

**BHAVNAGAR UNIVERSITY**  
**B.E. SEM III( EC )**  
**EC -301 APPLIED MATHAMATICS**

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    |                |             |           |
| <b>3</b>        | <b>0</b>   | <b>0</b>     | <b>100</b>         | <b>3</b> | <b>0</b>       | <b>100</b>  |           |

**(1) ORDINARY DIFFERENTIAL EQUATION OF HIGHER ORDER:**

Definition, complete solution, operator  $d$ , complementary function, inverse operator, rules for finding particular integral, cauchy's & legendre's linear equation, simultaneous linear equations with constant coefficients, application to engineering problems such as forced damped oscillations, electrical circuits etc.

**(2) FOURIER SERIES:**

Euler's formula, dirichlet's conditions, functions having points of discontinuity, change of interval, expansion of odd or even periodic functions, half range series.

**(3) LAPLACE TRANSFORM:**

Introduction, transform of elementary functions, properties of L.T., existence conditions, inverse transform, transform of derivatives, transform of integrals, multiplication by  $t$ , division by  $t$ , convolution theorem, application to solution of differential equation.

**(4) INTEGRAL TRANSFORM:**

Introduction, definition, Fourier integral, Fourier transform, convolution theorem for F-transform, parsel's identity, relation between Fourier transform & lap lace transform, f-transform of the derivative of a function, application of transform to boundary value problems.

**(5) Z-TRANSFORM**

Introduction, definition, ROC, different properties of Z-transform, Z-transform & Inverse Z transform of different functions.

**(6) PARTIAL DIFFERENTIAL EQUATION WITH APLICATION :**

formation of p.d.e., particular and complete integral, equation solvable by direct integration, linear equation of first order, non-linear equation of first order, homogeneous linear equation with constant co-efficient, method of separation of variables, boundary value problems, solution of wave equation, one dimensional heat flow problems, solution of lap lace's equation(two dimension)

**(7) SERIES SOLUTION OF DIFFERENTIAL EQUATION**

**BOOKS:**

- Higher engineering Mathematics by B.S.GREWAL
- A text book of Applied Mathematics by P.N.WARTICAR/J.N.WARTICAR
- Engg. Mathematics by G.V.KUMBHOJKAR II/III
- Advance Engg. Mathematics by CHANDRIKA PRASAD

**BHAVNAGAR UNIVERSITY**  
**B.E. SEM III( EC )**  
**EC -302 FUNDAMENTAL OF ELECTRICAL POWER & MACHINE**

**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         |

**D.C. GENERATORS:-**

Constructional features and working principle, Functions of different of d.c. machines, E.M.F. equations general idea of armature reaction and commutation, efficiency and losses, types, characteristics and applications.

**D.C. MOTORS:-**

Working principle, Back e.m.f. torque, efficiency and losses, types, characteristics and applications.

**TRANSFORMER:-**

Constructional features, Working principle and on load, O.C. and S.C. test, equivalent circuit, separation of losses, regulation and losses, Basic idea of parallel of operation. Auto transformer, Current and potential transformer working principle ratio and phase errors.

**SINGLE PHASE MOTORS:-**

Different types of single-phase motors, Details of capacitor and induction type single phase motors.

**SPECIAL PURPOSE MOTORS:-**

Stepper motor, PCB motor, D.C. and A.C. servomotor, Synchronos.

**ALTERNATOR:-**

Constructional features, Basic principle distribution factors, E.M.F. equation synchronous impedance armature reaction.

**STARTING OF ELECTRICAL MOTORS:-**

Starting of d.c. motors, d.c. motor starters, Starting of three phase induction motor, Induction motor starters.

**GENERATION OF POWER :-**

Site selection ,general layout and functional introduction of various major components of Thermal ,Hydro, Nuclear and gas, turbine Power stations and their relative comparison, Flow Duration curve, mass curve and classification of hydroelectric power station. Nuclear materials, Isotopes, Energy release by fission and fusion, chain reaction, control of fission, Reactor coolants, different types of Nuclear reactors. Different power station in Gujarat and their installed capacity, major power plant site in our country.

### **TRANSMISSION OF POWER: -**

Elements of transmission lines, inductance of single phase and three – phase Lines, GMR & GMD capacitance of single –phase and three phase lines, charging current, transmission line ABCD constants, performance of short line, mixed conditions, performance of short line, mixed conditions, performance of medium transmission lines, Pi and T methods of solution, inductive interference a with neighboring communication circuit6s, corona, power loss due to corona, transposition, Bundled conductors.

### **DISTRICUTION OF POWER:-**

Transmission and distribution systems, types of distribution system, arrangements ,selection and size of feeders, types of cables, calculation of Distribution sizes and voltage drops, Considerations for industrial distribution system.

#### ➤ **PRACTICAL/ORAL:-**

**The practical and termwork shall be based on syllabus.**

#### ➤ **BOOKS:-**

- ❖ A TEXTBOOK OF ELECTRICAL TECHNOLOGY VOL.-II ..... **B.L THAREJA.**
- ❖ PERFORMANCE AND DESIGN OF A.C. MACHINES ..... **M.G. SAY.**
- ❖ A COURSE IN ELECTRICAL POWER (1,2). BY SONI, GUPTA, BHATNAGAR.
- ❖ ELECTRICAL POWER SYSTEM DESIGN. . BY MV DESHPANDE.
- ❖ A COURSE IN ELECTRICAL AND ELECTRONIC MEASUREMENTS AND INSTRUMENTS. .BY AK SAWHNEY.
- ❖ POWER SYSTEM PROTECTION AND SWITCHGER. . BY B RAVINDRANATH & M CHANDER.

**BHAVNAGAR UNIVERSITY**  
**B.E. SEM III( EC )**  
**EC -303 NETWORK THEORY**

**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    |                |           |             |
| <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) CIRCUIT FUNDAMENTALS AND THEOREMS :-**

Charge and energy, Field and circuit concept and inter relation ship. Circuit parameters R.L.C.M. etc. Dot convention of coupled circuits, current and voltage sources and convention, source transformation, energy and power. Average and complex power. Insertion loss , optimizing power transfer. Tellegen's theorem. Kirchoff's Laws. Basic terms e.g. node, Branch, graph, tree, loop, etc. Network topologies. Graph and tree of a network. Number of network equations required for solution. Thevenin's . Norton's. Millman's superposition, Reciprocity theorem.

**(2) TRANSIENT AND STEADY STATE NETWORK ANALYSIS :-**

Initial 8-conditions, in elements Geometrical interpretation of derivatives procedure for evaluating initial conditions. Concept and physical significance of complex frequency. Transform impedance and admittance of R.L.C. elements and circuits. Driving point. Transformer input and output impedance of a network application of network theorem. Formulation of network equilibrium equations on node and loop basis. Duality. Method of writing parameter matrix directly. Solutions using minors and quasi methods. Network analysis using Laplace and inverse laplace transforms. General solutions of second order equations in S domain. Response related to s plane location of roots, pole zero concept. Sinusoidal steady state analysis using exponential.

**(3) TWO PORT NETWORK PARAMETERS :-**

Short circuit admittance (y), open circuit impedance (z). Transmission ( A B C D). Hybrid (h) parameters; Inter relations between parameter sets. Conditions for reciprocity of a Two port network. Input output and image impedance. Two part network topologies like. T. PIE. Ladder. Bridged T. Lattice etc. Symmetrical networks parallel connection of two port networks.

**(4) SYNTHESIS OF ONE PORT L - C NETWORKS :-**

Reactive networks, common features for driving point admittances, separation property, synthesis of Foster and Cauer reactive networks.

**PRACTICAL/ORAL :** The practicals & termwork shall be based on the syllabus.

**BOOKS:-**

1. NETWORK ANALYSIS BY M.E. VAN VALKENBARG
2. NETWORK ANALYSIS BY G.K. MITHAL KHANNA PUBLISHERS.
3. NETWORK THEORY AND FILTER DESIGN BY V.K. ATRE WILEY EASTEORN.
4. ENGINEERING CIRCUIT ANALYSIS BY W.H. HAYT J.E. KOMMERTY MGH.
5. ELECTRIC CIRCUITS BY J. EDMINISTER.
6. LINEAR CIRCUIT ANALYSIS BY S. MADHU PHI.
7. CIRCUIT THEORY BY CHAKRABARTY ( DHANPAT RAI & SONS)
- 8 NETWORK ANALYSIS ( TECHNICAL PUBLICATION PUNE)

**BHAVNAGAR UNIVERSITY**  
**B.E. SEM III( EC )**  
**EC –304 LINEAR 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 |                |           |             |
| 4               | 0          | 2            | 100                | 3     | 25             | 25        | 150         |

**1. Transport Phenomena in Semiconductors :-**

Mobility & Conductivity, Electrons & holes in an intrinsic semiconductor, Donor & acceptor impurities, Charge densities in a semiconductor, Electrical properties of Ge & Si, The hall effect, Conductivity modulation, Generation & recombination of charges, Diffusion, The continuity equation, Injected minority – carrier charge, The potential variation within a graded semiconductor, Recapitulation.

**2. Three Terminal Semiconductor Devices :-**

Review of transistor, current components, Configurations, Characteristics, Current gains & equations, Early effect, Reach through, Photo transistor, Power transistor, Switching characteristics & limits, Base drive, UJT, PUT, FET & MOSFET, Enhancement & depletion modes, Threshold voltages, Ion implantation, Power MOSFETs, Device specifications.

**3. The Transistor at Low frequencies :-**

Graphical analysis of the CE configuration, Two port devices & the hybrid model, Transistor hybrid model, The h parameters, Thevenin's theorems & corollaries, The emitter follower, Comparison of transistor amplifier configurations, Linear analysis of a transistor ckt, Miller's theorem & its dual, Cascading transistor amplifiers, Simplified CE Hybrid model, Simplified calculations for the CC configuration, The CE amplifier with an emitter resistance.

**4. The Transistor at High frequencies :-**

The hybrid - pi CE transistor model, Hybrid – pi conductance, The hybrid – pi capacitances, Validity of hybrid – pi model, Variation of hybrid- pi parameters, The CE short circuit current gain, Current gain with resistive load, The gain bandwidth product.

**5. Multistage Amplifiers :-**

Classification of amplifiers, Distortion in amplifiers, Frequency response of an amplifier, Step response of an amplifier, Bandpass of cascaded stages, The R-C coupled amplifier, Low frequency response of an R-C coupled stage, Effect of an emitter bypass capacitor on low frequency response.

**6. Feedback Amplifiers :-**

Classification of amplifiers, The feedback concept, The transistor gain with feedback, General characteristics of negative feedback amplifiers, Input resistance, Output resistance, Method of analysis of a feedback amplifier, Voltage series feedback, A voltage series feedback pair, Current series feedback, Current shunt feedback, Voltage shunt feedback.

### **7. Stability & Oscillators : -**

Criterion of oscillation ,General condition of oscillation ,Analysis & working of sinusoidal oscillators such as R- C phase shift , wein bridge , hartley ,colpitts ,crystal etc. Amplitude & frequency stability ,Basic principle & working of astable ,bistable , Monostable multivibrators ,UJT sawtooth oscillator ,Blocking oscillator .

### **8. Power Amplifiers : -**

Class A large signal amplifiers, Second harmonic distortion , Higher order harmonic generation , The transformer coupled audio power amplifier , Efficiency , Push pull amplifier , Class B amplifiers , Class AB operation .

### **9. Power Supply : -**

Action of L & C as basic filter elements L – C combinations ,Analysis & design of filter elements ,Bleeder resistors ,Critical inductance ,Swinging chokes ,Design of power transformer for rectifiers ,Complete design & performance of rectifier with filter., Regulated power supplies ,Regulation factors ,Series regulator ,Short circuit protection, Switch mode, Resonant & bidirectional power supplies ,Servo – controlled voltage regulators ,Buck – boost regulators.

### **PULSE FUNDAMENTALS:**

Properties of pulse, duty cycle, transition time, droop, ringing, characteristics of switching devices, effect of junction capacitances and device resistances, various switching times, typical transistor junction voltages, rise & fall time, sag, relational of sag and rise time with sinusoidal frequency response. Equivalent circuit & complete pulse response of a pulse transformer. Design consideration, ferrite transformers, Electromagnetic delay line.

**The practical & term work shall be based on syllabus.**

Books : -

- (1) INTEGRATED ELECTRONICS BY MILLMAN & HALKIAS , MGH.
- (2) ELECTRONIC DEVICES & CIRCUITS BY MILLMAN & HALKIAS , MGH.
- (3) ELECTRONIC CIRCUITS BY SCHILLING BELOVE ,MGH.
- (4) ELECTRONIC DEVICES & CIRCUITS BY MOTTERSLED.
- (5) ELECTRONIC ELECTRONIC DEVICES & CIRCUITS BY MOHAMMED S . GHAUSI.
- (6) ELECTRONIC PRINCIPLE BY A P MALVINO (TMH)
- (7) ANALOG ELECTRONICS CIRCUIT BY GODSE & BAKSHI ( TECH. PUBLICATION)
- (8) WAVE SHAPING TECHNIQUES BY BAKSHI & GODSE( TECH. PUBLICATION)
- (9) SEMICONDUCTOR DEVICE & CIRCUIT BY B P SINGH( DHANPAT RAI )
- (10) SOLID STATE PULSE CIRCUIT BY DEVID BELL

**BHAVNAGAR UNIVERSITY**  
**B.E. SEM III( EC )**  
**EC –305 ELECTRONICS INST. & MEASUREMENT**

**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. Qualities of Measurements:**

Performance characteristics, errors in measurements, statistical analysis, standards for basic electrical quantities.

**2. Electromechanical Indicating Instruments and Display Devices:**

Classification and principle of operation of electromechanical indicating instruments, dc ammeters and voltmeters, ohmmeter, multi meter (VDM), Watthourmeter, power factor meter, Thermoinstruments, Electrodynamometers, construction of diff. Types of display devices, different types of printers.

**3. Electronic Instruments:**

DC ammeters and voltmeters, calibration of dc instruments, extension of range, ac voltmeters, ohmmeters, analog Multimeter, digital voltmeter, digital multimeter, digital phase meter, digital capacitance meter, digital frequency meter

**4. CRO & its applications:**

Block diagram of CRO and detail understanding of associated functions and features, detail of front panel controls, CRO probes, oscilloscope techniques, special CRO's such as Dual beam, Dual trace sampling, storage, fiber optic CRT recording oscilloscope, application of CRO, oscilloscope operating precautions.

**5. Signal Generators and Wave analyzers:**

Standard signal generators, modern laboratory signal generators, function generators, AF sine and square wave generators, random noise generator, basic wave analyzer, frequency selective wave analyzer, spectrum analyzer, digital Fourier analyzer.

**6. Bridges and their applications:**

Principle and application of different types of bridges like wheat stone bridge, Kelvin's bridge, Maxwell's bridge, Hays Bridge, wein bridge, Resonance bridge, precautions when using bridges, Digital readout and microprocessor controlled bridge.

**Practical/Oral:**

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

**Books:**

- 1) ELECTRONIC INSTRUMENTATION BY H. S. KALSI [TMH]
- 2) MODERN ELECTRONIC INSTRUMENTATION AND MEASUREMENT TECHNIQUES BY W. D. COOPER [PHI]
- 3) ELECTRICAL AND ELECTRONIC MEASUREMENT AND INSTRUMENTATION BY A. K. SAHWNEY.

**BHAVNAGAR UNIVERSITY**

**B.E. SEM III( EC )**

**EC –306 COMMUNICATION SKILL AND CIRCUIT DESIGN TOOLS**

**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    |                |           |             |
| <b>0</b>        | <b>0</b>   | <b>4</b>     | <b>0</b>           | <b>0</b> | <b>50</b>      | <b>50</b> | <b>100</b>  |

**PART- A: COMMUNICATION SKILLS**

**Introduction:**

Significance of communication skills in our life, Communication codes and signs

Non verbal communication signs( kinesics, proxemics; manners market management

Important of communication, One way and two way communication, Essentials of good communication, Effective presentation, persuasive presentation, body language, timing and duration of speech, visual aids, others

**The uses of tenses:**

(a) The present indefinite or simple present, present continuous, present perfect, present perfect continuous

(b) The past indefinite or simple past, past continues us, past perfect continuous.

(c) The future indefinite or simple future, future continuous, future, perfect, future perfect continuous

**The common errors in English:**

Common errors in the use of articles, adjectives, tenses, pronouns, prepositions etc. errors arising due to loose participle, incongruous, construction, confused constructions, shifted constructions and rule of proximity, miscellaneous errors.

**Increasing vocabulary:**

Single words for phrases and sentences, words denoting numbers, words denoting places, words denoting professions or trades, words connected with various branches of science and art, synonyms and antonyms, pairs of words often confused, figurative expressions and their explanations proverbs, abbreviations.

**Group discussions:**

Oral communications, importance of objectivity, cool headedness, poise etc,

Students should be encouraged to participate in group discussions on various topics such as day to day burning questions, topics of typical importance, on social political, cultural and technical aspects etc..

**Public speaking and discussion skills:**

Public speaking, importance, salient features of public speaking, listening in public speaking, listening in public speaking, presenting the discussion, tips for speakers.

**Letter-writing and report writing::**

Lay out of business letters, various types of business letters.( inquiry, order, complaint, adjustment to complaint etc.) report writing, structure of report writing, types of reports..

**Reading and comprehension skills:**

Importance, eye movements, fixations, regression and visual wandering, significance of reading for professionalism, kinds of reading, labeling, skimming, scanning, sampling, studying..

**PART-B:**

**CIRCUIT DESIGN TOOLS**

Students have to design and simulate analog and digital electronics circuits using various circuit design and simulation tools.

**Practical/Oral:**

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

**Note :- Each part have equal weight age of marks and practical hours.**

**BOOKS FOR REFERENCE :**

1. Effective communication made simple by Eyre, E.C.
2. The art of speaking made simple by Gondin W. R.
3. Roget's English thesaurus
4. Word power made easy by Norman Lewis.
5. English Idioms by James Main Dixon
6. Chambers's 21str century dictionary of English
7. English Grammer and compostion By wren & Martin.
8. English conversation for all occasions sndha publications Pvt.Ltd.New Delhi.
9. Group discussion at a glance sndha publicaton New Delhi.
10. Common errors in English language IIMs publication New Delhi.
11. English vocabulary for all IIMs Publications.