

BHAVNAGAR UNIVERSITY
B.E. SEM IV (EC)
EC –401 IC DESIGN & APPLICATIONS

W.E.F. JULY 2006

Teaching scheme			Examination scheme				Total Marks
Theory Hours	Tut. Hours	Pract. Hours	Theory		Pra/Oral Marks	T/W Marks	
			Marks	Hours			
4	0	2	100	03	25	25	150

(1) **INTRODUCTIN TO OPERATIONAL AMPLIFIERS :**

OP-AMP, Interpretation of data sheets, Ideal OP-AMP, Equivalent circuits of an OP-AMP, Open loop OP-AMP configurations, Effect of negative feedback on voltage gain, Input impedance, Output impedance, band width and offset voltage, voltage series feedback amplifier, voltage shunt feedback amplifier, Differential amplifier, the practical op-amp, frequency response of op-amp.

(2) **LINEAR ANALOG SYSTEM :** \

AC & DC amplifier, Instrumentation, amplifier, Summers, voltage to current and current to voltage converters, High input impedance circuits, Integrators, Differentiators, Analog multiplexers and demultiplexers, peaking Amp.

(3) **NON LINTER ANALOG SYSTEM :**

comparators, window detectors, peak detectors, precision AC/DC converters, logarithmic amplifiers, Schmitt trigger, waveform generators e.g. pulse, square, triangle, sawtooth etc. voltage control oscillators v to f and f to v converters, a to d and d to a converters, sample and hold circuits.

(4) **SPECIALIZED APPLICATIONS :**

Internal block representation and functional understanding of various I.C.s. and their applications e.g. 555 Timer, phase locked loops, power amplifiers, Multipliers etc.

(5) **VOLTAGE REGULATORS :**

Fixed voltage regulators, Adjustable voltage regulators, switching regulators.

(6) **ANALOG COMPUTATION AND SIMULATION :**

Solution of simultaneous equations and solution of differential equations using opamps, Time and amplitude scaling, Function generation.

Practical/Oral:

The practical and term work shall be based on the syllabus.

BOOKS :

1. MICRO ELECTRONICS BY MILLMAN
2. OPAMPS AND LINEAR INTEGRATED CIRCUITS BY R.A.GAYAKWAD.
3. ANALOG COMPUTATION & SIMULATION BY RAJARAMAN.
4. INTEGRATED ELECTRONICS BY MILLMAN & HALKIAS.
5. INTRODUCTIN TO SYSTEM DESIGN USING I.C.S. BY B.S.SONDEY.
6. AN INTRODUCTION TO OPERATIONAL AMPLIFIERS BY L.M. FAULKENBERRY
7. MANUAL FOR INTEGRATED CIRCUIT USERS BY JOHN D. LENK

BHAVNAGAR UNIVERSITY
B. E. SEMESER IV EC
EC-402 ENGINEERING ELECTROMAGNETICS

W.E.F. july-2006

TEACHING SCHEME		EXAMINATION SCHEME				
THEORY HOURS	PRACTICAL HOURS	THEORY MARKS	HOURS	PRA/ORAL MARKS	TERMWORK MARKS	TOTAL MARKS
03	02	100	03	25	25	150

1. **VECTOR ANALYSIS:-**
Scalars and vectors, Dot and cross products, Co-ordinate systems and conversions.
2. **COULOMB'S LAW AND ELECTRICAL FIELD INTENSITY:-**
Coulomb's law, Field due to different charge distributions.
3. **ELECTRIC FLUX DENSITY, GAUSS'S LAW AND DIVERGENCE:-**
Concept of electric flux density, Gauss's law and its applications, Differential volume element, Divergence, Maxwell's first equation and divergence theorem.
4. **ENERGY AND POTENTIAL:-**
Energy expended in moving a point charge in electrical field, Line integral, Definition of potential difference and potential, Potential field of point charge and system of charges, Potential gradient, Dipole, Energy density in electrostatic field.
5. **CONDUCTORS, DIELECTRICS AND CAPACITANCE:-**
Definition of currents and current density, Continuity equation, Metallic conductors and their properties, Semiconductor, Dielectric materials, characteristics, boundary conditions, Capacitance of a parallel plate capacitor, Coaxial cable and spherical capacitors.
6. **POISSON'S AND LAPLACE EQUATION:-**
Poisson's and Laplace equation, Uniqueness theorem, Examples of solution of laplace and poisson's equations.
7. **STEADY MAGNETIC FIELD:-**
Biot-savart's law, Ampere's circuital law, Concept of flux density, Scalar and vector magnetic potential.
8. **MAGNETIC FORCES, MATERIALS AND INDUCTANCE:-**
Force on a moving charge, Force on a differential current element, Force and torque on close circuit, Magnetisation and permeability, Magnetic boundary conditions, Magnetic circuit, Self inductance and mutual inductance.
9. **TIME VARYING FIELD AND MAXWELL'S EQUATIONS:-**
Faraday's law, Displacement current, Maxwell's equations in point and integral forms.
10. **THE UNIFORM PLANE WAVES:-**
Wave motion in free space, Perfect dielectric, Lossy dielectric, Pointing vector, Power consideration, Propagation in good conductor, Phenomena of skin effect, Reflection of uniform plane waves.

Practical/Oral:

The practical and term work shall be based on the syllabus.

BOOKS:-

- **ENGINEERING ELECTROMAGNETICS VTH EDITION MCGRAW HILL. WILLIAM HAYT.**
- **ELECTROMAGNETICS IIIRD EDITION MCGRAW HILL JOHN D. KRAUS**
- **ELECTROMAGNETICS CONCEPTS AND APPLICATIONS,**
- **STIKET IIIRD EDITION PRENTICE HALL, INTERNATIONAL STANLEY MARSHALL & GABRIEL**
- **ELECTROMAGNETICS THEORY AND APPLICATIONS TMH PUB. P. MUKHOPADHYAY**

BHAVNAGAR UNIVERSITY
B.E. SEM IV(EC)
EC –403 DIGITAL ELECTRONICS

W.E.F. JULY 2006

Teaching scheme			Examination scheme				Total Marks
Theory Hours	Tut. Hours	Pract. Hours	Theory		Pra/Oral Marks	T/W Marks	
			Marks	Hours			
3	0	2	100	3	25	25	150

1. Logic Fundamentals :

Review of number systems and in conversion, complements, binary, error detection, reflect complement, review of Boolean algebra, functions and reduction of canonical and standard forms. Logic operators, review of logic gates EX-OR, EX-NOR GATES. NAND and NOR as a universal gate.

2. Combinational Logic :

Two level implementations of Boolean functions, Don't Care conditions, design using K-map and McCluskey (Tabular) method and implementation in various forms. Applications such as parallel adder, decimal adder , magnitude comparator, decoder, demultiplexer, multiplexer etc.

3. Sequential Logic :

Latch, R-S, J-K master slave, J-K, D-type flip-flops, Triggering of flip-flops , Analysis and design of sequential circuits using state tables, diagrams, equation reductions and assignments. Registers, left shift, right shift, serial-parallel input-output combinations, ripple and synchronous counters, up- Down counting, word time generation, Johnson counter.

4. Processor Logic Design:

Processor organization, arithmetic logic unit, design of arithmetic circuit, design of arithmetic logic unit, status register, design of shifter.

5. Memory Unit:

Basic IC memory unit, magnetic core memory, examples of other memory cells, read-write operations, address techniques, static and dynamic memories, CCD.

6. DIGITAL INTEGRATED CIRCUIT

Introduction, bipolar transistor characteristics, characteristics of RTL ,DTL , IIL, TTL,MOS, CMOS,ECL CIRCUITS.

PRACTICAL/ORAL : Practical and term work shall be based on syllabus.

BOOKS:

- (1) DIGITAL LOGIC AND COMPUTER DESIGN BY M. MORRISMANO, PHI.
- (2) DIGITAL ELECTRONICS BY W. H. GOTHMAN.
- (3) INTEGRATED ELECTRONICS BY MILLMAN AND HALKIAS
- (4) DIGITAL PRINCIPLES AND APPLICATIONS BY MALVINO AND LEACH
- (5) DIGITAL COMPUTER FUNDAMENTALS BY BARTEE
- (6) FUNDAMENTAL OF DIGITAL CIRUCIT BY ANAND KUMAR (PHI)
- (7) MODERN DIGITAL ELECTRONICS BY R. P JAIN(TMh)
- (8) DIGITAL ELECTRONICES BY GODSE (TECHNICAL PUBLICATION)

BHAVNAGAR UNIVERSITY
B.E. SEM IV(EC)
EC –404 CONTROL SYSTEM ENGINEERING

W.E.F. JULY 2006

Teaching scheme			Examination scheme				Total Marks
Theory Hours	Tut. Hours	Pract. Hours	Theory		Pra/Oral Marks	T/W Marks	
			Marks	Hours			
4	0	2	100	3	25	25	150

1: INTRODUCTION TO CONTROL THEORY :

Open loop and closed loop control system. Servomechanism , Linear, nonlinear, continuous data, sampled data and multivariable control system, illustration of some simple control system.

2: MATHEMATICAL MODELS OF PHYSICAL SYSTEM:

Linear and nonlinear model, transfer function, mechanical translational and rotational systems, analogous electrical systems. Construction, operation and transfer function of servo components such as a D.C. and A.C. servomotor, stepper motor, potentiometers, synchros, tachogenerators, etc. Construction, block diagram and transfer function of physical systems, ac, dc, position control system, Block diagram algebra, Signal flow graphs, obtaining overall transfer function using block reduction technique and using mason's gain formulas for signal flow graphs.

3. TIME DOMAIN ANALYSIS :

Standard test signals, time response of first order systems, time response of second order systems, steady state error and error constants, Design specification of second order system. Design considerations of higher order systems, performance indices.

4. FREQUENCY DOMAIN ANALYSIS :

Frequency domain specifications, correlation between time and frequency response. Polar plots, gain and phase margin.

5. STABILITY AND FREQUENCY DOMAIN ANALYSIS :

Concept of stability, Necessary conditions for stability, Routh & Nyquist stability criterion, Relative stability, closed loop frequency response performance, Specification and their determination using frequency response plots.

6. ROOTS LOCUS TECHNIQUE :

Concept of root locus, construction rules, Applications.

PRACTICAL / ORAL :

The practicals / tutorials and termwork shall be based on the syllabus.

BOOKS ;

1. CONTROL SYSTEM ENGINEERING BY NAGRATH & GOPAL
2. MODERN CONTROL ENGINEERING BY K. OGATA
3. AUTOMATIC CONTROL SYSTEM BY S.N. VERMA
4. A COURSE IN CONTROL ENGINEERING BY A. SUBBARAO & PARAG R. DESAI
5. FEED BACK CONTROL SYSTEM BY BHIDE & SHINDE (TECH. MAX)
6. CONTROL SYSTEM BY MANKE
7. AUTOMATIC CONTROL SYSTEM BY SAEED HASAN (KATARIYA & SONS)
8. FEED BACK CONTROL SYSTEM BY BAKSHI & GOYAL (TECH. PUBLICATION)

BHAVNAGAR UNIVERSITY
B.E. SEM IV(EC)
EC –405 ELECTRONIC COMMUNICATION

W.E.F. JULY 2006

Teaching scheme			Examination scheme				Total Marks
Theory Hours	Tut. Hours	Pract. Hours	Theory		Pra/Oral Marks	T/W Marks	
			Marks	Hours			
4	0	2	100	3	25	25	150

1. Introduction:

Introduction to communication system, Basic block diagram, different types of communication systems, application and use of various frequency band.

2. Series & Parallel resonance Circuits:

Series RLC circuit, parallel tuned circuit, mutual inductance, coupling circuit, passive filters.

3. Noise: Types of noises, equivalent noise resistance, signal to noise ratio, noise factor, noise temperature.

4. RF & Broad band amplifier:

Tuned RF amplifier neutralization, special RF amplifier, class C and linear amplifier, transmitter and amplifier matching., frequency synthesizer

5. Receivers:

Tune radio frequency receiver, Super heterodyne receiver, choice of intermediate frequency and oscillator frequency. Image rejection, adjacent channel selectivity and spurious response , tracking, AGC double conversion receivers, IF communication receivers.

6. Analog modulation: Need of modulation, AM, FM, PM, SSB modulation techniques, modulation index, different types of modulation and demodulation circuits, different types of modulated transmitter and receiver.

7. Satellite Communication:

Introduction to different types of Orbits , station keeping , satellite altitude transmission path and path loss.

Practical/Oral:

The practical and term work shall be based on the syllabus.

- (1) ELECTRONICS COMMUNICATION BY RODDY & COOLEN
- (2) ELECTRONICS COMMUNICATION BY KENEDY
- (3) ANALOG COMMUNICATION BY SANJAY SHARMA(KATSON)
- (4) COMMUNICATION SYSTEM I BY PROF CHITOD (TECH PUBLICATION)
- (5) ANALOG COMMUNICATION BY CHITOD(TECH PUBLICATION)

BHAVNAGAR UNIVERSITY
B.E. SEM IV(EC)
EC -406 ELECTRONIC WORKSHOP PRACTICE

W.E.F. JULY 2006

Teaching scheme			Examination scheme				Total Marks
Theory Hours	Tut. Hours	Pract. Hours	Theory		Pra/Oral Marks	T/W Marks	
			Marks	Hours			
0	0	2	0	0	25	25	50

Following aspects may be covered :

- (1) Use of data books, specification and commercial identification of components and devices.
- (2) Soldering and de soldering practice.
- (3) Study of different types of conductors, cables, connectors e.g. solid wired, standard wire, co-axial cable, Plugs and clips, terminal strips, phone plug, TV-VCR connectors, fuses such as glass cartridge fuses etc.
- (4) study of PCB design techniques and process.
- (5) Use of different types of circuit design and simulation tools (MATLAB AND VHDL)
- (6) Electronics circuit design practice (students have to submit a mini electronic design project to the department)

PRACTICAL/ORAL tutorial and term work shall be based on syllabus.

BOOKS :

1. Getting started with MATLAB by Rudrapratap.
2. VHDL primer by Bhasker