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॥ अंतरी पेटवू ज्ञानज्योत ॥

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North Maharashtra University, Jalgaon

Syllabus for Fourth Year Engineering Degree Course (B.E.)

ELECTRONICS

w.e.f. July,2001

C:\ENGINEERING\COVERPAGE.doc\PRAMOD CHAVAN

NORTH MAHARASHTRA UNIVERSITY, JALGAON
B.E. (ELECTRONICS ENGINEERING)
(1998 COURSE)

TERM – I

Sr No.	Subject Code	Subject	Teaching Scheme Hours/ Week		Examination Scheme				
					Paper Duration Hours	Maximum Marks			
			Lectures	Practical		Paper	TW	PR	OR
1		Elective – I	4	2	3	100	25	25	-
2		Power Electronics-I	4	2	3	100	25	25	-
3		Electronics Instruments and Measurements	4	2	3	100	25	-	-
4		Electronics Communication-II	4	2	3	100	25	25	-
5		Seminar	-	2	-	-	-	-	50
6		Project work	-	4	-	-	50	-	-
		Total	16	14	-	400	150	75	50
		Grand Total	30		-	675			

TERM – II

Sr No.	Subject Code	Subject	Teaching Scheme Hours/ Week		Examination Scheme				
					Paper Duration Hours	Maximum Marks			
			Lectures	Practical		Paper	TW	PR	OR
1		Elective – II	4	2	3	100	25	25	-
2		Power Electronics - II	4	2	3	100	25	25	-
3		Opto Electronics	4	2	3	100	25	-	-
4		Digital Communication	4	2	3	100	25	25	-
5		Technical Visit	-	-	-	-	50	-	-
6		Project work	-	4	-	-	50	-	50
		Total	16	12	-	400	200	75	50
		Grand Total	28		-	725			

Total Marks of Term I + Term II = 1400 Marks

In Countinuation of B.E (Electronics) Syllabus

Elective -I

1) Advanced Medical Electronics
2) Communication Theory
3) Microprocessar Based Systems
4) Digital Signal Processing

Elective -II

1) Process Instrumentation
2) Microwave Teachniques
3) Optical Fibre Communication
4) VLSI Tcachnology

B.E. (Electronics)

TermI Elective I

Advanced Medical Electronics

Teaching Scheme	Examination Scheme
lecturer :4Hrs /week	paper : 100 marks
Practical:2Hrs/week	Termwork : 25 marks
	Practical:25 marks

UNIT 1

Computer application in medical field: computer aided ECG analysis ,computerised catheterisation, computerised patients monitering system, computerised axial tomography scanners (CAT), interfacing of the computer medical instrumentation and other equipments

(10 Hrs ;20 marks)

UNIT2

Clinical laboratory equipments:colorimeter spectrophotometer Blood gas analysers:PH, PCO2,PO2 measurments. complete blood gas analysers, Blood flow meters: ultrasonic ,electromegnatic NMR blood FLOW METERS, LASER doppler flowmetry

10Hrs ; 20 marks

UNIT3

Audiometers:Basic audiometer, types of audiometers,evoked response audiometery system. Measurments in respiratory system, physiology of the respiration system,tests and instrumentation for the mechanics of breathing, respiration therapy equipment

10 Hrs; 20 marks

UNIT 4

Arrhythmias and Ambulatory monitering instruments: Cardiac arrhythmias, Arrthymia moniter, Basic arrhythmia monitering instruments, QRS detector,computerised arrhythmia monitor,Holter cardiography, data replay and analysis

10 Hrs ;20 marks

UNIT5

Instruments for surgery :Surgical diathermy machine, electrodes, safty aspects ,surgical diathermy analysers.
Laser applications in biomedical field :
pulsed ruby laser, ND-Yag Laser, Argon laser, Helium-Neon Laser, CO2 laser, clinical applications

10 Hrs ;20 marks

References

1 Hardware of biomedical instrumentation
R.S. Khandpur , Tata Mc Graw Hill
2 Biomedical Instrumentation and Measurments second edition
Crownwell, weibell ,pjetter
Premfice Hall India

The termwork should include a minimum a minimum of six experiments covering the above syllabus The termwork marks will be based on performance in theory and practical having a weightage of 40% and 60% respectively

B.E. (Electronics) Term I

Elective I

Communication Theory

Teaching Scheme
Lecturer :4 Hrs/ week

Practical : 2 hrs / week

Examination scheme
Paper : 100 marks
3 Hours duration
Termwork :25 marks
Practical :25 marks

UNIT 1

Spectral analysis : Fourier series, exponential form, amplitude spectra for a periodic train of impulses , pulses, sampling function ; normalised power ,fourier expansion; power spectral density ; Fourier transform, examples; convolution; Parseval's theorem, power and energy transfer through a network, correlation between waveforms, power and cross correlation, autocorrelation of a periodic, nonperiodic waveform; expansions in orthogonal functions

10 hrs ; 20 marks

UNIT 2

Random variables and processes: defination of a random variable, cumulative distribution function,probability density function, average value of a random variable ,variance, Tchebycheff's inequality, Gaussian probality density, error function, Raleigh probality density, random processes,autocorrelation Mathmaticalrepresentation of noise: sources of noise,frequency domain representation of noise ,noise bandwidth,quadrature componets of noise

10 hrs , 20 marks

UNIT3

Noise in amplitude modulation systems :AM receiver, superheterodyne principle , multiplexing; single-sideband, supressed carrier ,double-side band supressed carrier , double sideband with carrier, signal to noise ratio in each case, figure of merit ;envelope demodulator

10 Hrs ; 20 marks

UNIT4

Noise in frequency modulation systems: FM demodulator-limiter, discriminator, signal to noise ratio; comparison of FM and AM , pre-emphasis and de-emphasis phase modulation in multiplexing ; effect of transmitter noise

10 Hrs ; 20 marks

UNIT5

Threshold in frequency modulation :occurence of spikes, effect of modulation ,phase-locked loop ,analysis of operating range, bandwidth, spike supression, FM demodulation using feedback, bit synchronizer ,carrier recovery

10 Hrs ; 20 marks

References

1 Principles of communication system secound edition H. Toub ,D.L Schilling Tata Mc Graw Hill

2 Communication system - An introduction to signals and noise in electrical communication
A. bruce, carlson McGraw- Hill International edition

3 An Introduction to Analog and Digital communication
Simon haykin ,john wiley , SEA edition

List of Experiments

1 AM receiver
2 AM demodulator
3 FM receiver
4 Preemphasis in FM SYSTEM
5 Deemphasis in FM system
6 FM discriminator
7 FM demodulator using PLL
8 Bit synchronizer

The termwork should include a minimum of six experiments from the above list The termwork marks will be based on performance in theory and practicle having a weightage of 40 % and 60% respectively

B.E. Electronics
Term I Elective I
Microprocessor Based System

Teaching seleme
Lecturer : 4 Hrs/week
Practicle :4 hrs /week

Examination scheme
Paper : 100 Marks
3 hrs duration
T. W.: 25 Marks
PR : 25 Marks

UNIT - I

8086 Mp : Internal architecture : BIU pipelining, concept segmentization ,EU,flag registers, General purpose register: Addressing modes : Immediate, Register , Direct , Indirect , Implied mode .

Instruction set of 8086, Assemble directives, Introduction to programming 8086

(10 Hrs ,20marks)

Unit II

Procedure for 8086 : Types of procedures : Near type, Far type, Writing and using procedures , parameters passing method, Reentrant and Recursive procedures, Macros

8086 System configurations: Minimum mode, Maximum mode, system bus timing : Min & max mode

8086 Interrupts: Interrupt response, type -0, type -1, Type - 2, Type -3, Type-4,software Interrupts :0 to 255,Intr interrupts - 0 to 255 ,priority of 8086 interrupts

10 hrs 20 marks

UNIT III

Mutiprocessor systems : Co-processor configuration , closly coupled configuration, loosly coupled configuration

Numerical Data processor - 8087 : Architecture, Types of data,Instruction set in brief

I/O processor - 8089 : Architecture ,communication between 8086 and 8089

(10 Hrs 20 marks)

Unit IV

68000 MP : Internal archetecture,register structure,status register, Addressing modes, Exception types, priorities, Expception processing sequence for different type of Exceptions

Micro controllers : mc -8051 : features and architecture with instruction set ,mc -8096 : features and architecture with instruction set

(10 set , 20 marks)

UNIT V

8086 based DAS: for physical parameters such as pressure Temperature etc,Hardware interfacing,software segementwise

Overview of advanced microprocessors:80186, 80286 , 80386

(10 Hrs ,20 marks)

References

1 Microprocessors & Interfacing programming & H/W
2nd edition -> Douglas v. Hall (M.C.H.)
2 Microcomputers system : 8086 /8088 family
Architure programmily & Design
-> liu & Gibson (P.H.I.)
3 Introduction to Microprocessors
->Aditya Mathur (T.M.H.)
4 Intel Manual for Microcontroller (MCS -51 family)
5 Micro controller 8051 -> Ayala
6 Advanced Microprocessor & prinpharals
A.K. Ray & K.M.Burchandi
(TMH)

The term work should include a minimum of six experiments covering the above syllabus
The termwork marks will be based on performance in theory and practical having a weightage of 40 % and 60% respectively

B. E. Electronics

Elective I term I

Digital Signal Processing

Teaching scheme
Lecturer : 4 hrs /week

practical : 2 hrs /week

examination scheme
Paper : 100 marks
es hrs Duration
Termwork : 25 marks
practical :25 marks

Unit I
Discrete time signals and system: Discrete time sequences, superposition principles for liner system, unit sample, sample response sequence, Time inveriant systems, stability causility crierion for discrete time systems, linear constant coefficient different equation
10 hrs 20 marks

Unit 2
Fourier transform of discrete time signals: defination and important properties of the fourier transform, properties of the fourier transform for real valued sequences, defination and properties of the DFT ,circular convolution, linear convolution computing the DFT from discrete time sequence, FFT : Derivation in time, introduction to other fast realisation of the DET, FFT for spectral analysis
10 hrs 20 marks

UNIT 3
Z transform : Defination and properties of Z transform, complex Z plane ,region of convergence in z plane, relationship between fourier transform and Z transform, Z transform of symmetric sequence, inverse Z transform,the system function of a digital filter
10 hrs 20 marks

UNIT 4
Digital filter structures system : Describing equations, filter categories , Direct for structures, cascade combination of second order sections, practical combination of second order sections, linear phase FIR filter structure, frequncy sampling structure for FIR filter
10 HRS 20 marks

UNIT 5
Digital filter Design
Design consideration, choice of filter type, design consideration of IIR filter, methods to convert analog filter into digital filters, frequncy transformation, design consideration for FIR filter, windowing method, Design of FIR filter, Combining DFT and window method, final precision effects

Refrances

1 Analog and Digital signal processing- IInd edition
Ashok Ammbardar Brooks /cole publishing comp
2 Digital signal processing : Openheech and schator prentice Hall of India pvt ltd
3 Introduction to digital signal processing :
Rabiner and golf PH2 1975
4Introduction to digital signal processing: kuo
5 Digital filters: Antoni mogrow Hill 1979

The term work should include a minimum of six experiments covering tue syllabus
The termwork marks will be based on performance in theory and practicle having a weightage of 40 % and 60% respectively

B.E. (TERM I)

POWER ELECTRONICS I (ELECTRONICS)

Teaching Scheme :
Lectures : 4Hrs/Week
Practical : 2Hrs/Week

Examination Scheme:
Paper : 100 Marks
(3 Hours Duration)
Term Work : 25 Marks
Practical : 25 Marks

UNIT 1
Line frequency Phase Controlled Rectifier and inverters: Single Phase converters, idelized circuits, dc-side voltage, and Parameters ,effect of Ls , discontinuos current cinduction ,inverter mode operation. Three phase converters: idelized circuits, dc-side voltage and other parameter, effect of Ls, discontinuos operation , inverter mode of operation .

(10 Hrs; 20 Marks)

UNIT 2
dc- dc switch mode converter : dc- dc converter system, block diagram descriptions, step-down(buck) converter, step up (boost) converter, full bridge dc-dc converters, PWM with bipolar voltage switching dc- dc comparision.

(10 Hrs; 20 Marks)

UNIT 3
Switch mode dc-ac inverters : basic concepts of switch mode inverters, PWM switching scheme , square wave switching scheme, single phase inverters , half bridge inverters , full bridge inverters , Three phase inverters: PWM in three phase voltage source inverters, Programmed Harmonic elimination switching.

(10 Hrs; 20 Marks)

UNIT 4
RESONANT CONVERTERS : Zero voltage and/or servo current switching applications , switch mode inductive current switching, zero voltage and zero current switching , classification of resonant converters , high frequency integral half cycle converters , Load Resonant Converters , resonant switch converters , resonant dc link converters, Series resonant circuits - undamped series resonant circuits, series resonant circuit with capacitor parallel load, Frequency Characteristics of series resonant circuits, load resonant converters, series loaded resonant dc- dc converter, steady state operating characteristics, control of SCR dc-dc converters ,hybrid resonant dc- dc converters , parallel loaded resonant dc-ac inverters for induction heating , start-up, Class E Converters, Zero voltage Switching.

(10 Hrs; 20 Marks)

UNIT 5
Switching dc power supplies : Overviews of switching power supplies, control of switching mode dc power supplies , block diagram description , voltage feed forward PWM control , cuirrent mode control, digital pulse width modulation control, Power supply protection , soft start ,electrical isolation of feed back loop , designing of meet power supplies specification sysnchronous rectifier to improve energy efficiency, multiple outputs, EMI considerations , Power conditioners and UPS, Power line disturbances type and sources effect on snsitive equipment, Power conditioners Uninterruptable Power Supply [UPS]. Block diagram description.

(10 Hrs; 20 Marks)

REFERENCES:

1. Power Electronics : Converters applications and design, Second editing, Ned Mohan, T.M.Udeland , W.P.Robbins, John Wiley Publications and sons.
2. Introduction to thyristor and their Applications , 2nd Edition., M. Ramamurthy By East West Press.
3. Power Electronics , P.C.Sen Tata Mc Graw Hill .

LIST OF EXPERIMENTS

1. DC to DC switch mode converers : 2 Expts.
2. Switch mode of DC to DC inverters : 2 Expts.
3. Resonant Converters : 2 Expts.
4. Switching DC power supply : 1 Expts.
5. Uninterruptible Power Supply : 1 Expts.

The termwork should include a minimum of six experiments from the above list . The term works will be based on performance of theory and practicals having a weightage of 40% and 60% respectively.

B.E. (TERM I)

(ELECTRONICS & IND.ELECT.)

ELECRONIC INSTRUMENTS AND MESURMENTS

Teaching Scheme :
Lectures : 4Hrs/Week
Practical : 2Hrs/Week

Examination Scheme:
Paper : 100 Marks
(3 Hours Duration)
Term Work : 25 Marks
Practical : 25 Marks

UNIT 1
True RMS responding Voltmeter, Q-Meter ,Vector impedance meter , vetcor voltmeter , RF Power and voltage measurement, signal generator ; frequency synthesized signal generator, signal generator Modulation ,Sweep frequency generator , function generator .

(10 Hrs; 20 Marks)

UNIT 2
Signal Analysis : Wave analyzers, Harmonic distortion analyzers, Spectrum analyzers.
Frequency Counters and Time -Interval Measurements: Simple frequency range of the counters, automatic and computing counters.

(10 Hrs; 20 Marks)

UNIT 3
Oscilloscopes :Block Diagram, CRT Circuits, Vertical Defflection System, Oscilloscope Probe, delay line, multiple trace, horzontal deflection system, digital storage osciloscope.

(10 Hrs; 20 Marks)

UNIT 4
Analog and Digital acquisation system: Instrumentation systems; interfacing transducers to electronic control and measuring systems ,instrumentation amplifiers, shielding isolation amplifiers, effect of load resistance , current loop transmitters , frequency to voltage and volatge to frequency converters , multiplexing.
Computer controlled test systems: Testing an Audio Amplifiers, Testing a Radio Receivers, IEEE 488 standard interface.

(10 Hrs; 20 Marks)

UNIT 5
Recorders : galvanometric recorders , servorecorders- block diagram , performance characteristics; Magnetic recording recording process, digital data recording analog data recording , reproduction process, noise in reproduction ; line printer; ink -jet printers.
Fibre optic measurements: Introduction , sources and detectors , fibre optic power measuring , stabilized calibrated light sources , end - to -end measurement of fibre optic system loss, optical time domain reflectometer.
(10 Hrs; 20 Marks)

REFERENCES:

1. Modern Electronic Instrumentation and Measurment Techniques A.D.Helfrick, W.D. Cooper , Prentice Hall of India.
2. Electronic Measurements and Instrumentation , Oliver and Cage Mc Graw Hill Interantional Edition.
3. Instrumentation device and systems , Second edition , C.S. Rangan , G.R.Sarma, V.S.V.Mani, Tata Mc Graw Hill.

The termwork should include a minimum of six experiments from the above list . The term works will be based on performance of theory and practicals having a weightage of 40% and 60% respectively.

B.E.(ELECTRONICS) AND B.E.(INDUSTRIAL ELECTRONICS)

TERM I

ELECTRONIC COMMUNICATION II

Teaching Scheme :
Lectures : 4Hrs/Week
Practical : 2Hrs/Week

Examination Scheme:
Paper : 100 Marks
(3 Hours Duration)
Term Work : 25 Marks
Practical : 25 Marks

UNIT 1
Television Fundamentals:Television Broadcasting;Television Picture elements;television cameras, Vidicon, Plumbicon, Saticon;Colour pictures;Scanning and Synchronization; Video Signal, Construction of composite video signal, Horizontal Blanking time, Vertical blanking time, Video signal Amplitude and Frequencies, Colour information in Video signals
(10 Hrs; 20 Marks)

UNIT 2
Television transmission: Vestigial sideband transmission, television broadcast channels, standard television channel, FM Sound signal, Television Transmission Standards, Line-of-Sight transmission, Satelite Television.
Television Receivers : Functional block diagram description, sync and deflection, automatic gain control,dc power requriements, RF-section, IF section, Video detector, video amplifier section, dc component of the video signal, sound IF section,Receiving antenna.
(10 Hrs; 20 Marks)

UNIT 3
Colour television receiver: Producing luminance image,IF circuits, chroma section, bandpass amplifier, colour demodulators
Cable Television : Cable frequencies, Coaxial cables used, cable losses, cable distribution system, Cable Tv Converters
(10 Hrs; 20 Marks)

UNIT 4
Raster Circuits and Sync : amplitude and waveform separation of sync, sync separator, Vertical Sync integrator, Vertical deflection, troubles in vertical scanning, Horizontal sync and deflection, Vertical rolling of pictures,Diagonal black bars in the picture, power supplies, troubles in horizontal

scanning and HAFC

UNIT 5 (10 Hrs; 20 Marks)

Video tape Recorder and Disk Players : Video Recording requirements, FM recording, rotating Heads, slant tracks, servocontrols, VCR connections to the TV Receiver;tape recording and play back, recorded wavelength, Play back frequencies response, Head gap and recorded wavelength ; VCR modulation for luminance signal; colour under system for the chroma signal, down conversion of the frequency for recording, up conversion of the play back signal, cancellation of the time base error , combined colour and luminance signals; scanner servosystem; Video disk systems, optical disks, Capacitance disks, Modulation and Play back each type.

(10 Hrs; 20 Marks)

REFERENCES :

1. Basic Television and Video Systems, 5th Edition, Bernard Grob, Mc Graw Hill International Edition.
2. Modern Television Practice :Principles Technology, and servicing, R.R.Gulati,New Age International.
3. Television Engineering, A.M.Dhake, Tata Mc Graw Hill.

LIST OF EXPERIMENTS :

1. Study of TV Receiver (tracing, voltage, Measurements etc.)
2. RF and IF alignment of TV receiver using wobbuloscope.
3. Fault finding of TV Receiver, use of pattern gherator.
4. Yagi antenna - Measurement of gain, Directivity, and Impedance.
5. Study of VCR.
6. TV Receiption through Satelite Link.
7. Booster Gain Measurement.
8. Video amplifier.

The termwork should include a minimum of six experiments from the above list . The term works will be based on performance of theory and practicals having a weightage of 40% and 60% respectively.

B.E. ELECTRONICS ENGINEERING

TERM-I

SEMINAR

TEACHING SCHEME: EXAM SCHEME:
Practical : 2 Hrs/week Oral : 50 marks

Student shall select a topic based on latest research and development in the field of electronics, telecommunication, computer or allied field. he/she shall undergo detail study of the topic under supervision of guide. he/she shall submit a seminar report consisting of introduction, literature survey concept, analysis, application, future development and other information related topic.

Exam Scheme :
Seminar shall assessed by a panel of two examiners appointed by University Authority. (one of which shall be guide)
Seminar exam shall consist of presentation by student in the presence of examiners & staff members & other students of the duration of about 15 to 20 minutes and minutes followed by oral exam.

Evaluation Scheme :
Quality/Presentation of report : 10 marks
Presentation : 20 marks
Subject knowledge : 20 marks

B.E. ELECTRONICS ENGINEERING

TERM-I

PROJECT PART - I

TEACHING SCHEME:	EXAM SCHEME:
Practical : 4 Hrs/week	Term Work : 50 marks

Project work will be carried out by a batch of at the most 3 students working on a topic related to electronics, telecommunication, computer science (Simulation base) and allied field. The topic may be form one of the following :

1. Laboratory work involving theoretical design and implementation of the electronics (allied field) system/project.
2. Design modification with fabrication of an existing electronics system/equipment.
3. System design and fabrication based on practical need of industry,
4. Simulation software.

In the first term batch of students must get approved synopsis of the project and register the name of project to university within 4 weeks from the commencing the term. Theoretical design of project and at least 25 percent of implementation must over during the first term. Candidate shall submit term work in the form of hand-written /typed report which should include literature survey, technical details, design and related data and that are required for project - II and a separate progress report consisting of data-wise attendance and work done on the day.

The candidate shall give a talk on topic of the project in the presence of staff members and students. The term work will assessed by two internal examiners (one of the examiner shall be guide and other examiner shall be teacher of concerned dept.) appointed by principal of institution.

B.E.(ELECTRONICS)

TERM II ELECTIVE II

PROCESS INSTRUMENTATION

Teaching Scheme :	Examination Scheme:
Lectures : 4Hrs/Week	Paper : 100 Marks
Practical : 2Hrs/Week	(3 Hours Duration)
	Term Work : 25 Marks
	Practical : 25 Marks

UNIT 1.

Introduction to Process control : Process Control block diagram description - Process, measurement , error detector, controller, control element , feedback loop.

Thermal sensors:Bimetal strips, gas thermometers, Vapour Pressure thermometers, construction and characteristics of each type of sensors

Mechanical sensors: Level sensors, accelerometers,pressure sensors:- Bourdon tube ,differential pressure cell,

Flow sensor:- Rotameter , Magnetic Flowmeter.

(10 Hrs; 20 Marks)

UNIT 2

Control Operation : signal conversions, actuators and control element; pneumatic signals, current-to-pressure converters ; Actuators:- electric, Pneumatic and Hydraulic ; Control Elements:- Mechanical , Electrical , Fluid Valves, Control Valves types .

Discrete-state Process control : Defination, Characteristics, ladder diagram, Programmable Controllers.

(10 Hrs; 20 Marks)

UNIT 3

Controller Principles : Process Characteristics, control system parameters ; discontiuous controller modes -- two-position modes, neutral zones , multiposition mode, floating control mode; continuous controller modes-- proportional, integral, derivative; composite control modes-- proportional integral, control, proportional-derivative control, PID control

(10 Hrs; 20 Marks)

UNIT 4

Analog Controllers : electronic controllers-- single mode two position , reverse action , floating , proportional mode, integral mode, derivative mode, composite controller modes-- PI,PD, PID ;pneumatic controllers.

Digital controllers : digital electronic methods-- simple alarms,two-position control, multivariable alarms ; computers in process control-- programmable controllers, data logging, supervisory control

(10 Hrs; 20 Marks)

UNIT 5

multiloop control systems : Feed forward control system, cascade control system, ratio control, split range control , selective control & adaptive control systems. Control schemes : Applied to reactors , heat exchangers, and distribution columns.

(10 Hrs; 20 Marks)

REFERENCE:

1. Process control intsrumentation Technology , 4th edition , Curtis Johnson , Prentice - hall of india.
2. Principles of Process control, 2nd edition , D.Patranbis, Tata Mc Graw Hill.
3. Process Control , P. Harrilot , Mc Graw Hill.
4. Instrument Engineers Handbook , B.G. Liptak (editor), Chilton Book co. , Philadelphica, U.S.A.

The termwork should include a minimum of six experiments from the above list . The term works will be based on performance of theory and practicals having a weightage of 40% and 60% respectively.

B.E. ELECTRONICS ENGINEERING

TERM-II

Microwave Technique
(Elective -II)

TEACHING SCHEME:
Theory : 4 Hrs/week
Practical : 2 Hrs/week

EXAM SCHEME:
Paper :100 marks
Practical : 25 marks
Term Work : 25 marks

UNIT - I (20 Marks, 10 Hrs)

Guided wave and transmission system :
Review of Maxwell's equation, Uniform plane wave, reflection from dielectric conducting interface, smith chart, co-axial lines power handling capacity, single stub, double stub, quarter wave transformer.

UNIT - II (20 Marks, 10 Hrs)

Micro-wave Guides :
Rectangular wave guide's characteristics of TE & TM waves in rectangular wave guides dominant mode, circular wave guide, wave guide excitation.

Micro-wave passive devices : Terminator, Attenuator, Travelling detector, Micro-wave filter, resonator, E plane Tee, H plane Tee, Directional coupler, ferrite components, Microwave bridge circulator, Isolator, Slotted line, Tuners, coupling probes.

UNIT - III (20 Marks, 10 Hrs)

Micro-wave active devices : Kly stron, Reflex Klaystron, Two cavity Klaystron, TWT Megnetron, crystal diode, PIN diode, Tunnel diode, Gann diode, Varactor diode, step recovery diode, IMPATT diode, microwave BJT, FET, TRAPATT, BARITT, MASERS & LASERS.

UNIT - IV (20 Marks, 10 Hrs)

a) Microwave Measurement :
Measurement of voltage, VSWR, impedance, frequency, dielectric constant, power capacity attenuation, phase shift & noise measurement, antenna gain measurement.

b) Microwave antenna :
Horn antenna, slot antenna, parabolic reflector cassegrain feed lence antenna, broad side & end fire arrays.

UNIT - V (20 Marks, 10 Hrs)

Radar
Principle of Radar, Pulse Radar, Radar range equation, Radar Cross-section, Radar antennas & Scanning, Radar Indicators- PPI & A-Scope, noise figure of receiver, Mixer, Duplexer, Line pulses, MTI Radar, CW Radar, FM CW Radar, Doppler Effect, Radar Applications.

Reference Books :

1. Microwave devices and circuits	Samual Y. Liao
2. Microwave principles	J. H. Reach
3. Foundation for microwave engineering	Robart Collin
4. Microwave	K. C. Gupta
5. Radar System	Skolmik TMH
6. Understanding Radar System	Simon Kigsley TMH.

PRACTICAL EXAMINATION :
The practical exam will be of three hours duration. It consist of one experiment out of the list of experiment specified and an oral based on syllabus.

TERM WORK :
Term work will consist of a record of minimum eight experiments out of the following.

1. Impedance measurement using microwave bench of different microwave components.
2. Horn antenna pattern.
3. Parabolic component gain impedance, pattern.
4. Passive component-parameter measurement and specification testing. (Two Expt.)
5. Active device characteristic measurement (Four Expt.)
6. Study of MIC technique.
7. Measurement of VSWR.

B.E.(ELECTRONICS)

TERM II ELECTIVE II
OPTICAL FIBRE COMMUNICATION

Teaching Scheme :
Lectures : 4Hrs/Week
Practical : 4Hrs/Week

Examination Scheme:
Paper : 100 Marks
(3 Hours Duration)
Term Work : 25 Marks
Practical : 25 Marks

UNIT 1

Overview of optical fibre communication :Basic network information rates ; evolution of fibre optic systems; elements of an optical fibre transmission link
optical fibres : structure , wave guiding and fabrication -- fibre types , rays and modes theory for circular wave guides , overview of modes ;single mode fibre ; graded index , fibre structure ; fibre materials; fibre fabrications; mechanical properties of fibre, fibre optic cables

(10 Hrs; 20 Marks)

UNIT 2

Signal degradation in optical fibres: Attenuation-- units, absorption, scattering losses, bending losses, core and cladding losses ,signal distortion in optical waveguides,
optical sources: LEDs-- quantum efficency and power, modulation; Laser diodes-- external quantum efficiency, resonant frequencies, single-mode Lasers, modulation; light source linearity; modal, partition, and reflection noise.

(10 Hrs; 20 Marks)

UNIT 3

Power launching and coupling : Source-to-fibre power launching ; lensing schemes for coupling improvement ; fibre-to-fibre joints; LED coupling to single-mode fibres;types of couplers,coupler losses,calculation of coupler losses, fibre splicing;optical fibre connectors.
Photodetectors: Pin photodetector, avalanche photodiodes; photodetector noise; detector response time ; avalanche multiplication noise.
Optical receiver operation: fundamental receiver operation. digital receiver performance, preamplifier types.

(10 Hrs:20 Marks)

UNIT 4

Digital transmission systems: Point-to-point links; line coding-NRZ codes, RZ codes,block codes;error correction.
Analog systems: Overview of analog links: carrier-to-noise ratio; multichannel transmission techniques. WDM concepts and components: Operational principles of WDM; passive components, tunable sources; tunable filters.

(10 Hrs:20 Marks)

UNIT 5

Optical amplifiers: Basic applications and types of optical amplifiers ; semiconductor optical amplifiers;Erbium-doped fibre amplifiers; amplifier noise; power amplifiers; wavelength converters.
Optical networks: basic networks; SONET/SDH; broadcast and select WDM networks; wavelength-routed networks; nonlinear effects on network performance
Applications of optical fibre

(10 Hrs;20 Marks)

References:
1. Optical Fibre communications, third edction, Gerd keiser, McFGraw-Hill International edition.
2. Optical Fibre communications: Principles and Practie, J Senior, Prentice-Hall.
3. Fibre optic systems, second edition, John powers, McGraw-Hill International edition.

The termwork should include a minimum of six experiments from the above list . The term works will be based on performance of theory and practicals having a weightage of 40% and 60% respectively.

B.E. (ELECTRONICS)

(TERM II)

VLSI TECHONOLOGY ELECTIVE-II

Teaching Scheme :
Lectures : 4Hrs/Week
Practical : 2Hrs/Week

Examination Scheme:
Paper : 100 Marks
(3 Hours Duration)
Term Work : 25 Marks
Practical : 25 Marks

UNIT 1
Crystal growth and wafer preparataion : electronic-grade silicon, Czochralski crystal growing,silicon shaping.
Epitaxy:vapour-phase epitaxy, molecular beam epitaxy,epitaxial evaluation.

(10 Hrs; 20 Marks)

UNIT 2
Oxidation:thin oxides,oxidation techniques and systems,oxide properties,oxidation-induced defects.
Lithography: Optical,electron,X-ray,and ion lithography.

(10 Hrs; 20 Marks)

UNIT 3
Reactive plasma etching: plasma properties,etching techniques and equipment.
Dielectric and polysilicon film deposition: deposition processes,polysilicon and its properties.
Diffusion: diffusion in polycrystalline silicon, diffusin in SiO_2 , diffusion enhancements and retardations.

(10 Hrs; 20 Marks)

UNIT 4
Ion implantation: implantation equipment,annealing.
Metallization: physical vapour deposition, pattering.
VLSI process integration: fundamental considerations for IC processing ; NMOS, CMOS, and bipolar IC technologies;IC fabrication.

(10 Hrs; 20 Marks)

UNIT 5
Analytical techniques: analytical beams, chemical methods,Assembly techniques and packaging: package types, packaging design considerations,VLSI assembly technologies, Yield and reliability: mechanisms of yield loss, reliability requirements for VLSI.

(10 Hrs; 20 Marks)

REFERENCES:
1.VLSI Technology, S.M.Sze, McGraw - Hill International edition.
2.VLSI desiogn techniques for analog and digital circuits, Geiger,Allen,Strader, McGraw-Hill International edition.

The termwork should include a minimum of six experiments covering the syllabus. The term work will be based on performance of theory and practicals having a weightage of 40% and 60% respectively.

B.E. (Electronics) and B.E. (Industrial Electronics)

TERM 2

Power Electronics II

Teaching scheme
Lecturer :4Hrs /week

practical : 2 hrs /week

Examination scheme
Paper : 100 marks
3 hrs duration
Termwork : 25 marks
Practical : 25 marks

UNIT 1

Introduction to motor drive : control of motor drives,servo drives ,block diagram description; criteria for selecting drive components- match between the motor and the load, match between the motor and the power electronic converter--current rating, voltage rating, switching frequency and the motor inductance ,selection of speed and position sensors, servo drive control and current limiting, current limiting in adjustable speed drives

DC motor drives : block diagram description of DC motor drive, power electronic converter , ripple in armature current, selection of servo drive parameters ; line frequency controlled converters ,effect of discontinous armature current , power factor of the line current in adjustable speed drive

(10Hrs ; 20 marks)

UNIT 2

Introduction motor drives : constant-speed drive, adjustable speed drive, block diagram description ;speed control for varying stator frequency and voltage torque speed characteristics ,start up considerations ,voltage boost required at low frequency ,induction motor capability,below and above rated speed , braking in induction motors; harmonic motor currents, harmonic losses, torque pulsations;variable frequency converter classifications; variable frequency PWM-VSI drives,adjustable speed control of PWM- VSI drives,speed control circuit and current limiting circuit,induction motor servo drives,variable frequency squre wave VSI drives,variable frequency CSI drives , comparison of variable frequency drives;line frequency variable voltage drives ,reduced voltage starting (" soft start") of indution motor, speed control by static slip power recovery

10 Hrs ; 20 marks

UNIT 3

Power devices gate turn off thyristor (GTOs) - basic structure and i-v Characteristics,turn off operation, GTO switching characteristics-inclusion of snubber and drive circuits,GTO turn on transient, GTO turn off transient, minimumon on off state times , maximum controllable anode current ,overcurrent protection of GTOs;Insulated gate bipolar transistor(IGBT) - Basic structure,I-V Characteristic device operation , blocking state operation ,on state operation, latchup in IGBTs - causes of latcthup,avoidance of latchup,switching characteristics - turn on transient,turn off transsient ,NPT versus PT structures, device limits and SOAs ;Field controlled thyristor,(FCT) - basic structure and I-V characteristics, device operation - blocking state operation,on state operation, switching characteristics, JFET devices verssus other power devices ;MOS -controlled thyristor - basic structure, MOSFET-controlled turn on and turn off ,rationale of off FET placement in MCT structure , MCT switching behaviour, device limits and safe operating area; power integrated circuits - types of power integrated circuits, challenges facing PIC commercialisation

10 Hrs ; 20 marks

UNIT4

Gate and base circuit, preliminory design considerations; dc - coupled drive circuits - with unipolar output, with biomotor output, optocoupler drive circuits, transformer -isolated drive circuits providing both signal & power,cacode connected drive circuits - open emitter BJT drive circuit ,cacode drive circuit for normally on power devices, thyristor drive circuits - gate current pulse requirements ,gate pulse amplifiers, commutation circuit ; power device protection in drive circuit - overcurrent protection , blanking times for bridge circuit , " smart" drive circuits for snubblerless switching; circuit layout consideration - minimising stray inductance in drive circuit ,shielding and partitioning of drive circuit , reduction of stray inductance in bus bars, current measurement capacitor selection -aluminium electolytic capacitors, metallised polypropylene capacitors and ceramic capacitor

10 Hrs ; 20 marks

UNIT5

Snubber circuit : function and types, diode snubbers , capacitive snubber, effect of adding a snubber resistance , implementation; snubber circuit for thyristors; need for snubber with transistors; turn-off snubber;overvoltage snubber ; turn-on snubber; snubbers for bridge circuit configurations ;GTO snubber considerations

Component temp control and heat - sinks: control of semiconductor device temperature, heat transfer by conduction, thermal resistance ; heat sinks; heat transfer by radiation and convection ;heat sink-ambient calculation

10 Hrs ;20 marks

Reference

1 Power electronic : converter application and design second edition Ned Mohan ,T Mudeland W.D.Robbins john wilery and sons
2 Electric Drives : concepts and application: vedam subrahmanyam ,Tata McGraw Hill
3 Power Electronic: P.C. Sen Tata Mc Graw Hill

List of experiements
1 DC drive : 1 expt
2 AC drive : 1 expt
3 power devices : 2 expts
4 Gate and base drive circuits: 2 expts
5 Snubber circuit : 2 expts

The termwork should include a minimum of six experiment based on the above list. The termwork will be based on performance in theory and practical having weightage of 40% and 60 % respectively.

B.E. (TERM II)
OPTOELECTRONICS (ELECTRONICS)

Teaching Scheme :
Lectures : 4Hrs/Week
practical:2Hrs/week

Examination Scheme:
Paper : 100 Marks
(3 Hours Duration)
Term Work : 25 Marks

UNIT 1

FUNDAMENTAL OF LIGHT : Nature of light , wave theory of light, particle theory of light , EM spectrum , visible spectrum , Radiant Measurement system: Photometric Radiometric system.

LIGHT SOURCES: Types of Light Sources ; Natural , Artificial light sources; LED's, laser diode, Properties of light sources

LED : Principle ,energy level diagram , Direct ,Indirect Band Gap materials , Materials used for Visible and Infrared LED's Surface Emitter ,Edge emitter, LED Operating Characteristics, Calculation of 3-db electrical & optical B.W.,Digital Modulation and analog modulation of LED, radiation pattern of surface and edge emitter.

(10 Hrs; 20 Marks)

UNIT 2

Light detectors : Classification of Light detectors : Thermal Detectors, Quantum Detectors: Photoemissive, Photoconductive,Photovoltaic.

Properties of detectors : Responsivity , spetcral response, frequency response, noise , NEP.

Vaccum Photo Diode, Photo Multiplier, P-N Photodiode,p-i-n photodiopde, avalanche photodiode: construction working principle , materials used, calaculation of responsivity.

SOLAR CELL : Construction equivalent circuit , materials, conversion efficiency, I-V characteristics, Remote battery-Charging application.

phototransistors , PhotoFET's, PhotoThysristors , Infrared detectors, UV detectors

(10 Hrs; 20 Marks)

UNIT 3

Lasers : Principle of operation , Population of inversion optical resonators, energy level diagram: Two, Three, Four level diagram , laser modes.

types of laser : Ruby laser , HE-NE laser , semiconductor laser ,Hetero Junction Laser , Strip geometry laser diode, operating characteristics of lasers, radiation pattern.

Q-Switching methods, Application of laser in medical instrumentation , Communication field, Holography.

(10 Hrs; 20 Marks)

UNIT 4

Display Devices : Properties of display ,Types of displays: LED,CRT,LCD .

LED DISPLAY: Non multiplexed , multiplexed , seven segment LED decoder/ driver ; bar graph display.

LCD DISPLAY :

Basic Principle, Reflective transmissive LCDs, Types of ordering in liquid crystals : nematic, cholesteric, smetic, twisted-nematic

Types of LCD. : Seven segment LCD Display Driver , Comparision between LED AND LCD .

(10 hRS; 20 Marks)

UNIT 5

OPTICAL COMMUNICATION SYSTEMS:

Properties of light through opticle fibre, Types of fibres , Modulation schemes, Analog modulation ,digital moduaition , modes , losses in fibres , dispersion effect , Adv. of fibre in communication system.

OPTOCOUPLER :Principle, characteristics, Types, applications of optoisolator.

REFERENCE:

1. OPTOELECTRONICS: An Introduction , 2nd edition
J. Wilson, J.F.B. Hwakers.
2. Integrated Circuits and Semiconductor Devices :
Theory and Application
Deboo / Burrous
3. Fibre Optic Communication 3rd Edition
Joseph C. Palais
Prentice Hall

The termwork should include a minimum of six experiments covering the syllabus. The term work will be based on performance of theory and practicals having a weightage of 40% and 60% respectively.

DIGITAL COMMUNICATION

Teaching Scheme :
Lectures : 4Hrs/Week
practical:2Hrs/week

Examination Scheme:
Paper : 100 Marks
(3 Hours Duration)
Term Work: 25 Marks
Practical: 25 Marks

UNIT 1

Analog to digital conversion ; Pulse modulation , sampling theorem, low pass signals , band pass signals , discrete fourier transform; pulse amplitude modulation , channel bandwidth, natural sampling , flat top samling , signal recovery ;quanization of signals , quantization error, pulse-code modulation, electrical representation of binary digits.

(10 Hrs; 20 Marks)

UNIT 2

PCM System : Encoder, decoders; companding;multiplexing PCM signals ; differential pulse-code modulation; delta modulation ; adaptive delta modulation; vocoder

(10 Hrs; 20 Marks)

UNIT 3

Digital Modulation Techniques: binary phase shift keying; differential phase shift keying; differentially encoded PSK;Quadrature PSK; Quadrature amplitude shift keying;binary frequency shift keying; comparision of BFSK and BPSK ; minimum shift keying (MSK)

(10 Hrs; 20 Marks)

UNIT 4

Data Transmission: Baseband signal receiver, probabilities of error ,optimum filter, while noise- matched filter, coherent reception, pase - shift keying, ferequency shift keying, non coherent detection of FSK, differential FSK

(10 Hrs; 20 Marks)

UNIT 5

Information Theory and coding : Discrete messages, amount of information , average information, entropy, information rate ; coding to increase average infrmation;shanon's therom , channel capacity,capacity of gaussians channels;bandwidth - S/N trade off ; Coding for error detection and correction , block codes , hamming distances,coding and decoding hadeard codes, hamming codes, extended codes, cyclic codes.

(10 Hrs; 20 Marks)

REFERENCES:

Principles of Communication Systems, 2nd Edition,
H.Taub, D.L. Schilling, Tata Mc Graw Hill.
Communication system - An Introduction to signals and noise in electrical communication A. Bruce Carlson, Mc Graw Hill International Edition.
An Introduction to Analog To Digital Communuication,
Simon Haykin, John Wiley , SEA edition.

LIST OF EXPERIMENTS:

PCM System : 2 Expts.
Digital Modulation. : 2 Expts.
Coding and Decoding. : 4 Expts.

The termwork should include a minimum of six experiment based on the above list The termwork will be based on performance in theory and practical having weightage of 40% and 60 % respectively.

B.E. ELECTRONICS ENGINEERING

TERM-II

TECHNICAL VISIT

EXAM SCHEME:
Term Work : 50 marks

The technical visit is a part of the learning process that start before the visit and continues after the visit. Institution shall arrange at least two industrial visit to the electronics, computer and to theallied field industries/organization about eight hours duration. Institute shall obtain appropriate certificate of visit from the concern industries/organization. Students shall submit written report about the visit individually or in small groups (2-3 students).

The report should contain the information about the following.

1. The organization -activity of organization and administrative set up technical personnel and their main duties.
2. The project/industry brief description with sketches and salient technical information.
3. The work/process observed with specification of materials, item of work, equipment etc. and role of engineers.

The evaluation of the report of technical visit may be made by panel of two teachers appointed by the principal, as per following parts.

a] Coverage Aspects : Almost all item shall be covered.
b] Detailed Observation : System/process/product explained with data, diagram specification.
c] Quality of Presentation : Report shall be very objective and consist of clean and systematic organization of topic and information.
d] Critical : Display unusual clarity to observe critically and to give his own idea regarding merits, demerits, improvement needed etc.
e] Viva voca : A viva voca shall be conducted on the technical visit report by the subject teacher to access the specific knowledge gained by the students for technical application.

B.E. ELECTRONICS ENGINEERING

TERM-II

PROJECT PART - II

TEACHING SCHEME:
Practical : 4 Hrs/week

EXAM SCHEME:
Term Work : 50 marks
Oral : 50 marks

Project work Part-II will be the continuation of project -I. Undertaken by the candidates in the first term. The term work shall consist of a typed report on the work carried out by the batch of students in respect of the project assigned during the Part-I & Part-II.Report shall consist of introduction, literature survey, concept, design & analysis, application, future development and information related to project topic. Only those data sheets shall be included in the project report which are not studied in the previous years & absolutely required for the project.

ORAL EXAMINATION :

It shall consist of an oral examination based on the report submitted by the candidates and/orthe demonstration of the fabricated design project. The said examination will be conducted by a panel of two examiners, consisting of the guide and another external examiner preferably from Industry or other university.

NOTE : The candidate must bring the project Part-I report and the final report completed in all respect while appearing for practical examination of the project.