2010-11

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
Kakinada 533 003
II B.TECH. (ELECTRICAL AND ELECTRONICS ENGINEERING)
COURSE STRUCTURE AND SYLLABUS – 2010-11 BATCH

II Year

I SEMESTER				II SEMESTER			
S.No.	**Subject**	**P**	**C**	**S.No.**	**Subject**	**P**	**C**
1	Electrical Circuit Analysis-I	4+1*	4	1	Electrical Circuit Analysis-II	4+1*	4
2	Fluid Mechanics & Hydraulic Machines	4+1*	4	2	Switching Theory and Logic Design	4+1*	4
3	Electronic Devices and Circuits	4+1*	4	3	Pulse & Digital Circuits	4+1*	4
4	Managerial Economics and Financial Analysis	4+1*	4	4	Power Systems-I	4+1*	4
5	Electro Magnetic Fields	4+1*	4	5	Electrical Machines-II	4+1*	4
6	Electrical Machines-I	4+1*	4	6	Control Systems	4+1*	4
7	FM & HM Lab	3	2	7	EM-I Lab	3	2
8	Electronic Devices &Circuits Lab	3	2	8	Electrical Circuits	3	2
9	English Communication Practice	2	1	9	English Communication Practice	2	1
Total Credits			**29**		**Total Credits**		**29**

*** Tutorial**

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
II B.TECH. (ELECTRICAL AND ELECTRONICS ENGINEERING)

II Year B.Tech. – I Sem.

ELECTRICAL CIRCUIT ANALYSIS-I

Objective:

This course introduces the basic concepts of circuit analysis which is the foundation for all subjects of the Electrical Engineering discipline. The emphasis of this course is laid on the basic analysis of circuits which includes single phase circuits, magnetic circuits, theorems, transient analysis and network topology.

UNIT-I Introduction to Electrical Circuits

Circuit concepts –Resistor(R)-Inductor(L)-Capacitor(C)-Voltage and Current Sources (Ideal and Non-Ideal)- Independent and Dependent Sources-Source transformation-Voltage - Current relationship for passive bilateral elements (for different input signals-square, ramp, saw tooth, triangular)-Ohm's law

UNIT-II

Kirchoff's laws – Network reduction techniques-Series, parallel, series parallel, star-to-delta or delta-to-star transformation, Nodal analysis, mesh analysis, super node and super mesh for D.C excitations.

UNIT-III Single Phase A.C Circuits

R.M.S,Average values and form factor for different periodic wave forms – sinusoidal alternating quantities – Phase and Phase difference – Complex and polar forms of representations, J-notation, Steady state analysis of R,L and C (in series, parallel and series parallel combinations) with sinusoidal excitation-Concept of Reactance, Impedance, Susceptance and Admittance-Power Factor and significance-Real and Reactive power, Complex Power.

UNIT-IV Locus diagrams & Resonance

Locus diagrams - series R-L, R-C, R-L-C and parallel combination with variation of various parameters - Resonance-series, parallel circuits, concept of band width and Q factor.

UNIT-V Magnetic Circuits

Magnetic circuits-Basic definition of MMF, flux and reluctance-Analogy between electrical and magnetic circuits, Faraday's laws of electromagnetic induction-concept of self and mutual inductance-dot convention-coefficient of coupling-composite magnetic circuit-analysis of series and parallel magnetic circuits

UNIT-VI Network topology

Definitions – Graph – Tree, Basic cutset and Basic Tieset matrices for planar networks – Loop and Nodal methods of analysis of Networks with dependent & independent voltage and current sources – Duality & Dual networks.

UNIT-VII Network theorems –I (Without Proof)

Thevenin's, Norton's, Maximum Power Transfer and Millman's theorems for D.C and sinusoidal excitations.

UNIT-VIII Network theorems – II (Without Proof)

Tellegen's, Superposition, Reciprocity and compensation theorems for D.C and sinusoidal excitations.

Text Books:

- Engineering Circuit Analysis by William Hayt and Jack E.Kemmerley,Mc Graw Hill Company,6 th edition
- Network Analysis by K.Satya Prasad and S.Sivanagaraju, Cengage Learning

Reference Books:

- Electrical Circuits by A. Sudhakar and Shyammohan S Palli, Tata McGraw- Hill.
- Network Analysis by N.C.Jagan, C.Lakshmi Narayana BS publications 2nd edition.
- Network Analysis: Van Valkenburg; Prentice-Hall of India Private Ltd.

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II B.TECH. (ELECTRICAL AND ELECTRONICS ENGINEERING)

II Year B.Tech. – I Sem.

FLUID MECHANICS AND HYDRAULIC MACHINERY

UNIT I

Fluid statics: Dimensions and units: physical properties of fluids- specific gravity, viscosity surface tension- vapor pressure and their influence on fluid motion- atmospheric gauge and vacuum pressure – measurement of pressure- Piezometer, U-tube and differential manometers.

UNIT II

Fluid kinematics: stream line, path line and streak lines and stream tube, classification of flows-steady & unsteady, uniform, non uniform, laminar, turbulent, rotational, and irrotational flows-equation of continuity for one dimensional flow.

Fluid dynamics: surface and body forces –Euler's and Bernoulli's equations for flow along a stream line, momentum equation and its application on force on pipe bend.

UNIT III

Closed conduit flow: Reynold's experiment- Darcy Weisbach equation- Minor losses in pipes- pipes in series and pipes in parallel- total energy line-hydraulic gradient line.

Measurement of flow: pilot tube, venturimeter, and orifice meter, Flow nozzle, Turbine flow meter (Ref.4)

UNIT IV

Basics of turbo machinery: hydrodynamic force of jets on stationary and moving flat, inclined, and curved vanes, jet striking centrally and at tip, velocity diagrams, work don and efficiency, flow over radial vanes.

UNIT V

Hydroelectric power stations: Elements of hydro electric power station-types-concept of pumped storage plants-storage requirements, mass curve (explanation only) estimation of power developed from a given catchment area; heads and efficiencies.

UNIT VI

Hydraulic Turbines: classification of turbines, impulse and reaction turbines, Pelton wheel, Francis turbine and Kaplan turbine-working proportions, work done, efficiencies , hydraulic design –draft tube- theory- functions and efficiency.

UNIT VII

Performance of hydraulic turbines: Geometric similarity, Unit and specific quantities, characteristic curves, governing of turbines, selection of type of turbine, cavitation, surge tank, water hammer.

UNIT-VIII

Centrifugal pumps: classification, working, work done – manomertic head- losses and efficiencies- specific speed- pumps in series and parallel-performance characteristic curves, NPSH.

Reciprocating pumps: Working, Discharge, slip, indicator diagrams

TEXT BOOKS:

1. Hydraulics, fluid mechanics and Hydraulic machinery MODI and SETH.

2. Fluid Mechanics and Hydraulic Machines by Rajput.

REFERENCE BOOKS:

1. Fluid Mechanics and Fluid Power Engineering by D.S. Kumar, Kotaria & Sons.

2. Fluid Mechanics and Machinery by D. Rama Durgaiah, New Age International.

3. Hydraulic Machines by Banga & Sharma, Khanna Publishers.

4. Instrumentation for Engineering Measurements by James W. Dally, William E. Riley ,John Wiley

& Sons Inc. 2004 (Chapter 12 – Fluid Flow Measurements)

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II B.TECH. (ELECTRICAL AND ELECTRONICS ENGINEERING)

II Year B.Tech. – I Sem.

ELECTRONIC DEVICES AND CIRCUITS

Unit-I

Electron Ballistics and Applications: Force on Charged Particles in Electric field, Constant Electric Field, Potential, Relationship between Field Intensity and Potential, Two Dimensional Motion, Electrostatic Deflection in Cathode ray Tube, CRO, Force in Magnetic Field, Motion in Magnetic Field, Magnetic Deflection in CRT, Magnetic Focusing, Parallel Electric and Magnetic fields and Perpendicular Electric and Magnetic Fields.

Unit- II

Review of Semi Conductor Physics : Insulators, Semi conductors, and Metals classification using Energy Band Diagrams, Mobility and Conductivity, Electrons and holes in Intrinsic Semi conductors, Extrinsic Semi Conductor, (P and N Type semiconductor) Hall effect, Generation and Recombination of Charges, Diffusion, Continuity Equation, Injected Minority Carriers, Law of Junction, Fermi Dirac Function, Fermi level in Intrinsic and Extrinsic Semiconductor

Unit- III

Junction Diode Characteristics : Open circuited P N Junction, Forward and Reverse Bias, Current components in PN Diode, Diode Equation,Volt-Amper Characteristic, Temperature Dependence on V – I characteristic, Step Graded Junction, Diffusion Capacitance and Diode Resistance (Static and Dynamic), Energy Band Diagram of PN Diode,

Special Diodes: Avalanche and Zener Break Down, Zener Characterisitics, Tunnel Diode, Characteristics with the help of Energy Band Diagrams, Varactor Diode, LED, PIN Diode, Photo Diode

Unit IV

Rectifiers and Filters: Half wave rectifier, ripple factor, full wave rectifier(with and without transformer), Harmonic components in a rectifier circuit, Inductor filter, Capacitor filter, L-section filter, Π- section filter, Multiple L- section and Multiple Π section filter, and comparison of various filter circuits in terms of ripple factors, Simple circuit of a regulator using zener diode, Series and Shunt voltage regulators

Unit- V

Transistors :

Junction transistor, Transistor current components, Transistor as an amplifier, Characteristics of Transistor in Common Base and Common Emitter Configurations, Analytical expressions for Transistor Characteristics, Punch Through/ Reach Through, Photo Transistor, Typical transistor junction voltage values.

Unit VI

Field Effect Transistors:

JFET characteristics (Qualitative and Quantitative discussion), Small signal model of JFET, MOSFET characteristics (Enhancement and depletion mode), Symbols of MOSFET, Introduction to SCR and UJT and their characteristics,

UNIT-VII

Transistor Biasing and Thermal Stabilization : Transistor Biasing and Thermal Stabilization: Operating point, Basic Stability, Collector to Base Bias, Self Bias Amplifiers, Stabilization against variations in V_{BE},, and β for the self bias circuit, Stabilization factors, (S, S', S''), Bias Compensation, Thermistor and Sensitor compensation, Compensation against variation in V_{BE}, I_{co},, Thermal runaway, Thermal stability

UNIT- VIII

Small signal low frequency Transistor models: Two port devices and the Hybrid model, Transistor Hybrid model, Determination of h-parameters from characteristics, Measurement of h-parameters, Conversion formulas for the parameters of three transistor configurations, Analysis of a Transistor Amplifier circuit using h- parameters, Comparison of Transistor Amplifier configurations

Text Books

1. Electronic Devices and Circuits – J. Millman, C.C. Halkias, Tata Mc-Graw Hill
2. Electronic Devices and Circuits – K Satya Prasad, VGS Book Links

Reference

1. Integrated Electronics – Jacob Millman, Chritos C. Halkies,, Tata Mc-Graw Hill, 2009
2. Electronic Devices and Circuits – Salivahanan, Kumar, Vallavaraj, TATA McGraw Hill, Second Edition
3. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall,9thEdition,2006
4. Electronic Devices and Circuits -BV Rao, KBR Murty, K Raja Rajeswari, PCR Pantulu, Pearson, 2nd edition

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
II B.TECH. (ELECTRICAL AND ELECTRONICS ENGINEERING)

II Year B.Tech. – I Sem.

MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

Common to all Branches (w.e.f.2010 batch)

Unit I

Introduction to Managerial Economics:

Introduction to Managerial Economics & Demand Analysis: Definition of Managerial Economics, Characteristics and Scope – Managerial Economics and its relation with other subjects- Basic economic tools in Managerial Economics

Demand Analysis: Meaning- Demand distinctions- Demand determinants- Law of Demand and its exceptions.

Unit-II

Elasticity of Demand & Demand Forecasting: Definition -Types of Elasticity of demand - Measurement of price elasticity of demand: Total outlay method, Point method and Arc method- Significance of Elasticity of Demand.

Demand Forecasting: Meaning - Factors governing demand forecasting - Methods of demand forecasting (survey of buyers' Intentions, Delphi method, Collective opinion, Analysis of Time series and Trend projections, Economic Indicators, Controlled experiments and Judgmental approach) - Forecasting demand for new products- Criteria of a good forecasting method.

Unit-III

Theory of Production and Cost Analysis: Production Function- Isoquants and Isocosts, MRTS, Law of variable proportions- Law of returns to scale- Least Cost Combination of Inputs, Cobb-Douglas Production function - Economies of Scale.

Cost Analysis: Cost concepts, Opportunity cost, Fixed Vs Variable costs, Explicit costs Vs. Implicit costs, Out of pocket costs vs. Imputed costs.-Determination of Break-Even Point (simple problems) - Managerial Significance and limitations of BEP.

UNIT-IV

Introduction to Markets, Managerial Theories of the Firm & Pricing Policies: Market structures**:** Types of competition, Features of Perfect Competition, Monopoly and Monopolistic Competition. Price-Output Determination under Perfect Competition, Monopoly, Monopolistic Competition and Oligopoly Managerial theories of the firm - Marris and Williamson's models.

Pricing Policies: Methods of Pricing-Marginal Cost Pricing, Limit Pricing, Market Skimming Pricing, Penetration Pricing, Bundling Pricing, and Peak Load Pricing. Internet Pricing Models: Flat rate pricing, Usage sensitive pricing, Transaction based pricing, Priority

pricing, charging on the basis of social cost, Precedence model, Smart market mechanism model.

Unit V

Types of Industrial Organization & Introduction to business cycles: Characteristic features of Industrial organization, Features and evaluation of Sole Proprietorship, Partnership, Joint Stock Company, State/Public Enterprises and their types.

Introduction to business cycles: Meaning-Phases of business cycles- Features of business cycles.

Unit VI

Introduction to Financial Accounting: Introduction to Double-entry system, Journal, Ledger, Trial Balance- Final Accounts (with simple adjustments)- Limitations of Financial Statements.

Unit VII

Interpretation and analysis of Financial Statement: Ratio Analysis – Liquidity ratios, Profitability ratios and solvency ratios – Preparation of changes in working capital statement and fund flow statement.

Unit VIII

Capital **and Capital Budgeting**: Meaning of capital budgeting, Need for capital budgeting – Capital budgeting decisions (Examples of capital budgeting) - Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR), IRR and Net Present Value Method (simple problems)

Text Books:

1. **J.V.Prabhakar Rao**: Managerial Economics and Financial Analysis, Maruthi Publications, 2011
2. **N. Appa Rao. & P. Vijaya Kumar**: 'Managerial Economics and Financial Analysis', Cengage Publications, New Delhi, 2011

References:

1. A R Aryasri - Managerial Economics and Financial Analysis, TMH 2011
2. Suma damodaran- Managerial Economics, Oxford 2011
3. S.A. Siddiqui & A.S. Siddiqui, Mangerial Economice and Financial Analysis, New Age International Publishers, 2011.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

II Year B.Tech. Electrical and Electronics Engineering. I-Sem.

ELECTROMAGNETIC FIELDS

Objective:
The objective of this course is to introduce the concepts of electric field and magnetic fields and their applications useful for Electrical Machine Analysis and Power Systems

UNIT – I Electrostatics:
Electrostatic Fields – Coulomb's Law – Electric Field Intensity (EFI) – EFI due to a line and a surface charge – Work done in moving a point charge in an electrostatic field – Electric Potential – Properties of potential function – Potential gradient – Guass's law – Application of Guass's Law – Maxwell's first law, div(D)=ρv

UNIT – II Conductors and Dipole:
Laplace's and Poison's equations – Solution of Laplace's equation in one variable. Electric dipole – Dipole moment – potential and EFI due to an electric dipole – Torque on an Electric dipole in an electric field – Behavior of conductors in an electric field – Conductors and Insulators.

UNIT – III Dielectric & Capacitance:
Electric field inside a dielectric material – polarization – Dielectric – Conductor and Dielectric – Dielectric boundary conditions, Capacitance – Capacitance of parallel plate and spherical and co-axial capacitors with composite dielectrics – Energy stored and energy density in a static electric field – Current density – conduction and Convection current densities – Ohm's law in point form – Equation of continuity

UNIT – IV Magneto Statics:
Static magnetic fields – Biot-Savart's law – Oesterd's experiment - Magnetic field intensity (MFI) – MFI due to a straight current carrying filament – MFI due to circular, square and solenoid current – Carrying wire – Relation between magnetic flux, magnetic flux density and MFI – Maxwell's second Equation, div(B)=0.

UNIT – V Ampere's circuital law and its applications:
Ampere's circuital law and its applications viz. MFI due to an infinite sheet of current and a long current carrying filament – Point form of Ampere's circuital law – Maxwell's third equation, Curl (H)=Jc, Field due to a circular loop, rectangular and square loops.

UNIT – VI Force in Magnetic fields:
Magnetic force - Moving charges in a Magnetic field – Lorentz force equation – force on a current element in a magnetic field – Force on a straight and a long current carrying conductor in a magnetic field – Force between two straight long and parallel current carrying conductors – Magnetic dipole and dipole moment – a differential current loop as a magnetic dipole – Torque on a current loop placed in a magnetic field

UNIT – VII Self and Mutual inductance:
Self and Mutual inductance – determination of self-inductance of a solenoid and toroid and mutual inductance between a straight long wire and a square loop wire in the same plane – energy stored and density in a magnetic field.

UNIT – VIII Time Varying Fields:
Time varying fields – Faraday's laws of electromagnetic induction – Its integral and point forms – Maxwell's fourth equation, Curl (E)=-∂B/∂t – Statically and Dynamically induced EMFs – Simple problems -Modification of Maxwell's equations for time varying fields – Displacement current – Poynting Theorem and Poynting vector.

TEXT BOOKS:
1."Engineering Electromagnetics" by William H. Hayt & John. A. Buck Mc. Graw-Hill Companies, 7th Editon.2006.

REFERENCE BOOKS
1." Principles of Electro Magnetics" by Sadiku, Oxford Publications,4th edition
2."Introduction to Electro Dynamics" by D J Griffiths, Prentice-Hall of India Pvt.Ltd, 2nd edition

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
II B.TECH. (ELECTRICAL AND ELECTRONICS ENGINEERING)

II Year B.Tech. – I Sem.

ELECTRICAL MACHINES - I

Objective :

Electrical machines course is one of the important courses of the Electrical discipline. In this course the different types of DC generators and motors which are widely used in industry are covered and their performance aspects will be studied.

UNIT – I Electromechanical Energy Conversion

Electromechanical Energy conversion – forces and torque in magnetic field systems – energy balance- energy and force in a singly excited magnetic field system, determination of magnetic force - co-energy – multi excited magnetic field systems.

UNIT – II D.C. Generators – Construction & Operation

D.C. Generators – Principle of operation – Constructional Features-E.M.F Equation- Action of commutator – armature windings – lap and wave windings – simplex and multiplex windings –Methods of Excitation-Types of DC generator: separately excited and self excited generators

UNIT – III Armature Reaction in D.C. Generator

Armature reaction – Cross magnetizing and de-magnetizing AT/pole –commutation Process – reactance voltage – methods of improving commutation – Compensating windings – Interpoles.

UNIT – IV Characteristics of D.C Generators

O.C.C– build-up of E.M.F - critical field resistance and critical speed - causes for failure to self excite and remedial measures—Internal & External characteristics of shunt, series and Compound generator-Applications, Losses and Efficiency.

UNIT – V Parallel Operation

Need for parallel operation - Parallel operation of DC Shunt and Compound generators – use of equalizer bar and cross connection of field windings – load sharing.

UNIT – VI D.C. Motors

D.C Motors – Principle of operation – Back E.M.F. - Torque equation –characteristics of shunt, series and compound motors – Armature reaction and commutation, Losses and Efficiency.

UNIT – VII Speed Control of D.C. Motors

Speed control of d.c. Motors: Armature voltage and field flux control methods. Ward-Leonard system. Principle of 3 point and 4 point starters – protective devices—Application of DC Motors.

UNIT – VIII Testing of D.C. Machines

Testing of d.c. machines: methods of testing-:Brake test, Indirect testing: Swinburne's method-- Regenerative or Hopkinson's method-- Field's test for series machines—Retardation test-- separation of losses

TEXT BOOKS:

1.Electrical Machines – P.S. Bimbra., Khanna Publishers

REFERENCE BOOKS:

1.Electrical Machines by R.K.Rajput, Lakshmi publications,5th edition

2.Electrical Machines by D P.Kothari, I .J .Nagarth,Mc GrawHill Publications, 4th edition

3.Electrical Machines by J.B.Guptha. S.K.Kataria & Sons

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II B.TECH. (ELECTRICAL AND ELECTRONICS ENGINEERING)

II Year B.Tech. – I Sem.

FLUID MECHANICS AND HYDRAULIC MACHINES LAB

1. Impact of jets on Vanes

2. Performance Test on Pelton Wheel.

3. Performance Test on Francis Turbine

4. Performance Test on Kaplan Turbine

5. Performance Test on Single Stage Centrifugal Pump

6. Performance Test on Multi Stage Centrifugal Pump

7. Performance Test on Reciprocating Pump

8. Calibration of Venturimeter

9. Calibration of Orifice meter.

10. Determination of friction factor for a given pipe line.11. Determination of loss of head due to sudden contraction in a pipeline.

12. Turbine flow meter.

Note: Any 10 of the above 12 experiments are to be conducted.

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II B.TECH. (ELECTRICAL AND ELECTRONICS ENGINEERING)

II Year B.Tech. – I Sem.

ELECTRONIC DEVICES AND CIRCUITS LAB

PART A : (Only for viva voce Examination)

ELECTRONIC WORKSHOP PRACTICE (in 6 lab sessions) :

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards.
2. Identification, Specifications and Testing of Active Devices, Diodes, BJTs, Lowpower JFETs, MOSFETs, Power Transistors, LEDs, LCDs, Optoelectronic Devices, SCR, UJT, DIACs, TRIACs, Linear and Digital ICs.
3. Soldering practice – Simple Circuits using active and passive components.
4. Single layer and Multi layer PCBs (Identification and Utility).
5. Study and operation of
   - Multimeters (Analog and Digital)
   - Function Generator
   - Regulated Power Supplies
   1. Study and Operation of CRO.

PART B : (For Laboratory examination – Minimum of 10 experiments)

1. **Frequency measurment using Lissajous Figures**
2. PN Junction diode characteristics A. Forward bias B. Reverse bias.(cut-in voltage & Resistance calculations)
3. Zener diode characteristics and Zener as a regulator
4. Transistor CB characteristics (Input and Output) & h Parameter calculations
5. Transistor CE characteristics (Input and Output) & h Parameter calculations
6. Rectifier without filters (Full wave & Half wave)
7. Rectifier with filters (Full wave & Half wave)
8. FET characteristics
9. SCR Charecteristics
10. UJT Charectristics
11. CE Amplifier

12. CC Amplifier (Emitter Follower).

PART C:

Equipment required for Laboratories:

1. Regulated Power supplies (RPS)	-	0-30v
2. CROs	-	0-20M Hz.
3. Function Generators	-	0-1 M Hz.
4. Multimeters		
5. Decade Resitance Boxes/Rheostats		
6. Decade Capacitance Boxes		
7. Micro Ammeters (Analog or Digital)	-	0-20 µA, 0-50µA, 0-100µA, 0-200µA
8. Voltmeters (Analog or Digital)	-	0-50V, 0-100V, 0-250V
Electronic Components	-	Resistors, Capacitors, BJTs, LCDs, SCRs, UJTs, FETs, LEDs,

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
II B.TECH. (ELECTRICAL AND ELECTRONICS ENGINEERING)

II Year –I Sem. (Common to All Branches)

ENGLISH COMMUNICATION PRACTICE
LIFE, LANGUAGE AND CULTURE EXPLORATIONS-I

Purpose of the Course: English for Semesters 3 is designed to provide the learners an opportunity to enhance their language skills through a reading of literary texts which will also help them relate themselves to different cultures vis-à-vis their own. Independent reading is also expected to increase spontaneity in expression among the learners.

Objectives: The Course aims at exposing the learners to nuances in culture, inculcating the habit of independent reading which provides the learners an opportunity to develop critical thinking and analytical skills that can be applied to any subject.

Content of the course: The literary pieces are carefully chosen from across cultures as samples of contemporary life and issues of global interest. This is meant to encourage students to relate language to personality development. In all, five stories have been selected for English Communication Practice.

Topics: Culture and traditions, philosophy, familial relationships, ethics, inter-personal relationships, ability to face disaster and poverty, tolerance.

Time frame/Hours of instruction: 2hrs per week (for pre-reading and post reading tasks of the lessons). Total number of hours per semester - 32.

Time Allocation: Reading of the text should be done at home. The class hours are meant for discussion, analysis and related activities. Project should be completed in consultation with the teacher.

Evaluation: The learner will be assessed on a continuous basis by way of projects and work-sheets given at the end of each story.

Stories selected for English Communication Practice

Life, Language and Culture:

1. The Cop and the Anthem by O. Henry
2. The Festival of the Sacred Tooth Relic in Sri Lanka
(based on the Travelogues of FA Hien Compiled by Ashok JainAssisted by Dhurjjati Sarma)
3.The Hawk and the Tree by Mohammad Azam Rahnaward Zaryab
4. To Be or Not To Be by Zaheda Hina
5. Bade Bhai Saab(My Elder Brother) by Munshi Premchand

Recommended Book: Life, Language and Culture Explorations-I, Cengage Learning India Pvt. Ltd., New Delhi.

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II Year B.Tech. Electrical and Electronics Engineering. II-Sem.

ELECTRICAL CIRCUIT ANALYSIS-II

Objective:
This course aims at study of Three Phase systems, Transient analysis, Network synthesis and Fourier analysis for the future study and analysis of Power Systems

UNIT-I Balanced Three phase circuits
Three phase circuits: Phase sequence- Star and delta connection-Relation between line and phase voltages and currents in balanced systems-Analysis of balanced three phase circuits-Measurement of Active and Reactive power in balanced Three phase systems.

UNIT-II Unbalanced Three phase circuits
Analysis of Three Phase unbalanced circuits-Loop Method- Application of Millman's Theorem- Star Delta Transformation Technique – Two Wattmeter Method of measurement of three phase power.

UNIT-III D.C Transient Analysis
Transient response of R-L, R-C, R-L-C series circuits for D.C excitation-Initial conditions-solution method using differential equation and laplace transforms, Response of R-L & R-C & R-L-C networks to pulse excitation.

UNIT-IV A.C Transient Analysis
Transient response of R-L, R-C, R-L-C series circuits for sinusoidal excitations-Initial conditions-Solution method using differential equations and laplace transforms

UNIT-V Two Port Networks
Two port network parameters – Z, Y, ABCD and hybrid parameters and their relations, Cascaded networks, poles and zeros of network functions.

UNIT-VI Network synthesis
Positive real function, Basic Synthesis procedure, LC Immittance functions, RC Impedance functions, RL impedance function or RC admittance functions, foster and cauer methods.

UNIT-VII Fourier analysis of A.C Circuits
Fourier theorem- Trigonometric form and exponential form of Fourier series – conditions of symmetry- line spectra and phase angle spectra- Analysis of Electrical Circuits to Non sinusoidal periodic waveforms.

UNIT-VIII Fourier Transforms
Fourier Integrals and Fourier Transforms – properties of Fourier Transforms and Application to Electrical Circuits.

Text Books:
1. Engineering Circuit Analysis by William Hayt and Jack E.Kimmerley,Mc Graw Hill Company,6th edition

Reference Books:

1. Network Theory by A. Sudhakar and Shyammohan S Palli, Tata McGraw- Hill Publications,first edition
2. Network Analysis by N.C.Jagan, C.Lakshmi Narayana, BS Publications,2nd edition
3. Network Synthesis: Van Valkenburg; Prentice-Hall of India Private Ltd.
4. Introduction to circuit analysis and design by Tildon Glisson, Jr. Springer Publications.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
II B.TECH. (ELECTRICAL AND ELECTRONICS ENGINEERING)

II Year B.Tech. – II Sem.

SWITCHING THEORY AND LOGIC DESIGN

UNIT I: Review of Number systems:

Representation of numbers of different radix, conversion of numbers from one radix to another radix, r-1's complement and r's complement of unsigned numbers subtraction, problem solving. Signed binary numbers, different forms, problem solving for subtraction. 4-bit codes: BCD, EXCESS 3, alphanumeric codes,9's complement, 2421, etc.. (Text Books: 2,, Reference Books: 1,2,4)

UNIT II

Logic operation, error detection and correction codes: Basic logic operations NOT, OR,AND,Boolean theorems, Complement and dual of logical expressions, NAND and NOR Gates, EX-OR, EX-NOR Gates, standard SOP and POS, Minimisation of logic functions using theorems, Generation of self dual functions. Gray code, error detection and error correction codes, parity checking even parity, odd parity, Hamming code, multi leveled AND-NOR Realisations. Two level NAND-NAND and NOR-NOR realizations. Degenerative forms and multi level realizations. (Text Books: 1,2, Reference Books: 12,4)

UNIT III

Minimisation of switching functions: Minimisation of switching functions using K-Map up to 6-variables, Tabular minimization, minimal SOP and POS Realisation. Problem solving using K-map such as code converters binary multiplier etc.,(Text Books: 1,2 , Reference Books: 2,4)

UNIT IV

Combinational logic circuits-I: Design of Half adder, full adder, half subtractor, full subtractor, applications of full adders, 4-bit binary adder, 4-bit binary subtractor, adder-subtractor circuit, BCD adder circuit Excess3 adder circuit, look-a-head adder circuit. (Text Books: 2, , Reference Books: 1,2,3)

UNIT V

Combinational logic circuits-II: Design of decoder, Demultiplexer, higher order demultiplexing, encoder, multiplexer, higher order multiplexer, realization of Boolean functions using decoders and multiplexers, priority encoder, different code converter using full adders. (Text Books: 1,2, Reference Books: 1,2,3)

UNIT VI

Combinational logic circuits-III: PROM,PLA,PAL, realization of switching functions using PROM,PLA and PAL; comparison of PROM,PLA,and PAL, Programming tables of PROM,PLA and PAL. (Text Books: 1,2, Reference Books: 1,2,4)

UNIT VII

Sequential circuits I: Classification of sequential circuits (synchronous and asynchronous): basic flip-flops, truth tables and excitation tables (nand RS latch, nor RS latch, RS flip-flop. JK flip-flop, T flip-flop, D flip-flop with reset and clear terminals).Conversion of flip-flop to flip-flop. Design of ripple counters, design of synchronous counters, Johnson counters, ring counters. Design of registers, Buffer register, control buffer register, shift register, bi-directional shift register, universal shift register. (Text Books: 1,2, Reference Books: 1,2,3)

UNIT VIII

Sequential circuits II: Finite state machine, capabilities and limitations, analysis of clocked sequential circuits, design procedures, reduction of state tables and state assignment. Realization of circuits using various flip-flops. Meelay to Moore conversion and vice-versa. (Text Books: 1 Reference Books: 1,2,4)

TEXTBOOKS:

1. Switching theory and logic design by Hill and Peterson Mc-Graw Hill MH edition
2. Modern Digital Electronics by RP Jain, TMH.

Reference Books:

1. Switching Theory and Logic Design by A. Ananda Kumar
2. Digital design by Mano 2nd edition PHI.
3. Micro electronics by Millman MH edition.
4. Fundamentals of Logic Design by Charles H.Roth Jr, Jaico Publishers.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
II B.TECH. (ELECTRICAL AND ELECTRONICS ENGINEERING)

II Year B.Tech. – II Sem.

PULSE AND DIGITAL CIRCUITS

Unit I

Linear wave shaping : High pass, low pass RC circuits, their response for sinusoidal, step, pulse, square and ramp inputs. RC network as differentiator and integrator, double differentiation, attenuators, RL and RLC circuits and their response for step input, Ringing circuit.

UNIT II

Non – Linear Wave Shaping : Diode clippers, Transistor clippers, clipping at two independent levels, Transfer characteristics of clippers, Emitter coupled clipper, Comparators, applications of voltage comparators, clamping operation, clamping circuits using diode with different inputs, Clamping circuit theorem, practical clamping circuits, effect of diode characteristics on clamping voltage, Transfer characteristics of clampers.

Unit III

Switching Characteristics of Devices: Diode and Transistor as switches, Break down voltage consideration of transistor, saturation parameters of Transistor and their variation with temperature, Design of transistor switch, transistor-switching times.

Digital Logic gate circuits: Realization of Logic Gates using DTL, TTL,ECL and CMOS logic circuits ,Comparison of logic families

Unit IV

Multivibrators: Analysis & Design of Bistable Multivibrators : Fixed bias& self biased transistor binary, Commutating capacitors, Triggering in binary, Schmitt trigger circuit,Applications

UNIT V

Multivibrators(Cotnd.): Analysis & design of Monostable Multivibrator: Collector-coupled and Emitter-coupled Monostable multivibrators, Triggering in monostable multi;

Analysis & design of Astable multivibrator (Collector coupled and Emitter-coupled) using transistors.

UNIT VI

Time Base Generators

General features of a time base signal, methods of generating time base waveform, Miller and Bootstrap time base generators – basic principles, Transistor miller time base generator, Transistor Bootstrap time base generator, Current time base generators.

Unit VII

Synchronization and Frequency Division : Principles of Synchronization, Frequency division in sweep circuit, Astable relaxation circuits, Monostable relaxation circuits, Phase delay&phase jitters;Synchronization of a sweep circuit with symmetrical signals, Sine wave frequency division with a sweep circuit.

Unit VIII

Blocking oscillators & Sampling Gates:

Blocking oscillators: Monostable blocking oscillators (Basetiming& Emitter timing): Astable blocking oscillators (Diode-Controlled & RC controlled), Applications

Sampling gates; Basic operating principles of sampling gates, Unidirectional and Bi-directional sampling gates, Reduction of pedestal in gate circuits, Four-diode sampling gates; Applications of sampling gates.

Text Books :

1 . J. Millman and H. Taub, "Pulse, Digital and Switching Waveforms", McGraw-Hill, 1991.

2. A. Anand Kumar, "Pulse and Digital Circuits", PHI, 2005.Second Edition

References :

1. Venkat Rao. K. Ramasudha K, Manmadha Rao G, "Pulse and Digital Circuits," Pearson Education, 2010

2.David J.Comer,"Digital Logic State Machine Design', Oxford University Press,2008,Third Edition

3 MS Prakash Rao – " Pulse and Digital Circuits " Tata McGrawHill

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
II B.TECH. (ELECTRICAL AND ELECTRONICS ENGINEERING)

II Year B.Tech. – II Sem.

POWER SYSTEMS-I

Objective :
Electrical Power plays significant role in day to day life of entire mankind. This course concerns the generation and distribution of power along with the economic aspects.

UNIT-1 Thermal Power Stations
Line diagram of Thermal Power Station showing paths of coal, steam, water, air, ash and flue gasses- Brief description of TPS components: Boilers, Super heaters, Economizers, Turbines, Condensers, Cooling towers, and Chimney.

UNIT-2 Nuclear Power Stations
Working principle, Nuclear fuels. Nuclear reactor Components: Moderators, Control roads, Reflectors and Coolants. Types of Nuclear reactors and brief description of PWR, BWR and FBR. Radiation: Radiation hazards and Shielding.

UNIT-3 Gas ,Wind and Solar power generation
Gas Power station: Principle of operation and component (block diagram approach only).
Solar Power generation: Line diagram of solar energy storage, solar energy collector, point focusing collector, solar power generation.

Unit-4 Distribution Systems
Classification of distribution systems, design features of distribution systems, radial distribution, ring main distribution, voltage drop calculations: DC distributors for following cases: radial DC distributor fed at one end and at both ends (equal / unequal voltages), ring main distributor, stepped distributor and AC distribution. comparison of DC and AC distribution.

Unit-5 Substations
Classification of substations: **Air insulated substations -** Indoor & Outdoor substations: Substations layout showing the location of all the substation equipment.
Bus bar arrangements in the Sub-Stations: Simple arrangements like single bus bar, sectionalized single bus bar, double bus bar with one and two circuit breakers main and transfer bus bar system with relevant diagrams.

Gas insulated substations (GIS) – Advantages of Gas insulated substations, different types of gas insulated substations, single line diagram of gas insulated substations, bus bar, construction aspects of GIS, Installation and maintenance of GIS, Comparison of Air insulated substations and Gas insulated substations.

Unit-6 Underground Cables
Types of Cables, Construction, Types of insulating materials, Caluculations of insulation resistance and stress in insulation, Numerical Problems
Capacitance of single and 3-Core belted Cables, Numerical Problems

Grading of Cables-Capacitance grading, Numerical Problems, Description of Intersheath - Grading

UNIT-7 Economic Aspects of Power Generation

Load curve, load duration and integrated load duration curves, discussion on economic aspects: connected load, maximum demand, demand factor, load factor, diversity factor, capacity factor, utilization factor, capacity, utilization and plant use factors- Numerical Problems.

Unit-8 Tariff Methods

Costs of Generation and their division into Fixed, Semi-fixed and Running Costs. Desirable Characteristics of a Tariff Method, Tariff Methods: Simple rate, Flat Rate, Block-Rate, two-part, three –part, and power factor tariff methods.

TEXT BOOKS:

1. A Text Book on Power System Engineering by M.L.Soni, P.V.Gupta, U.S.Bhatnagar and A.Chakrabarti, Dhanpat Rai & Co. Pvt. Ltd., 1999.

REFERENCE BOOKS:

1.Generation,Distribution and Utilization of Electric Energy by C.L.Wadhawa New age International (P) Limited, Publishers 2002

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
II B.TECH. (ELECTRICAL AND ELECTRONICS ENGINEERING)

II Year B.Tech. – II Sem.

ELECTRICAL MACHINES – II

Objective :

As an extension of Electrical machines I course this subject facilitates to study of the performance of Transformers and Induction motors which are the major part of industrial drives and agricultural pump sets.

UNIT-I Introduction to Single Phase Transformers

Construction & Operation – Principle of operation of Single phase transformers-Construction details — types - emf equation - operation on no load and on load - phasor diagrams

UNIT-II Performance of Single Phase Transformers

Equivalent circuit –Regulation – losses and efficiency - effect of variations of frequency & supply voltage on iron losses-- All day efficiency.

UNIT-III Testing of Transformer

OC and SC tests - Sumpner's test -separation of losses -parallel operation with equal and unequal voltage ratios - auto transformers-equivalent circuit - comparison with two winding transformers.

UNIT-IV Poly-Phase Transformers

Polyphase connections - Y/Y, Y/Δ, Δ/Y, Δ/Δ and open Δ -- Third harmonics in phase voltages-three winding transformers : tertiary windings-determination of Zp, Zs and Zt -- transients in switching - off load and on load tap changers -- Scott connection.

UNIT-V 3-phase Induction Motors

construction details of cage and wound rotor machines-production of a rotating magnetic field - principle of operation - rotor emf and rotor frequency - rotor current and pf at standstill and during running conditions -Rotor power input, rotor copper loss and mechanical power developed and their inter relationship

UNIT-VI Characteristics of Induction Motors

Torque equation- expressions for maximum torque and starting torque - torque slip characteristic - equivalent circuit - phasor diagram - double cage and deep bar rotors - crawling and cogging

UNIT-VII Testing's and Starting methods

No load and blocked rotor tests- Circle diagram for predetermination of performance-methods of starting and starting current and torque calculations

UNIT-VIII Speed Control Methods

Stator voltage control – frequency control – Pole changing -- cascade connection. injection of an emf into rotor circuit (qualitative treatment only)-induction generator-principle of operation.

TEXT BOOKS:

1.Electrical Machines – P.S. Bimbra., Khanna Publishers

REFERENCE BOOKS:

1.Electrical Machines by R.K.Rajput, Lakshmi publications,Fifth edition

2.Electrical Machines by D P.Kothari, I .J .Nagarth,Mc GrawHill Publications, 4th edition

3.Electrical Machines by J.B.Guptha. S.K.Kataria & Sons

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA
II B.TECH. (ELECTRICAL AND ELECTRONICS ENGINEERING)

II Year B.Tech. – II Sem.

CONTROL SYSTEMS

Objective :

In this course it is aimed to introduce to the students the principles and applications of control systems in every day life. The basic concepts of block diagram reduction, time domain analysis solutions to time invariant systems and also deals with the different aspects of stability analysis of systems in frequency domain and time domain.

UNIT – I INTRODUCTION

Concepts of Control Systems- Open Loop and closed loop control systems and their differences- Different examples of control systems- Classification of control systems, Feed-Back Characteristics, Effects of feedback.

Mathematical models – Differential equations, Impulse Response and transfer functions - Translational and Rotational mechanical systems

UNIT II TRANSFER FUNCTION REPRESENTATION

Transfer Function of DC Servo motor - AC Servo motor- Synchro transmitter and Receiver, Block diagram representation of systems considering electrical systems as examples -Block diagram algebra – Representation by Signal flow graph - Reduction using Mason's gain formula.

UNIT-III TIME RESPONSE ANALYSIS

Standard test signals - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants – Effects of proportional derivative, proportional integral systems.

UNIT – IV STABILITY ANALYSIS IN S-DOMAIN

The concept of stability – Routh's stability criterion – qualitative stability and conditional stability – limitations of Routh's stability

Root Locus Technique:

The root locus concept - construction of root loci-effects of adding poles and zeros to G(s)H(s) on the root loci.

UNIT – V FREQUENCY RESPONSE ANALYSIS

Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram-Phase margin and Gain margin-Stability Analysis from Bode Plots.

UNIT – VI STABILITY ANALYSIS IN FREQUENCY DOMAIN

Polar Plots-Nyquist Plots-Stability Analysis.

UNIT –VII CLASSICAL CONTROL DESIGN TECHNIQUES

Compensation techniques – Lag, Lead, Lead-Lag Controllers design in frequency Domain, PID Controllers.

UNIT – VIII State Space Analysis of Continuous Systems

Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalization- Solving the Time invariant state Equations- State Transition Matrix and it's Properties – Concepts of Controllability and Observability

TEXT BOOKS:

1.Control Systems Engineering – by I. J. Nagrath and M. Gopal, New Age International Limited Publishers, 2nd edition.

REFERENCE BOOKS:

1. Control Systems by A.Anand Kumar,PHI Publications,4th edition
2. Control Systems Engineering by S.Palani,Tata Mc Graw Hill Publications
3. Moderen Control Engineering, Fifth edition, Kotsuhiko Ogata, Prentice Hall of India

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

II Year B.Tech. Electrical and Electronics Engineering. II-Sem.

ELECTRICAL MACHINES LAB – I

Any 10 of the following experiments are to be conducted:

1. Magnetization characteristics of DC shunt generator. Determination of critical field resistance and critical speed.
2. Load test on DC shunt generator. Determination of characteristics.
3. Brake test on DC shunt motor. Determination of performance curves.
4. Load test on DC compound generator. Determination of characteristics.
5. Hopkinson's test on DC shunt machines. Predetermination of efficiency.
6. Fields test on DC series machines. Determination of efficiency.
7. Swinburne's test and Predetermination of efficiencies as Generator and Motor
6. Speed control of DC shunt motor by Field and armature Control
9. Brake test on DC compound motor. Determination of performance curves.
10. Load test on DC series generator. Determination of characteristics.
11. Retardation test on DC shunt motor. Determination of losses at rated speed.
12. Separation of losses in DC shunt motor.

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

II Year B.Tech. Electrical and Electronics Engineering. II-Sem.

ELECTRICAL CIRCUITS LAB

Any 10 of the following experiments are to be conducted:

1) Verification of Thevenin's and Norton's Theorems
2) Verification of Superposition theorem and Maximum Power Transfer Theorem
3) Verification of Compensation Theorem
4) Verification of Reciprocity , Millmann's Theorems
5) Locus Diagrams of RL and RC Series Circuits
6) Series and Parallel Resonance
7) Determination of Self, Mutual Inductances and Coefficient of coupling
8) Z and Y Parameters
9) Transmission and hybrid parameters
10) Measurement of Active Power for Star and Delta connected balanced loads
11) Measurement of Reactive Power for Star and Delta connected balanced loads
12) Measurement of 3-phase Power by two Wattmeter Method for unbalanced loads

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