

# BHAVNAGAR UNIVERSITY

## B.E. SEM IV ( Elec.)

Inforce-2006

### E- 401 ELECTRICAL MEASUREMENT & MEASURING INSTRUMENTS

TEACHING SCHEME			EXAMINATION SCHEME			TOTAL	
HOURS PER WEEK			THEORY	HOURS PRACT/ORAL	TERM WORK	MARKS	
THE.	TUT.	PRACT.	MARKS	MARKS	MARKS		
4	--	02	100	3	25	25	150

#### I. Units and Dimensions :

In S.I. systems meas. of absolute values of current and resistance, standard batteries. Characteristics of instruments-Definitions - true value - Accuracy precision-error-sensitivity and resolution.

#### II. Instruments :

P.M.M.C. - M.I. Electrodynamics - Electrostatic- induction and rectifier instrument for measurement of current voltage, power frequency and resistance, Induction type energy meters.

#### III. Instrument Transformers : -

Construction and principle of work-error characteristics-design considerations and testing.

#### IV. Power factor meter-frequency meter-synchroscope-maximum demand meter- mess. of VAH & VARH.

#### V. Measurement of low, medium & high resistances.

#### VI. A.C. & D.C. potential meters and their applications.

#### VII. A.C. Bridges :

Characteristic equation meas. of self inductance by max well's Hay's Anderson's and oweri's bridge. Measurement of capacitance by Desauty and schering bridge. Meas of Freq. by Wien's bridge.

#### IX Static Meters

#### VIII Magnetic Measurements :

Determination of B.H. curve. A.C. magnetic testing.

**Term Work** will be based on above syllabus reference books.

(1) Elect. Meas. & Meas. Instruments

by E.S.Golding

(2) Elect. & Electronic Measurements & Instrumentation

by A.K. Sawhney.

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## B.E. SEM IV ( Elec.)

### E- 402 ELECTRICAL POWER SYSTEM-I

TEACHING SCHEME			EXAMINATION SCHEME			TOTAL	
HOURS PER WEEK			THEORY	HOURS	PRACT/ORAL	TERM WORK MARKS	
THE.	TUT.	PRACT.	MARKS		MARKS	MARKS	
4	--	--	100	3	--	--	100

- (1) Conventional methods of Generation - Thermal, Hydro, Diesel and Nuclear power plants.  
- Equipment layout of the above plants.  
- Station auxiliaries & their arrangements, cooling system etc.

- (2) Distribution (A.C. & D.C. both):  
and comparisons of distribution systems - insulators used in transmission & system-various types of poles used-construction detail of distribution system ground cables, Its types and construction lying & fault detection - calculation of and insulation resistance.
- Types  
distribution  
-under  
capacitance

- (3) Mechanical Design of Transmission line :-  
Sag calculation - supports at equal and unequal levels - stringing chart - preparation of Sag templates.

- (4) Substation : Equipments and layout of bus bar.

- (5) Generation and distribution Economics : Cost of generating stations - fixed, capital and running cost - running charges - tariffs - load curve-demand factor - Diversity of load - D.F., Plant factor - capacity factor - Connected load factor - load duration curve - integrated load duration curve.

- (6) Consideration of Effect of low Power Factor : Advantage of power factor improvement - methods of improving p.f. - The most economical p.f.

- (7) Neutral Earthing : Introduction - Isolated neutral - earth neutral. System-solid, Resi.,Reactance, Arc suppression coil, voltage transformer & ear thing transformer ear thing systems.

- (8) Equipment earthing - plat earthing, pipe earthing & substation earthing.

Industrial visits to power station and substations.

Ref. :- (1) Elect. power

(2) Transmission & Distribution

(3) Coarse in electrical power

by Dr. S.L.Uppal

by H. Cotton

by Sahwny & Bhattnagar.

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### E- 403 LINEAR CONTROL SYSTEM

TEACHING SCHEME			EXAMINATION SCHEME			TOTAL	
HOURS PER WEEK			THEORY	HOURS PRACT/ORAL	TERM WORK	MARKS	
THE.	TUT.	PRACT.	MARKS		MARKS	MARKS	
4	--	02	100	3	25	25	150

- (1) **Introduction :**  
Open loop and closed loop control system. Servomechanism. Laplace transformation.
- (2) **Mathematical models of Physical systems :**  
Differential equations of electromechanical system transfer function analogous systems. Block diagram reduction techniques signal flow graph. Meson's gain formulae, application transfer function of D.C. and A.C. Servomotors, sychros, techogenerator, gear trains.
- (3) **Time Response Analysis :**  
Standard test signals, time response of first order and second order control systems time domain Specifications steady state error and error constants compensation methods.
- (4) **Stability :**  
Concept of stability, necessary conditions Hurwitz criterion routh criterion, relative stability analysis applications to control systems.
- (5) **Root Locus Techniques :**  
Root locus concept, construction of root locus, determination of relative stability.
- (6) **Frequency Rresponse Aanalysis :**  
Introduction Correlation between time and frequency response, polar plots bode plots phase margin gain margin. Nyquist stability criterion assessment of relative stability

Term work/practical shall be based on the subject.

Reference books : (1) Control systems engineerin  
(2) Modern control system,

BY I.J. Nagrath/N. Gopal  
BY Ogath

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**E. 404 INTEGRATED ELECTRONICS**

Theory	Prac.	Total	Exam Marks	Sessional	Term work	Prac.	Total Marks
4	2	6	100	00	25	25	150

Operation Amplifier; Introduction, Block diagram representation of a typical op amp, Analysis op amp  $I_c$ , Circuits, Types, Designations, packages pin configurations and power supplies.

Ideal op amp, equi. circuit, open loop op amp configurations of Diff. inv. and non-inv. amplifiers op amp feedback amplifiers -inv. & Non.inv. closed loop gain, analysis diff. Amplifier analysis, Diff. amp with one, two & three op amp.

Op amp parameters—offset voltages and currents, bias current, drift, PSRR, CMRR offset nulling methods.

AC performance :- Bandwidth, slew rate and freq. response.

OP Am applications: DC & AC amplifiers, peaking, summing scaling and averaging amplifiers, instrumentation amplifier, Diff. input and diff. output amplifier, v to I and I to V converters, Integrator, differentiator comparator, Non-linear amplifier, phase shift oscillator, wein bridge oscillator, square, triangular and sawtooth wave generator, voltage controlled oscillator. Zero crossing detector window detector. Introduction to analogue simulation.

Active filters :- basic low & high pass filters. Band pass & notch filters.

555 timer IC, Monostable, bistable, astable operations, their industrial applications.

Phase locked loop :- operating principle, 565 IC, basic applications.

Voltage regulators : Three terminal regulator ICs, basic block schematic— 78 x x & 79 x x series -

Adjustable output voltage regulator LM 317, LM 340 and LM 337 series power supply ICs. their use and basic design considerations for designing regulator power supplies.

Power amplifier IC. - LM 380

Basic logic gates, truthable Boolean algebra, Karnaugh map, Simple basic combinational logic circuits, Flip, Flops - S.R, D-types, J.K. & Master slave.

Books :

- (1) Op Amp and Linear integrated Circuit technology - by Ramakant A gayakwad, prentice Hall India
- (2) Operational Amplifiers and Linear integrated circuits by—Robert F. Conghlin Frederick F. Driscoll Prentice Hall India
- (3) Applications of Analog integrated circuits. by - Sidney Soclof. Prentice Hall India
- (4) Digital Electronics - An introduction to theory and practice. by William H. Gothmen, Prentice Hall India

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**B.E. SEM IV( ELECTRICAL. )**

***E –405 Advanced Computer Programming***

Teaching scheme			Examination scheme			Total Marks
Theory Hours	Tut. Hours	Pract. Hours	Theory		Pract/Oral Marks	
			Marks	Hour		
<b>4</b>	<b>0</b>	<b>2</b>	<b>100</b>	<b>3</b>	<b>25</b>	<b>25</b>
						<b>150</b>

**1. Principles of Object -Oriented Programming:-**

Software Crisis, Software Evolution, A look at Procedure-Oriented Programming, Object-Oriented Programming Paradigm, Basic Concepts of Object-Oriented Programming, Benefits of Object-Oriented Programming, Object-Oriented Languages, Applications of Object-Oriented Programming.

**2. Beginning with C++:-**

What is C++, Applications of C++,A simple C++ Program, More C++ Statements, An Example with Class, Structure of C++ Program, Creating a Source File, Compiling and Linking.

**3. Tokens, Expressions and Control Structures:-**

Introduction, Tokens, Keywords, Identifiers, Basic Data types, User Defined Data Types, Derived Data Types, Symbolic Constants, Type Compatibility, Declaration of Variables, Dynamic Initialization of variables, Reference Variables, Operators in C++, Scope Resolution Operator, Member Differencing Operators, Memory Management Operators, Manipulators, Type Cast Operator, Expressions and Implicit Conversions, Operator Overloading, Operator Precedence, Control Structures.

**4. Functions In C++:-**

Introduction, The Main Function Reference, Function Prototyping. Call by Reference, Return By Reference, Inline Function, Default Arguments, Const Arguments, Function Overloading, Friend and Virtual Functions.

**5. Classes and Objects:-**

Introduction, C Structures Revisited, Specifying class, Defining Member Functions, A C++ Program with Class, Making an outside Function Inline, Nesting of Member Functions, Private Member Functions, Arrays within a class, Memory Allocation for Objects, Static Data Members, Static Data Functions, Arrays of objects, Objects as Function Arguments, Friendly Function, Returning Objects, Const Member Function, Pointer to Members.

**6. Constructors & Destructors:-**

Introduction,, Constructors, Parameterized Constructors, Multiple Constructors in a class, Constructors with default Arguments, Dynamic Initialization of objects, Copy Constructor, Dynamic Constructors, Constructing two Dimensional Arrays, Destructors.

**7. Operator Overloading and Type Conversions:-**

Defining Operator Overloading, Overloading Unary Operators, Overloading Binary Operators, Overloading Binary Operators Using Friends, Manipulation of Strings Using Operators, Rules for Overloading Operators, Type Conversions.

**8. Inheritance: Extending Classes:-**

Introduction, Defining Derived classes, Single Inheritance, Making a Private Member Inheritable, Multilevel Inheritance, Multiple Inheritance, Hierarchical Inheritance, Hybrid Inheritance, Virtual Base Classes, Abstract Classes, Constructors In Derived Classes, Member Classes: Nesting of Classes.

**9. Pointers, Virtual Functions and Polymorphism:-**

Introduction, Pointers to objects, this Pointer, Pointer to Derived Classes, Virtual Functions, Pure Virtual Functions.

**10. Managing Console I/O Operations:-**

Introduction, C++ Stream, C++ Stream Classes, Unformatted I/O Operations, Formatted Console I/O Operations, Managing Output with Manipulators

**11. Working with Files:-**

Introduction, Classes for File Stream Operations, Opening and Closing a File, Detecting End of File, More About Open():File Modes, File Pointers And Their Manipulation, Sequential Input And Output Operations, Updating a File: Random Access, Error handling During File operations, Command Line Arguments

**12. Object Oriented Systems Development:-**

Introduction, Procedure Oriented Paradigms, Procedure Oriented Development Tools, Object Oriented Paradigms, Object Oriented Notations And Graphs, Steps in Object Oriented Analysis, Steps in Object Oriented Design, Implementation, Prototyping Paradigm, Wrapping Up

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

**Books :**

**OBJECT-ORIENTED PROGRAMMING WITH C++ By: E BALAGURUSAMY**

## E-406 Computer Techniques for Network And Control theory (Lab only)

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

1. Introduction to Matlab and Pspice. Solving simultaneous equations.
2. Kirchoff's current and voltage laws and series-parallel resistive circuits.
3. Node and Loop Analysis.
4. Source Transformation.
5. Network Theorems.
6. Laplace Transforms.
8. Introduction to computer software for control system simulation.
9. Getting time response of second order system for different types of input using simulink
10. Plotting root locus and thereby study of system performance.
11. Plotting Bode plots and thereby study of system performance.
12. Plotting Nyquist plots and thereby study of system performance.

### Reference Books:

1. Linear Circuit Analysis by Raymond A. DeCarlo and Pen-min Lin, Oxford University Press.
2. Fundamentals of Electrical Engineering by Leonard S. Bobrow, Oxford University Press.
3. Getting Started with Matlab 6, Rudra Pratap, Oxford University Press.
4. Circuit Analysis by A. Bruce Carlson, Thomson Publishers.
5. Modern Control Theory: Ogata
6. Getting Started With Matlab 6.5, Rudra Pratap, Oxford University Press
7. Programming with MATLAB - Stephen Chapman
8. Control system tool box manual
9. Simulink manual.