

UNIT II : **(7 Hrs.)**

Transmission line effects - transmission lines - point to point wiring - infinite uniform transmission lines - effects of source and load impedance - special transmission line cases - line impedance and propagation delay - ground planes and layer stacking.

UNIT III : **(3 Hrs.)**

crosstalk crosstalk in solid ground planes, slotted ground planes and cross-hatched ground planes - near and far end crosstalk

SECTION-II

UNIT IV: **(8 Hrs.)**

Terminations and vias - terminations - end, source and middle terminations - AC biasing for end terminations - resistor selection - crosstalk in terminators - properties of vias – mechanical properties of vias - capacitance of vias - inductance of vias - return current and its relation to vias

UNIT V : **(7 Hrs.)**

Stable reference voltage and clock distribution - stable voltage reference - distribution of uniform voltage - choosing a bypass capacitor –

UNIT VI : (3 Hrs.)

Clock distribution - clock skew and methods to reduce skew - controlling crosstalk on clock lines - delay adjustments - clock oscillators and clock jitter

TEXT / REFERENCE BOOKS:

1. Howard Johnson & Martin Graham, **"High Speed Digital Design: A Handbook of Black Magic"**, Prentice Hall of India.
2. Dally W.S. & Poulton J.W., **"Digital Systems Engineering"**, Cambridge University Press
3. Masakazu Shoji, **"High Speed Digital Circuits"**, Addison Wesley Publishing Company

TERM WORK : (Minimum 8 tutorials)

Minimum 8 tutorials / assignments based on above syllabus covering all units

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Semester –VII

DIGITAL IMAGE PROCESSING

(Elective-I)

Teaching Scheme		**Examination Scheme**	
Lectures	:3 hours/week	Theory	:100 marks
Tutorial	:1 hour/week	Term work	: 25 marks

SECTION-I

UNIT I : DIGITAL IMAGE FUNDAMENTALS (7 Hrs.)
Elements Of Visual Perception, fundamentals steps in DIP, A simple image formation model, Basic concept of sampling and quantization, Representation of binary, Gray level , colour image, Metric & topological properties of digital image , colour model.

UNIT II : **IMAGE ENHANCEMENT IN SPATIAL DOMAIN (5 Hrs.)**
Gray level transformation function: image negation ,Log transformation , power law transformation ,Piecewise linear transformation functions, Histogram equalization, Enhancement using arithmetic / Logic operation.

UNIT III : **IMAGE FILTERING (6 Hrs.)**
Basics of spatial filtering, smoothening linear filter, Sharpening spatial filter : Gradient and laplacian filter, Filtering in frequency domain: basic properties, filtering in frequency domain **.**

SECTION-II

UNIT IV : **MORPHOLOGICAL IMAGE PROCESSING (6 Hrs)**
Dilation & erosion, opening and closing operation , Hit- or –miss transformation. Basic morphological algorithms: Boundary extraction, region filling, thinning and thickening, skeletons.

UNIT V : **IMAGE SEGMENTATION (6 Hrs.)**
Detection of discontinuities: Point detection, line detection, edge detection, Sobel, Prewitt, Laplacian mask for edge detection, Thresholding , Role of illumination, global and adaptive thresholding , Region based segmentation : region growing, region splitting and merging.

UNIT VI : IMAGE COMPRESSION (6 Hrs.)

Fundamentals, Coding redundancy , interpixel redundancy, fidelity criteria , image compression model, lossless predictive coding, Lossy predictive coding , DCT compression.

TEXT BOOKS :

1. Rafael C Gonzalez , Richard E. Woods," **Digital image processing "**,Pearson Publication.
2. Milan sonka , Vaclav Hlavac ,**"Processing analysis and Machine vision"** Thomson Publication

REFERENCE BOOKS:

1. S. Jayraman, S Esakkiarajan , Veerakumar,**" Digital image processing",** MC-GRAW Hill, publication.
2. B. Chanda , D. Datta, majnudar ,**"Digital image processing and Analysis**", Prentice Hall of India.
3. Rafael C Gonzalez ,**"Digital image processing using Matlab**".
4. S.Annadurai, R. Shanmugalaxmi ,**"Fundamentals of Digital Image Processing"** Pearson Publication.

TERM WORK :

Tutorial based on MATLAB programs:

1. Reading & displaying of image (various image file format)
2. Simple gray level transformation.
3. Histogram processing.
4. Image smoothening operation.
5. Edge detection.
6. Morphological operation.
7. Segmentation using thresholding.
8. Image compression using DCT.

Shivaji University, Kolhapur.

Revised Syllabus w.e.f. Academic Year 2010-11

B.E. (Electronics Engineering)

Semester –VII

REAL TIME SYSTEMS

(Elective-I)

Teaching Scheme		**Examination Scheme**	
Lectures	:3 hours/week	Theory	:100 marks
Tutorial	:1 hour/week	Term work	: 25 marks

SECTION I

UNIT I : INTRODUCTION (4 Hrs.)

Issues in Real Time Computing, Structure of a Real Time System, Task Classes, Performance Measures for Real Time Systems, Estimating Program Run Times.

UNIT II : TASK AND SCHEDULING (8 Hrs.)

Task Assignment and Scheduling – Classical uniprocessor scheduling algorithms, Uniprocessor scheduling of IRIS tasks, Task assignment, Mode changes, and Fault Tolerant Scheduling.

UNIT III : PROGRAMMING LANGUAGES AND TOOLS (6 Hrs.)

Programming Languages and Tools – Desired language characteristics, Data typing, Control structures, Facilitating Hierarchical Decomposition, Packages, Run – time (Exception) Error handling, Overloading and Generics, Multitasking, Low level programming, Task Scheduling, Timing Specifications, Programming Environments, Run – time support**.**

SECTION II

UNIT IV : REAL TIME DATABASES (4 Hrs.)

Basic Definition, Real time Vs General Purpose Databases, Main Memory Databases, Transaction priorities, Transaction Aborts, Concurrency control issues, Disk Scheduling Algorithms, Two – phase Approach to improve Predictability, Maintaining Serialization Consistency, Databases for Hard Real Time Systems.

UNIT V : COMMUNICATION (8 Hrs.)

Real – Time Communication – Communications media, Network Topologies Protocols, Fault Tolerant Routing. Fault Tolerance Techniques – Fault Types, Fault Detection. Fault Error containment Redundancy, Data Diversity, Reversal Checks, Integrated Failure
handling.

UNIT VI : EVALUATION TECHNIQUES (6 Hrs.)

Reliability Evaluation Techniques – Obtaining parameter values, Reliability models for Hardware Redundancy, Software error models. Clock Synchronization – Clock, A Nonfault – Tolerant Synchronization Algorithm, Impact of faults, Fault Tolerant Synchronization in Hardware, Fault Tolerant Synchronization in software.

TEXT BOOK:

1. Krishna. C. M., Kang. G, Shin, **"Real Time Systems"**, McGraw Hill, 2003.

REFERENCE BOOKS:

1. Herma. K, **"Real Time Systems – Design for distributed Embedded Applications"**, Kluwer Academic, 2002.
2. Jane W. S. Liu , **"Real-Time systems**" Pearson Education

TERM WORK : (Minimum 8 tutorials)

Minimum 8 tutorials / assignments based on above syllabus covering all units

Shivaji University, Kolhapur.

Revised Syllabus w.e.f. Academic Year 2010-11

B.E. (Electronics Engineering)

Semester –VII

ROBOTICS

(Elective-I)

Teaching Scheme		**Examination Scheme**	
Lectures	: 3 hours/week	Theory	: 100 marks
Tutorial	: 1 hour/week	Term work	: 25 marks

SECTION-I

UNIT I : ROBOTIC MANIPULATION (6 Hrs.)

Automation and Robots; Robot Classification Drive Technologies, Work-Envelope Geometries, Motion Control Methods, Applications; Robot Specifications No. of Axes, Capacity and Speed, Reach and Stroke, Tool Orientation, Repeatability, Precision, Accuracy, Operating Environment, An Example; Rhino X-3.

UNIT II : DIRECT KINEMATICS (6 Hrs.)

The Arm Equation Homogenous Co-ordinates Frames, Translationsand Rotations, Composite Homogenous Transformations; Screw Transformations; Link Co-ordinates; The Arm Equation; A Five-Axis Articulated Robot; A Four-Axis Scada Robot; A Six-Axis Articulated Robot; Problems.

UNIT III : INVERSE KINEMATICS (6 Hrs.)

Solving the Arm Equation: The Inverse Kinematics Problem; General Properties of Solutions; Tool Configuration; Inverse Kinematics of a Five-Axis Articulated Robot, Four-Axis Scara Robot, Six-Axis Articulated Robot and Three-Axis Planer Articulated Robot; A Robotic Work Cell; Problems.

SECTION- II

UNIT IV : WORK SPACE ANALYSIS AND TRAJECTORY PLANNING (4 Hrs.)

Work Space Analysis; Work Envelope of a Five-Axis Articulated Robot; Work Envelope of a Four Axis Scrara Robot; Work Space Fixtures; The Pick and Place Operation; Continuous Path Motion; Interpolated Motion;Straight Line Motion; Problems.

UNIT V : DIFFERENTIAL MOTION AND STATICS (5 Hrs.)

The Tool Configuration Jacobian Matrix; Joint Space Singularties; Generalized Inverses; Resolved Motion Rate Control; n > 6; Rate Control of Redundant Robots : n > 6; Rate Control using (1) Inverses; The Manipulator Jacobean; Induced Joint Torques and Forces; Problems.

UNIT VI : MANIPULATOR DYNAMICS (5 Hrs.)

Lagrange's Equation; Kinetic & Potential Energy; Generalized Force; Lagrange Euler Dynamic Model; Dynamic Models of a Two-Axis Planer Articulated Robot and A Three-Axis SCARA Robot; Direct & Inverse Dynamics; Recursive Newton - Euler Formulation; Dynamic Model of a One-Axis Robot; Problems.

UNIT VII : ROBOT CONTROL (4 Hrs.)

The Control Problems; State Equations; Constant Solutions; Linear Feedback Systems; Single-Axis PID Control; PD-Gravity Control; Computed Torque Control; Variable-structure Control; Impedance Control; Problems.

TEXT BOOKS :

1. Robert J.Schilling," **Fundamental of Robotics -Analysis & Control** " PHI Publication
2. John J. Craig," **Introduction to Robotics -Mechanics & Control"**, Addition Wesley Publication.

REFERENCE BOOKS :

1. Wolfram Stadler,"**Analysical Robotics & Mechatronics"** Mc-Graw Hill,Publication
2. Mikell P. Grover, Weiss,Nagel and Ordef ," **Industrial Robotics - Technology, Programming & Applications"**, Mc-Graw Hill International Edition.
3. Richard D.Klafter, Thomas A. Chmielewski and Michael Negin,"**Robotic Engineering An Integrated Approach** " PHI Publication.
4. R.K.Mittal and I.J.Nagrath," **Robots and Control**" Tata McGraw Hill Publication.

TERM WORK : (Minimum 8 tutorials)

Minimum 8 tutorials / assignments based on above syllabus covering all units.

Shivaji University, Kolhapur.

Revised Syllabus w.e.f. Academic Year 2010-11

B.E. (Electronics Engineering)

Semester –VII

ADVANCE CONTROL ENGINEERING

(Elective-I)

Teaching Scheme		**Examination Scheme**	
Lectures	:3 hours/week	Theory	:100 marks
Tutorial	:1 hour/week	Term work	: 25 marks

SECTION – I

UNIT I : INTRODUCTION (5 Hrs.)

Control system analysis and design by conventional methods: overview
Root locus analysis of control system, system with transport lag, Root contour plots, Bode diagram, Polar plots, Nyquist stability criterion, Stability analysis, experimental determination of transfer functions.

UNIT II. : **SIGNAL PROCESSING IN DIGITAL CONTROL (5 Hrs.)**

Why Use Digital Control, Configuration of the Basic Digital Control Scheme, Principles of Signal Conversion, Basic Discrete – Time signals, Time – Domain models for discrete – time systems, Transfer function models, Stability on the Z-plane and the Jury stability criterion, Sampling as Impulse Modulation, Sampled Spectra and Aliasing, Filtering Practical Aspects of the choice of sampling rate, Principle of discretization, The Routh stability criterion on their- plane.

UNIT III.:**DIGITALCONTROL DEVICES AND SYSTEMS AND ALGORITHMS (10 Hrs.)**

Introduction, z-Domain description of sampled continuous – time plants, z-Domain description of systems with Dead – Time, Implementation of Digital Controllers, Digital temperature control system, Digital position control system, Stepping motors and their control.z- plane specifications of control system design, Digital compensator Design using frequency response plots, Digital compensator Design using root Locus plots, z- plane Synthesis.

SECTION – II

UNIT IV: CONTROL SYSTEM ANALYSIS USING STATE VARIABLE METHODS (8 Hrs.)

Introduction, Vectors and Matrices, State variable representation, Conversion of state variable models, to Transfer functions, Conversion of Transfer functions to canonical state Variable models, Eigen values and Eigenvectors, Concepts of controllability and observability, Equivalence between transfer function and state variable representations, multivariable systems.

UNIT V: STATE VARIABLE ANALYSIS OF DIGITAL CONTROL SYSTEMS (5 Hrs.)

Introduction, State descriptions of Digital Processors, State Description of sampled continuous time plants, State Description of systems with Dead- Time, Solution of State difference equations, Controllability and observability, Multivariable systems.

Unit VI.: POLE-PLACEMENT DESIGN AND STATE OBSERVERS (7 Hrs.)

Introduction, Stability improvement by state feedback, Necessary and sufficient conditions of arbitrary pole-placement, State regulator design, Design of State Observers, Compensator Design by the separation principle, Servo design: Introduction of the reference input by feed forward control, State Feedback with Integral Control, Digital Control systems with state feedback, Deadbeat control by state feedback and Dead beat observers.

TEXT / REFERENCE BOOK :

1. Katsuhiko Ogata ,"**Modern Control Engineering.**" PHI Publication.
2. Frohr, OrHenburger, **" Introduction to Electronics Control Engineering.**" Wiley Eastern publication
3. M. Gopal,**" Digital Control Engineering",** PHI Publication.
4. M. Gopal ,**"Digital Control And State Variable Methods",** Tata McGraw Hill Publication
5. Kuo B.C.,**"Digital Control system"**, Wiley Eastern publication, II nd Edition
6. Ogata K ,**"Discrete Time Control Systems"** PHI Publication.

TERM WORK : (Minimum 8 tutorials)

Minimum 8 tutorials / assignments based on above syllabus covering all units

Shivaji University, Kolhapur.

Revised Syllabus w.e.f. Academic Year 2010-11

B.E. (Electronics Engineering)

Semester –VII

FUZZY LOGIC & APPLICATION

(Elective – I)

Teaching Scheme		**Examination Scheme**	
Lectures	:3 hours/week	Theory	:100 marks
Tutorial	:1 hour/week	Term work	: 25 marks

SECTION -I

UNIT I : INTRODUCTION: FUZZY SET THEORY AND FUZZY LOGIC (4 Hrs.)

Complexity-Significance dilemma: Principle of Incompatibility, Origin of Fuzzy Set Theory, Historical developments Fuzzy Logic, Benefits, Limitations and Myths of Fuzzy Logic, Application potentials and application domains of Fuzzy Logic

UNIT II : FUZZY SET THEORY (8 Hrs.)

Fuzzy Set: discrete and continuous domains, Crisp Set versus Fuzzy Set, Concept of membership function and its features, Types of Fuzzy Sets (Triangular, Trapezoidal, Exponential), Characteristic properties of Fuzzy Set (Support, Width, Height, Peak, Normality, Cardinality, Convexity), Methods of assigning membership grade values, Hedges, Labels, Context dependency with Fuzzy Set, Linguistic variable and Fuzzy Set, Fundamental operations (Union, Intersection, Complement, Containment), Laws of excluded middle and contradiction, Algebraic operations (Cartesian product, Algebraic sum and difference, Bounded sum and difference), Dilution (DIL) and Concentration (CON) of Fuzzy Set, Geometric interpretation of Fuzzy Set, α-cut of Fuzzy Set and decomposition principle, Concept of Fuzzy Number and Extension principle, Problem solving with Fuzzy Set and Fuzzy Number.

UNIT III : FUZZY RELATION (6 Hrs.)

Concept of relation: Classical (Crisp) and Fuzzy Relations, Mathematical, Matrix form and Graphical representation of Fuzzy Relation, Fundamental operations (Union, Intersection, Complement, Containment), Properties of Fuzzy Relation, Fuzzy Tolerance and Equivalence Fuzzy Relations with illustrative examples, Projection and Cylindrical Extension operations with Fuzzy Relation, Converse and other Fuzzy Relations, Composition of Fuzzy Relation, Problem solving with Fuzzy Relation.

UNIT IV : FUZZY REASONING AND FUZZY IMPLICATION (7Hrs.)

Fuzzy Proposition, Formation of Fuzzy Rules, Compound rules, Aggregation of Fuzzy rules, Fuzzy (Approximate) Reasoning, Types of Fuzzy Reasoning, Mamadani and

TSK methods of Fuzzy Reasoning, Fuzzy Inference System (FIS), Types of FIS: Mamadani and Sugeno type, Comparison, Fuzzy Implication: Generalized Modus Ponens and Tolens, Types of Implications, Conversion of Fuzzy Rules into Fuzzy Relation by Zadeh and Mamadani type implications, Compositional Rule of inference.

UNIT V : FUZZY LOGIC CONTROL (8Hrs.)

General structure of Fuzzy Logic Control, Steps involved in designing Fuzzy Logic Control: Fuzzification Interface, Knowledge Elicitation, Inference Logic, Defuzzification Interface, Types of Defuzzification Methods: Centroid Method, Mamadani and Sugeno-Takagi Architectures of Fuzzy Logic Controller, Simplified Design of Fuzzy Logic Control for: Furnace Temperature, Boiler Steam Pressure, DC Motor Speed, Subway Train Operation, Safe Car Drive, Washing Machine Cycle, Vacuum Cleaner Mechanism, Air Craft Landing.

UNIT VI: HARDWARE IMPLEMENTATION (4 Hrs.)

Introduction to Digital and Analog hardware implementation of Fuzzy Logic, Analog Techniques: Voltage Mode, Current Mode, Mixed Mode, Fuzzy Analog Memory.

REFERENCE BOOKS:

1. G. J. Klir, B. Yuon, **"Fuzzy Sets and Fuzzy Logic: Theory and applications"**, PHI, New Delhi.
2. J. Yen, R. Langari , **"Fuzzy Logic"**, Pearson Education, New Delhi
3. D. Driankov, H. Hellendroon, M. Reinfrank,**"An Introduction to Fuzzy Logic Control"**, (1996), Narosa Publishing House, New Delhi
4. S. N. Sivanandam, S. N. Deepa,**"Principles of Soft Computing"**, Wiley, India (P) Ltd., Ist Indian Edition, 2008),
5. M. N. Cirstea, A. Dinu, J. G. Khor, M. McCormick,**"Neural and Fuzzy Logic Control of Drives and Power systems"**, Newnes, London
6. A. M. Ibrahim,**"Introduction to Applied Fuzzy Electronics"**, PHI, New Delhi
7. S. Rajsekaran, G. A. Vijayalaxmi Pai,**" Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis and applications"**, PHI, New Delhi
8. A. M. Ibrahim,**"Fuzzy Logic for Embedded System and applications"**, Elsevier Science, USA

TERM WORK : (Minimum 8 tutorials)

Minimum 8 tutorials / assignments based on above syllabus covering all units.

Shivaji University, Kolhapur.

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B.E. (Electronics Engineering)

Semester –VII

PROJECT-I

Teaching Scheme		**Examination Scheme**	
Practical	: 4 hour/week	Term work	: 50 marks
		OE	: 25 marks

The project work is to be carried out in two semesters of B.E. (Electronics) Part – I & Part– II. The practical batch for project will be of 15 students. The batch will be preferably divided into groups each consisting of not more than 3 students.
In semester – I, group will select a project with the approval of the guide and submit the synopsis of project in the month of August. The group is expected to complete details system design, layout etc. in semester – I, as a part of term work in the form of a joint report.
In addition all students of project group will deliver the seminar on the proposed project only.
If the group of student select a project under sponsored category from industry, it is essential that they should take prior written permission & approval at the beginning of semester-I from Head of Institution through Head of Department & Concerned Guide .

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B.E. (Electronics Engineering)

Semester –VIII

COMPUTER NETWORK

Teaching Scheme		**Examination Scheme**	
Lectures	: 4 hours/week	Theory	: 100 marks
Practical	: 2 hours/week	Term work	: 25 marks
		OE	: 50 marks

SECTION – I

UNIT I : INTRODUCTION TO COMPUTER NETWORK (6 Hrs.)
Network definition & requirements Network topology, Types of networks, reference models – OSI, TCP/IP,
Physical Layer network components: Transmission media and types, Modems – types, block schematic & standards, Network Devices: Network Connectors, Hubs, Switches, Routers, Bridges(Types of Bridges)

UNIT II : DATA LINK LAYER (7 Hrs.)
Design issues,elementary data link protocols, sliding window protocols.
HDLC – types of stations, modes of operation, HDLC frame formats, additional features Medium Access Sublayer – Channel allocation problem, multiple access Protocols, IEEE standard 802.3

UNIT III : NETWORK LAYER (7 Hrs.)
Design issues, Routing algorithms – shortest path, distance
vector routing, link state routing, flow based routing, routing for mobile hosts,
Congestion control – congestion prevention policies-leaky bucket algorithm,
token bucket algorithm, congestion control in virtual circuit subnet and choke packets.

SECTION-II

UNIT IV: IP ADDRESSES (8 Hrs.)
Classful addressing, other issues, subnetting and supernetting, Classless addressing, variable length blocks- subnetting, IP protocol and it's header format

UNIT IV : (4 Hrs.)
ARP, RARP, ICMP, IGMP

UNIT V : TCP AND UDP (8Hrs.)
UDP protocol, TCP services, TCP Segment, Flow control, Congestion control, TCP Timers, IP/V.6.

TEXT / REFERENCE BOOKS :

1. Forouzan, , **"Data Communication and Networking"** IInd edition,Tata Mc-Graw Hill, Publication.
2. Tanenbaum, **"Computer Neworks"** IV Edition, pearson Education.
3. Wayne Tomasi, **" Introduction to Data communications and Networking"** Pearson Education.
4. Forouzan, **"TCP/IP Protocol Suite"** IIIrd Edition Tata Mc-Graw Hill publication.
5. Michael A. Gallo, William M. Hancock,**" Computer Communications and Networking Technologies"** Cengage Learning (India Edition)

TERM WORK : (Minimum 10 Experiments)

Minimum 10 experiments based on above syllabus covering all units.

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Shivaji University, Kolhapur.

Revised Syllabus w.e.f. Academic Year 2010-11

B.E. (Electronics Engineering)

Semester –VIII

OPERATING SYSTEM

Teaching Scheme		**Examination Scheme**	
Lectures	:4 hours/week	Theory	:100 marks
Practical	:2 hour/week	Term work	: 25 marks
		OE	: 50 marks

SECTION-I

UNIT I : FUNDAMENTALS OF OS AND SYSTEM SOFTWARE (4 Hrs.)
Overview of all system software Operating system- I/O Manager- Assembler- Compiler- Linker- Loader, OS services and components, multitasking, multiprogramming, time sharing, buffering, spooling

UNIT II : PROCESS AND THREAD MANAGEMENT (7 Hrs.)
Concept of process and threads , process states process management context switching , interaction between processes and OS , multithreading

UNIT III : CONCURRENCY CONTROL (7 Hrs.)
Concurrency and race conditions, mutual exclusion requirements , s/w and h/w solutions, semaphores, monitors, classical IPC problem and solutions, Dead locks - characterization , detection ,recovery, avoidance and prevention.

SECTION-II

UNIT IV : MEMORY MANAGEMENT (6 Hrs.)
Memory partitioning , swapping, paging, segmentation, virtual memory - Concepts, Overlays, Demand paging, Performance of demand paging , page replacement algorithm, Allocation algorithms

UNIT V : I/O SYSTEMS (8 Hrs.)
Principles of I/O hardware - I/O devices - device controller - direct memory access Principles of I/O software – Goals - interrupt handlers - device drivers- device independent I/O software
Secondary-storage structure - Disk structure - Disk scheduling - Disk Management - Swap-space management - Disk reliability - Stable storage implementation File concept File support- Access methods- Allocation methods- Directory systems- File Protection

UNIT VI : EMBEDDED OPERATING SYSTEMS (4 Hrs.)

Characteristics of embedded operating systems, Real time operations, Reactive operations, configurability, I/O device flexibility, protection mechanism, direct use of interrupts.

TEXT / REFERENCE BOOKS :

1. Achyut S. Godbole,**" Operating Systems"** IInd Edition,Tata Mc Graw Hill .
2. William Stallings ,**"Operating System: Internals & Design Principles'**, Prentice Hall of India.
3. Flynn & Metioes ,**"Understanding Operating System"** IVth Edition, Thomsan publication.
4. Silberschatz & Galvin,**" Operating System Concepts",**VII th Wiley 2000 .
5. Milman Milenkovic," **Operating systems, concept &design"**
6. P.balkrishna Prasad," Operating Systems" II nd Edition,Scitech Publication
7. Flynn /McHoes," Operating Ststems" Cengage Learning (India Edition)

TERM WORK : (Minimum 8 Experiments)

Minimum 8 experiments based on above syllabus covering all units.

Shivaji University, Kolhapur.

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B.E. (Electronics Engineering)

Semester –VIII

MICROWAVE ENGINEERING

Teaching Scheme		**Examination Scheme**	
Lectures	:4 hours/week	Theory	:100 marks
Practical	:2 hour/week	Term work	: 25 marks

SECTION I

UNIT I : WAVE GUIDES (6 Hrs.)

Rectangular and circular wave guides: TE and TM mode wave, power transmission in wave guide, power losses in wave guide, excitation of modes in wave guide, Characteristics of standard wave guides.

UNIT II : MICROWAVE COMPONENTS AND TUBES (9 Hrs.)

Microwave cavities, microwave hybrid circuits, directional coupler, Circulators and Isolators, microwave attenuators, slotted lines, parallel, coplanar & shielded micro strip lines.

Klystrons, reflex klystrons, TWTs.

Microwave Crossed Field Tubes: Magnetrons, Forward wave crossed field amplifier (FWCFA), M-carcinotron oscillators, high power Gyrotrons.

UNIT III : MICROWAVE SOLID STATE DEVICES (6 Hrs.)

Microwave tunnel diodes, microwave FETs, Gunn effect diodes, RWH Theory, LSA diodes, InP diodes,CdTe diodes, IMPATT diodes, PIN diodes, Ruby laser, MESFETs and HEMT.

SECTION II

UNIT IV : MONOLITHIC MICROWAVE INTEGRATED CIRCUITS AND HAZARDS (6 Hrs.)

Materials: substrate, conductor dielectric & resistive MMIC growth, thin film formation, hybrid microwave I.C. fabrication , Electromagnetic compatibility, plane wave propagation in shielded rooms, anechoic chambers, microwave clean rooms, microwave hazards.

UNIT V : MICROWAVE MEASUREMENTS (7 Hrs.)

Detection of microwave power: measurement of microwave power bridge circuit using thermister & barraters. Theory & operation of barraters, direct reading barraters bridges.

Measurement of wavelengths: single line cavity coupling system, frequency pulling by reactive load, Transmission cavity wave meter & reaction wave meter, measurement of VSWR, measurements of attenuation, free space attenuation.

UNIT VI : MICROWAVE ANTENNAS (8 Hrs.)

RF antenna and Microwave antennas, Horn antenna, Parabolic reflector with all types of feeding methods, slotted antenna, Lens antenna, Microwave strip line antennas, Rod reflector, Corner reflector Equation for antenna gain, Directivity and Beam width of all above antenna types.

TEXT BOOK :

1. Samuel Liao ,**"Microwave Devices and Circuit"** Prentice Hall of India

REFERENCE BOOKS:

1. Peter A. Rizzim,**"Fundamentals of Microwave Engineering"** Prentice Hall of India.
2. R.E.Collin, **"Foundation for Microwave Engineering"**, Mc-Graw Hill International.
3. Sisodia and Raghuvanshi, **" Microwave Circuits and Passive Device"**, New Edge International limited Publishers.
4. Manjit Mitra, **" Microwave Engineerin"**, Dhanpat Rai & Co.
5. Annapurna Das & Sisir K Das,**" Microwave Engineering**", Tata Mc-Graw Hill.
6. David Pozar,**" Microwave engineering"**, Wiley Publication
7. G.S.N. Raju , **"Antennas and wave propagation**" ,Pearson Education
8. Skolnik,**" Principles of Radar Engineering**", Tata Mc-Graw Hill.
9. M.L. Sisodia,**" Microwave: Introduction to Circuit Devices and Antenna"**, New Edge International limited Publishers.
10. M.L. Sisodia,**" Microwave Active Devices -vacuum and solid state"** New Edge International limited Publishers.

TERM WORK : (Minimum 8 Experiments)

Minimum 8 experiments based on above syllabus covering all units.

LIST OF EXPERIMENTS:

1. Reflex Klystron Characteristics
2. GUNN Diode Characteristics
3. VSWR Measurement (Using Vmax / Vmin Method)
4. Frequency and wavelength measurement
5. Input impedance measurement
3. Study of E plane /H plane and magic Tee
4. Study of Directional coupler, coupling factor
7. Horn Antenna (Gain, Radiation Pattern and beam width)
8. Parabolic Antenna (Gain, Radiation Pattern and beam width)
9. Measurement of attenuation (Fixed and variable)

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B.E. (Electronics Engineering)

Semester –VIII

BROADBAND COMMUNICATION

(Elective-II)

Teaching Scheme		**Examination Scheme**	
Lectures	:3 hours/week	Theory	:100 marks
Tutorial	:1 hour/week	Term work	: 25 marks

SECTION – I

UNIT I : ISDN (**8 Hrs.)**

Switching Techniques, Principles of ISDN, Architecture, ISDN standards, I-series Recommendations, Transmission structure, User network interface, ISDN protocol architecture, ISDN connections, Addressing, Interworking,

UNIT II : B-ISDN ARCHITECTURE AND STANDARDS, B-ISDN SERVICES (**6 Hrs.)**

Conversational, Messaging, Retrieval, Distribution, Business and Residential requirements.

UNIT III : B-ISDN PROTOCOLS **(6 Hrs.)**

User plane, Control plane, Physical layer, Line coding, Transmission structure, SONET- Requirement, Signal Hierarchy, System Hierarchy.

SECTION-II

UNIT IV : ATM – OVERVIEW, VIRTUAL CHANNELS (**8 Hrs.)**

Virtual paths, VP and VC switching, ATM cells, Header format, Generic flow control, Header error control, Transmission of ATM cells, Adaptation layer, AAL services and protocols.

UNIT V : ATM SWITCHING **(6 Hrs.)**

ATM switching building blocks, ATM cell processing in a switch, Matrix type switch, Input, Output buffering, Central buffering, Performance aspects of buffering switching networks.

UNIT VI : ATM TRAFFIC AND CONGESTION CONTROL **(6 Hrs.)**

Requirements for ATM Traffic and Congestion Control, Cell-Delay Variation, ATM Service Categories, Traffic and Congestion Control Framework, Traffic Control, Congestion Control,

TEXT BOOK :

1. William Stallings,"**ISDN and Broadband ISDN with Frame Relay and ATM** Prentice-Hall, IVth edition.

REFERENCE BOOKS:

1. Balaji Kumar,**" Broadcast Communications"**, McGraw Hill Publication.
2. W. Stallings, **"ISDN-An Introduction",** McGraw Hill Publishing company.
3. M. Schwartz, " **Telecommunication Network "**Addison Wesley publication.
4. M. Schwartz," **Computer Communication network – Design & Analysis"** Prentice Hall India Publication.

TERM WORK : (Minimum 8 tutorials)

Minimum 8 tutorials / assignments based on above syllabus covering all units.

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Semester –VIII

WIRELESS COMMUNICATION NETWORK

(Elective-II)

Teaching Scheme		**Examination Scheme**	
Lectures	:3 hours/week	Theory	:100 marks
Tutorial	:1 hour/week	Term work	: 25 marks

SECTION-I

UNIT I : INTRODUCTION OF WIRELESS COMMUNICATION. **(6 Hrs.)**

Challenges in wireless networking ,Wireless communications standards Overview, evolution of cellular system, Cellular system architecture & operation, Performance criteria.Multiple access schemes for wireless communication -TDMA, FDMA, CDMA, SDMA

UNIT II : WIRELESS NETWORK PLANNING AND OPERATION **(7 Hrs.)**

frequencies management, channel assignments, frequency reuse, System capacity& its improvement, Handoffs & its types, roaming, co channel & adjacent channel interference .

UNIT III : DIGITAL CELLULAR NETWORKS (5 Hrs.)

GSM architecture& interfaces, signal processing in GSM, frame structure of GSM, Channels used in GSM.

SECTION – II

UNIT IV : WIRELESS LAN TECHNOLOGY (5 Hrs.)

Overview, WLAN technologies, infrared LANs, Spread Spectrum LANs Narrowband Microwave LANs

IEEE 802.11- Architecture, protocols, MAC layer .MAC frame, MAC management,

UNIT V : BLUETOOTH (4 Hrs.)

Overview, Radio specification, Base band specification, Link manager specification, logical link control & adaptation protocol.

UNIT VI : MOBILE DATA NETWORKS (4 Hrs.)
Introduction, Data oriented CDPD networks, GPRS

UNIT VII : WIRELESS ACCESS PROTOCOL (5 Hrs.)
WAP architecture , Wireless Datagram ,Wireless Transport layer security, wireless transaction ,Wireless Session ,Wireless Application Environment ,WML

TEXT BOOKS:

1.William C.Y.Lee," **Mobile communication Engg"** , Tata Mc-Grraw Hill Publications
2.T.S.Rappaport," **Wireless Communication, principles & practice" P**earson Education
3. Schiller,"**Mobile communication**", IInd Edition, Pearson Education

REFERENCE BOOKS:

1. William Stalling,**" Wireless Communication & Networking"**
2. Rampantly," Mobile communication"
3. Kamilo Feher,**" Wireless digital communication", PHI, 1999**
4. Kavesh pahlavan & P.Krishna Murthy,**" Principles of Wireless networks"**

TERM WORK : (Minimum 8 tutorials)

Minimum 8 tutorials / assignments based on above syllabus covering all units

Shivaji University, Kolhapur.

Revised Syllabus w.e.f. Academic Year 2010-11

B.E. (Electronics Engineering)

Semester –VIII

BIOMEDICAL CONTROL & INSTRUMENTATION

(Elective-II)

Teaching Scheme		**Examination Scheme**	
Lectures	:3 hours/week	Theory	:100 marks
Tutorial	:1 hour/week	Term work	: 25 marks

SECTION-I

UNIT I : CARDIAC MEASUREMENT (8 Hrs.)

Cardiovascular System, Heart Structure, Cardiac Cycle, ECG Theory, ECG Electrodes, Electrocardiograph, Indicator dilution methods; Measurement of continuous Cardiac output derived from aortic pressure waveforms, cardiac Arrhythmias; Foetal heart rate measurements Plethysmography. Cardiac Pacemakers ,AC/DC Defibrillators, Heart-Lung Machine (HLM)

UNIT II : PATIENT MONITORING SYSTEMS (6 Hrs.)

Different Types of ECG Monitors, Ambulatory monitoring Instruments. Measurement of Blood pressure, Temperature, Respiration rate, Apnea detectors; Computerized patient monitoring system. Oximetry, pulse oximeters, Ear oximeters.

UNIT III : PULMONARY FUNCTION ANALYZERS (5 Hrs.)

Natural Process of Breathing, O2 and CO2 Transport, Regulation of Breathing, Pulmonary function measurement; Spirometry; Pulmonary function analyzers. Respiratory gas analyzers. Ventilators

SECTION – II

UNIT IV : NERVOUS SYSTEM (6 Hrs.)

Structure of Neuron, Central Nervous System, Electroencephalography, Evoked Response, Biofeedback, Myoelectric voltages, Electromyography,

UNIT V : SENSORY INSTRUMENTATION (6 Hrs.)

Mechanism of Hearing, Sound Conduction System, Basic Audiometer; Pure tone audiometer; Audiometer system Bekesy; Evoked response Audiometer system, Hearing Aids,Anatomy of Eye, Errors in Vision, ophthalmoscope, Tonometer, Perimeter.

UNIT VI : LUNGS, KIDNEY AND BONE (7Hrs.)

Lungs , Pulmonary Volume measurement, pulmonary flow measurement, pulmonary diffusion, Kidney Structure, Regulation of Water and Electrolyte Balance, Artificial Kidney, Dialysis System, Lithotripsy , kidney clearance ,Kidney imaging analysis ,Peritoneal Dialysis,

Bones mineral density, joint friction, Bone positions, Bone-strain related Potentials.

TEXT BOOK :

1. John G. Webster, **'Medical Instrumentation application and design',** III rd Edition, Wiley publication.

REFERENCE BOOKS :

1. Goddes L.A and Baker L.E, **"Principles of Applied Biomedical Instrumentation'** Wiley-Inter science, III rd edition.
2. R.S. Khandpur, **"Handbook of Biomedical Instrumentation"**, Tata McGraw Hill, II nd edition
3. John G. Webster,**" Bio instrumentation"** Wiley India Edition
4. Leslie Cromwell, Fred J. Weibell, Erich A. Pfeiffer, **"Biomedical Instrumentation and Measurements"**, Prentice-Hall India, II nd edition.
5. S.K. Venkata Ram, **"Biomedical Electronics and Instrumentation'**,Galgotia Publication Pvt. Ltd. New Delhi.
6. Nandini K.Jog,**" Electronics in Medicine and Biomedical Instrumentation"** PHI Edition.

TERM WORK : (Minimum 8 tutorials)

Minimum 8 tutorials based on above syllabus covering all units.

Shivaji University, Kolhapur.

Revised Syllabus w.e.f. Academic Year 2010-11

B.E. (Electronics Engineering)

Semester –VIII

CMOS VLSI DESIGN

(Elective –II)

Teaching Scheme		**Examination Scheme**	
Lectures	:3 hours/week	Theory	:100 marks
Tutorial	:1 hour/week	Term work	: 25 marks

SECTION- I

UNIT I : INTRODUCTION (5 Hrs.)

MOS Transistors, MOS Transistor Switches, CMOS Logic, Circuit and System Representations, MOS Transistor Theory - Introduction MOS Device Design Equations, The Complementary CMOS Inverter-DC Characteristics, Static Load MOS Inverters, The Differential Inverter, The Transmission Gate, The Tri State Inverter, Bipolar Devices.

UNIT II : CIRCUIT CHARACTERISATION AND PERFORMANCE ESTIMATION (8 Hrs.)

Introduction, Resistance Estimation Capacitance Estimation, Inductance, Switching Characteristics, CMOS-Gate Transistor Sizing, Power Dissipation, Sizing Routing Conductors, Charge Sharing, Design Margining, Reliability.

UNIT III : CMOS CIRCUIT AND LOGIC DESIGN (5 Hrs.)

CMOS Logic Gate Design, Basic Physical Design of Simple Gate, CMOS Logic Structures, Clocking Strategies, I/O Structures, Low Power Design.

SECTION- II

UNIT IV : SYSTEM DESIGN AND DESIGN METHOD (8 Hrs.)

Design Strategies CMOS Chip Design Options, Design Methods, Design Capture Tools, Design Verification Tools, Design Economics, Data Sheets, CMOS Testing - Manufacturing Test Principles, Design Strategies for

UNIT V : TESTING (4 Hrs.)

Test, Chip Level Test Techniques, System Level Test Techniques, Layout Design for Improved Testability.

UNIT VI: CMOS SUB SYSTEM DESIGN (6 Hrs.)

Data Path Operations-Addition/Subtraction, Parity Generators, Comparators, Zero/One Detectors, Binary Counters, ALUs, Multiplication, Shifters, Memory Elements, Control-FSM, Control Logic Implementation.

TEXT BOOK:

1. Nell H. E. Weste and Kamran Eshraghian, **" Principles of CMOS VLSI Design "**, Addision Wesley, II nd edition .

REFERENCE BOOKS:

1. John P . Uyemura **" Introduction to VLSI Circuits and Systems",** Wiley India Edition
2. Jacob Backer, Harry W. Li and David E. Boyce, **" CMOS Circuit Design, Layout And Simulation "**, Prentice Hall of India, 1998.

TERM WORK :

Total eight assignment based on above syllabus covering all units (Assignments using Magic tool on linux OS may be performed)

Shivaji University, Kolhapur.

Revised Syllabus w.e.f. Academic Year 2010-11

B.E. (Electronics Engineering)

Semester –VIII

ADVANCE DIGITAL SIGNAL PROCESSORS

(Elective-II)

Teaching Scheme		**Examination Scheme**	
Lectures	:3 hours/week	Theory	:100 marks
Tutorial	:1 hour/week	Term work	: 25 marks

SECTION-I

UNIT I : INTRODUCTION TO DSP PROCESSORS (5 Hrs.)
Advantages of DSP Processors, Characteristics of DSP Processors, Applications of DSP Processors, Types of Architectures: von Neumann Architecture, Harvard Architecture, Super Harvard Architecture, VLIW Architecture.

UNIT II : ARCHITECTURE FOR PROGRAMMABLE DSP DEVICES (8 Hrs.)
Basic Architectural features, DSP computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation Unit, Programmability and Program Execution, Speed issues Features for External interfacing.

UNIT III : EXECUTION CONTROL AND PIPELINING (5 Hrs.)
Hardware looping, Interrupts, Stacks, Relative Branch Support, Pipelining and performance, Pipeline Depth, Interlocking, Branching effects, Interrupt effects, pipeline Programming models.

SECTION-II

UNIT IV : PROGRAMMABLE DIGITAL SIGNAL PROCESSORS (9 Hrs.)
Commercial Digital signal-processing Devices, Architecture of TMS320C67XX Processors, Data Addressing modes of TMS320C67XX Processors, Memory space of TMS320C67XX Processors, Program Control, TMS320C67XX instructions and Programming, On-Chip peripherals, Interrupts of TMS320C67XX processors, Pipeline Operation of TMS320C67XX Processors.

UNIT V: ANALOG DSP PROCESSOR FAMILY (5 Hrs.)
Analog 21061 series SHARC Processor block diagram, Interrupt Hardware, Memory quantization, Central arithmetic logic unit, system control etc.

UNIT VI : IMPLEMENTATION OF BASIC DSP ALGORITHMS (4 Hrs.)
FIR Filters, IIR Filters, interpolation Filters, Decimation filters, Adaptive Filters, 2-D Signal Processing.

TEXT / REFERENCE BOOKS :

1. Analog Devices & Texas Instruments Users Manuel of TMS320C67XX and ADSP 21061.
2. P. Pirsch,**"Architectures for Digital Signal Processing"** John Wiley publication.
3. Kuo and Gan,"**Digital Signal Processors"** Pearson Education
4. Phil Lapsley, **"DSP Processor Fundamentals: architectures and Features"**, Wiley publication
5. DSP Applications using C and the TMS320C6x DSP

TERM WORK : (Minimum 8 tutorials)

Minimum 8 tutorials / assignments based on above syllabus covering all units.

Shivaji University, Kolhapur.

Revised Syllabus w.e.f. Academic Year 2010-11

B.E. (Electronics Engineering)

Semester –VIII

SYSTEM ON CHIP

(Elective-II)

Teaching Scheme		**Examination Scheme**	
Lectures	:3 hours/week	Theory	:100 marks
Tutorial	:1 hour/week	Term work	: 25 marks

SECTION -I

UNIT I : SYSTEM DESIGN (6 Hrs.)

Concept of system, importance of system architectures, introduction to SIMD, SISD, MIMD and MISD architectures, concept of pipelining and parallelism.

UNIT II : INTRODUCTION TO SOC (6 Hrs.)

Typical SOC architecture, SOC design flow, Differences between Embedded systems and SOCs, Designing microprocessor /Microcontroller based system and embedded system. System design issues in SOCs

UNIT III : SOC PROCESSORS (6 Hrs.)

Introduction to CISC , RISC, Von Neuman and Harward Architecture,Concept of Soft processors , Study of IBM's power PC,Spartan-III FPGA , Picoblaze processor, Microblaze processor

SECTION –II

UNIT IV : SYSTEM BUSES (6 Hrs.)

Introduction to busses used in SOCs. Introduction to AMBA bus.
Detailed study of IBM's core connect bus, concept of PLB-processor local bus and OPB-on chip peripheral bus.

UNIT V : SOC IMPLEMENTATION (6 Hrs.)

Study of features like embedded RAMs, multipliers, Digital clock management etc. Introduction to tools used for SOC design, Xilinx embedded development kit.

UNIT VI : SOC DEVELOPMENT TOOLS (6 Hrs.)

• Developing simple systems by interfacing simple peripherals to Spartan III .
Tools : Xilinx ISE and Xilinx EDK Latest versions SOC system design tutorial-designing an image processing system with interface to host using either UART/PCI/USB bus.

REFERENCE BOOKS:

1. Wyne wolf ,**"FPGA based system design"** by Prentice Hall of india.
2. Giovanni De Micheli, Rolf Ernst and Wayne Wolf **"Readings in hardware/software co-design".** Morgan Kaufman publishers
3. "**Computers as components : principles of embedded computing system Design"** Morgan Kaufman publishers
4. Ahmed jerrya, wayne wolf ,**"Multiprocessors systems-on-chips"** Morgan Kaufman Publishers
5. Core connect architecture at http://www.chips.ibm.com/products/coreconnect
6. EDK power PC tutorial at http://www.xilinx.com/EDK
7. Spartan III handbook from xilinx
8. Power PC info http://www.chips.ibm.com/productspowerPC/cores/405sde_pb.html
9. White papers form xilinx.com and http://www.chips .ibm.com
10. Arm processor details at WWW.arm.com
11. Amba bus architecture at

http://www.arm.com/products/solutions/Ambahomepage.html
http://www.princeton.edu/~wolf

TERM WORK : (Minimum 8 Tutorials)

Minimum 8 tutorials / assignment based on above syllabus covering all units

Shivaji University, Kolhapur.

Revised Syllabus w.e.f. Academic Year 2010-11

B.E. (Electronics Engineering)

Semester –VIII

MECHATRONICS

(Elective-II)

Teaching Scheme		**Examination Scheme**	
Lectures	:3 hours/week	Theory	:100 marks
Tutorial	:1 hour/week	Term work	: 25 marks

SECTION-I

UNIT I : INTRODUCTION (6 Hrs.)

Definition, Trends, Control Systems, Microprocessor/Micro controller based controllers, PC based controllers, proportional/Integral/Differential controllers, PID Controllers, Digital Controllers, Adaptive Controller.

UNIT II : ELECTROMECHANICAL DRIVES (4 Hrs.)

DC Servo motors, 4-quadrant servo drives, braking methods, Bipolar drives, MOSFET Drivers, SCR Drives, variable frequency drives.

UNIT III : PLC CONTRILLERS (8 Hrs.)

Ladder diagram, FSD structured programming, Interfacing of Sensors and Actuators to PLC.

Programmable Motion Controllers: Interpolation: point-to-point, Linear Circular, B-S plane, Home, Record position.

SECTION II

UNIT IV : PRECISION MECHANICAL ACTUATION (6 Hrs.)

Pneumatic Actuators, Electro-pneumatic Actuators, hydraulic Actuators, Electrohydraulic Actuators, Types of motions, Kinematics, Inverse Kinematics, Timing Belts, Ball Screw and Nut, Linear motion Guides, Linear Bearings, Harmonic Transmission, motor/Drive selection.

UNIT V : MEMS (7 Hrs.)

Overview of MEMS & Microsystems, Typical MEMS & Micro system, products and applications.

Micro sensors and micro actuators : Phototransistors, pressure sensors, thermal sensors, micro grippers, micro motors, micro valves, Micro pumps.

Micro Manufacturing : Bulk Manufacturing, Surface Manufacturing, LIGA Process.

UNIT VI : DESIGN OF MECHATRONIC SYSTEMS (6 Hrs.)

The design process, traditional and Mechatronic designs. A few case studies like piece counting system pick and place manipulator, simple assembly involving a few parts, part loading. Unloading system, automatic tool and pallet changers etc.

TEXT BOOKS / REFERENCE BOOKS :

1. W.Bolton **"Mechatronics "**,Addison Wesley , IInd Edition
2. N.P. Mahalik,**" Mechatronics Principles, Concepts and Applications"** , Tata Mc-Graw Hill, New Delhi.
3. Dan Necsulescu, **" Mechatronics"**, Pearson Eduction.
4. Yoram Koren , **"Computer Control of Manufacturing systems"**,Mc-Graw Hill ,New Delhi
5. Tai Ran Hsu,**" MEMS and Microsystems Design and Manufacture"** Tata Mc-Graw Hill, New Delhi.
6. Grover, Weiss, Nagel, and Ordey, **" Industrial Robotics : Technology, Programming and Applications"**, Mc-Graw Hill publication
7. Fu, Gonzalez and Lee, **"Robotics : Controls,Sensing,Vision and Intelligence"**, Mc-Graw Hill publication
8. S.R.Deb, **"Robotics Technology and Flexible Automation",**Tata Mc-Graw Hill, Publication.

TERM WORK : (Minimum 8 tutorials)

Minimum 8 tutorials/ assignments based on above syllabus covering all units

Shivaji University, Kolhapur.

Revised Syllabus w.e.f. Academic Year 2010-11

B.E. (Electronics Engineering)

Semester –VIII

PROCESS INSTRUMENTATION

(Elective-II)

Teaching Scheme		**Examination Scheme**	
Lectures	:3 hours/week	Theory	:100 marks
Tutorial	:1 hour/week	Term work	: 25 marks

SECTION-I

UNIT I : (4 Hrs.)

Overview of process Control System loop components, Block diagram, Process Variables & degree of freedom, dynamics & Characteristics of physical systems like electrical, liquid, thermal, gas & Mechanical processes & their influence oncontrol system quality.

UNIT II : (7 Hrs.)

Controller principles - Control system parameters, steady state and unsteady state analysis control system for change in load variable & change in set point variable practical example, mathematical characterization of the components,deviation calculation. Response of process under controller actions (on/off,Proportional, integral derivative & combinational mode controllers).

UNIT III : (7 Hrs.)

Digital Controllers: Elementary of digital control method, simple alarms & multivariable alarm, interactive multivariable control digital control strategies,sampling & signal processing, selection of sample frequency, differenceequations. Three term / PID control controllers stability of digital control.

Case Study : Design of Digital temperature control using digital IC's design of PC,motor control, design of light intensity control. (System specifications, Blockdiagram, system design, Schematic diagram).

SECTION-II

UNIT IV : (6 Hrs.)

Computer control of Industrial processes Classes of control Hierarchy concepts, Necessity and functions of computer, level of automation, economy of computer control, functional models of computer process control system, special feature and selection of computer for data logging & controlling, direct digital control &supervisory computer control block schematic concepts, I/O systems, Sampling, multiplexing & quantization of A/D & D/A converters, ADC & DAC Interfacing,

Interfacing with different types of transducers, analog/digital, electrical-electrical,DAS & Control features.

UNIT V : (6 Hrs.)

Direct Digital Control system – DDC structure computer control theory, DDC Software classes of control, programmed I/O operations, interrupt systems, I/O software. Selection of control criterion- Introduction to optimization techniques & adaptive techniques, Introduction to statistical analysis, Analytical design of discrete systems, Process control programming languages, data processing &reduction techniques, programming techniques on-line & real time digital control systems.

UNIT VI : (6 Hrs.)

Control algorithm – position algorithm, velocity algorithm, PID algorithm using Ztransform deadbeat Kalmars & Dalwins approach, Use of standard algorithm, standard algorithm for controller tuning, computer tuning, Selection of sampler time.
Intelligent controller : model based controller, model reference adaptive & Self tuning adaptive controller, optimal controllers using Kalman filter, Predictive controller, Expert system (IKBS) and expert controller.

TEXT BOOKS/REFERENCE BOOKS :.

1. C.D. Johnson, **"Process control Instrumentation"**
2. B.G. Liptah,**"Process control"**
3. Krishant, **"Computer based Industrial control"**
4. Thomes E. narlin, **"Process control designing processes and control system for dynamic processes"**
5. Ramakant Gaikwad , **"Analog and Digital control"**
6. George Bereny, **" Intelligent Instrumentation"**
7. Dawles WDT, **"control Algorithm for DDC design "**
8. Bristal ,**"Design & programming control algorithm for DDC "**
9. Coff K.W., **"A systematic approach to DDC design"**
10. C.D. Johnson, **" Microprocessor based process control "**
11. Thomas W. Webes ,**"An Introduction to process Dynamic & control"**

TERM WORK : (Minimum 8 tutorials)

Minimum 8 tutorials based on above syllabus covering all units

Shivaji University, Kolhapur.

Revised Syllabus w.e.f. Academic Year 2010-11

B.E. (Electronics Engineering)

Semester –VIII

NEURAL NETWORK & APPLICATION

(Elective-II)

Teaching Scheme		**Examination Scheme**	
Lectures	:3 hours/week	Theory	:100 marks
Tutorial	:1 hour/week	Term work	: 25 marks

SECTION-I

UNIT I : BIOLOGICAL NEURON, ARTIFICIAL NEURON AND NEURON MODELS (5 Hrs.)

Features of Biological Neural Network, Biological Neuron, Artificial Neural Network, performance comparison of Artificial Neural Network and Biological Neural Network, historical developments, advantages and application examples of Artificial Neural Network.

UNIT II : ARTIFICIAL NEURON MODEL AND BASIC LEARNING LAWS (6 Hrs.)

Artificial Neuron model and its components, synoptic interconnections, activation functions, weights, bias, threshold, Mc culloch-pitts Neuron, feedforward network: single layer, multi layer perceptron, linear seperability, Hebb model, feedback network, ADLINE and MADLINE models, learning and training: supervised, unsupervised, reinforcement. Hebbian, Perceptron, Delta, Winner-Take-All Learning rules, Electronic Implementation of Artificial Neuron, Simple problems.

UNIT III : SUPERVISED LEARNING NETWORK (7 Hrs.)

Perceptron networks, perceptron leaning rule, training and testing algorithms for single and multiple output classes, Adaptive Linear Neuron (ADALINE), Delta rule for single output unit: architecture, training and testing algorithms, multiple adaptive linear Neuron, back propagation network: architecture, training and testing algorithms, Tree Neural Network, problems on implementation of NOT, AND, OR functions.

SECTION-II

UNIT IV : ASSOCIATIVE MEMORY NETWORKS (6 Hrs.)

Content Addressable memory (CAM), training algorithm for pattern association: Hebb rule, outer products rule, Auto-associative Memory Network: architecture, training and testing algorithms, Hetero-associative Memory Network, Bidirectional Associative Memory (BAM), Hopfield Network: architecture, training and testing algorithms,

Continuous Hopfield Network, hardware model.

UNIT V : UNSUPERVISED LEARNING NETWORKS (6 Hrs.)

Fixed weight competitive network: Maxnet, Mexican Hat net, Hamming network, Kohonen self-organizing feature mapping network, architecture, training algorithm, Kohonen self-organizing motor map, Adaptive Resonance Theory (ART) Network, ART, ART-1, ART-2: Fundamental architecture, operating principles and training algorithm.

UNIT VI : NEURAL NETWORK APPLICATION (6 Hrs.)

Simple tasks from following domains and their neural network based solution-Pattern Classification: Symbol and Character Recognition
Associative Memory: Image Pattern Recall and Information Retrieval
Process Control and optimization: Temperature and Motor Speed Control
Image Processing: Texture Classification and Image Segmentation

TEXT / REFERENCE BOOKS :

1. J. M. Zurada " **Introduction to Artificial Neural systems"**, Jaico Publishing House, Delhi, VI Edition, 2003.
2. B. Yegnanarayana " **Artificial Neural Networks**", PHI, New Delhi, VI Edition, 2001
3. S. N. Sivanandam, S. N. Deepa, " **Principles of Soft Computing**",Wiley, India (P) Ltd. New Delhi, (Ist Indian Edition, 2008)
4. Simon Haykn "**Neural Networks: A comprehensive Foundation**", Pearson Education, New Delhi 2009.
5. S. Rajsekaran, G. A. Vijayalaxmi Pai "**Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis and applications**", PHI, New Delhi
6. Satish Kumar "**Neural Networks: A class room Approach**", Tata Mc- Graw Hill, New Delhi 2008
7. B. Kosko "**Neural Networks and Fuzzy Systems: A Dynamical System Approach to Machine Intelligence**", PHI, New Delhi 2001.
8. S. V. Kartalopoulos "**Understanding Neural Networks and Fuzzy Logic**: Basic Concepts and Applications", PHI, New Delhi 2000.
9. A. Carling "**Introducing Neural Networks**", Galgotia Publications, (2001), New Delhi

TERM WORK : (Minimum 8 tutorials)

Minimum 8 tutorials/ assignments based on above syllabus covering all units.

Shivaji University, Kolhapur.

Revised Syllabus w.e.f. Academic Year 2010-11

B.E. (Electronics Engineering)

Semester –VIII

PROJECT-II

Teaching Scheme	**Examination Scheme**
Practical : 8 Hours/week	Term work : 100 marks
	OE : 100 marks

The Project group in semester-I will continue. the project work in Semester- II and complete project in all respect (assembly, testing, fabrication, tabulation, test result etc.) The project work along with project report should be submitted as part of term work in Semester- II on or before the last day of the semester -II.
The Term work marks of the project-II will be based on mid-term evaluation by team of faculties along with the concerned Guide.

EQUIVALENCE FOR B.E.(Electronics Engg.)

Sr.No	**B.E. Part-I (Pre- Revised)**	**B.E. Part-I (Revised)**
1	Embedded Systems	Embedded system Design
2	Digital Communication	Information Theory and coding
3	Digital Signal Processing	Digital Signal Processing (Revised syllabus at T.E. Part-II)
4	Power Electronics	Power Electronics and Drives
Elective –I		
5	Advanced Control Engineering	Advanced Control Engineering
6	Bio-medical Instrumentation	Bio-medical Instrumentation
7.	Real Time Systems	Real Time Systems
8.	Fuzzy Logic	Fuzzy Logic and Application
9.	Remote Sensing and GIS	Remote Sensing & GIS of B.E. (E&TC) Part-I Sem.-VII

Part –II (Semester-VIII)

Sr.No	**B.E. Part-II (Pre- Revised)**	**B.E. Part-II (Revised)**
1	Audio and Video Engineering	Video Engineering
2	Microwave Engineering	Microwave Engineering
3	Computer Network	Computer network
Elective –II		
4	Neural Network	Neural Network and Application
5	Image Processing	Digital Image Processing
6	Mechatronics	Mechatronics
7.	Information Technology	Information Tech.(Replace subject only for repeater / class improvement candidates)
8.	Broadband Communication	Broadband Communication
9	System On Chip	System On chip