Rajiv Gandhi University of Knowledge and Technology

Basar, Mudhole, Adilabad – 504107

B. TECH. ELECTRONICS AND COMMUNICATION ENGINEERING

I YEAR I SEMISTER

Code	Subject	L-T	P	C
EC1101	Network Analysis	4	-	4
PH1001	Engineering Physics	4	-	4
MA1101	Mathematics-1	4	-	4
CS1101	Programming in C	4	-	4
HS1001	English	4	-	3
EC1701	Network Analysis Lab	-	3	2
PH1601	Engineering Physics Lab	-	3	2
CS1701	Programming in C Lab	-	3	2
HS1101	Communication Skills-I	2	-	1
	Total	**22**	**9**	**26**

EC1101 Network Analysis

Externals: 60Marks **(L-T)-P-C**

Internals: 40Marks **4-0-4**

Course Objectives:

1. To provide concepts of Network/Circuit Theory and Theorems.
2. To provide the knowledge of A.C and D.C analysis of circuits.

UNIT- I: DC CIRCUIT ANALYSIS

R-L-C Parameters, Voltage and Current Independent and Dependent Sources, Source Transformation – V–I relationship for Passive elements, Kirchhoff's Laws, Network reduction techniques – series, parallel, series parallel, star–to-delta, delta-to-star transformation, Nodal Analysis

UNIT- II: DC TRANSIENTS

DC Transients: RL, RC and RLC, Laplace transforms and their adaptation to networks

UNIT- III: SINGLE PHASE AC CIRCUITS

Single Phase AC Circuits - R.M.S. and Average values, Form Factor, steady state analysis of series, Parallel and Series parallel Combinations of R, L and C with Sinusoidal excitation, concept of reactance, Impedance, Susceptance and Admittance – phase and phase difference, Concept of Power Factor, j-notation, complex and Polar forms of representation.

UNIT- IV: RESONANCE and NETWORK THEOREMS

Resonance – Series resonance and Parallel resonance circuits, concept of bandwidth and Q factor, Locus Diagrams for RL, RC and RLC Combinations for Various Parameters.
Network Theorems - The venin's, Norton's, Maximum Power Transfer, Superposition, Reciprocity, Tellegen's, Millman's and Compensation theorems for DC and AC excitations.

UNIT- V: TWO PORT NETWORKS and GRAPH THEORY
Two port networks: Z, Y, h and ABCD parameters
Graphs: Paths, connectedness, circuits, cutsets, trees; Matrix representation of directed graphs: incidence, cutset and circuit matrices; Methods of analysis of linear networks: nodal-cutset-mesh- and loop-analysis.**Transfer functions:** poles and zeros; Elements of Filter Theory.

TEXT BOOKS:
1. Network Theory by N.Sreenivasulu, REEM Publications
2. Circuits & Networks by A. Sudhakar and Shyammohan S Palli,
Tata McGraw- Hill
3. Electric Circuits- Schuam Series

REFERENCE BOOKS:

1. Network Analysis by M.E Van Valkenberg, Prantice Hall India, 3rd Edition.
2. Electric circuit Analysis by C.L. Wadhwa, New Age international
3. Electric circuits by David A. Bell, Oxford University press

PH1001 Engineering Physics

Externals: 60Marks **(L-T)-P-C**

Internals: 40Marks **4-0-4**

Objectives:

1. To inculcate in the Students a sense of yearning to learn the basic Physics behind the applications that we look around in day to day life.

2. To deliver the basic Principles of Physics that forms the basis for the development of Technology.

3. The basic details of Solid state Physics, Optics and Electrodynamics and Quantum Physics provided in a subtle fashion dealt in finer details to have strong basics in these areas.

UNIT – I
MATHEMATICAL PHYSICS (3)

1. Gradient, Divergence, Curl and their physical significance
   Scalar and Vector point Functions, Differential operator, Gradient , Physical significance, Divergence, Significance, Curl, Physical Significance, Vector Identities

1.2 Stokes theorem & Gauss theorem
   Vector Integral Theorems, Line Integral, Surface and Volume Integrals, Stokes Theorem, Gauss-Divergence Theorem, Application

1.3 Curvilinear coordinates
   Types of Coordinate systems, Polar coordinates, Cylindrical and Spherical coordinates, Equations Relating Cartesian, Spherical and Cylindrical coordinate

UNIT – II
ELECTRODYNAMICS (6)

2.1 Maxwell's Equations
   Electrodynamics before Maxwell, Fixing of Ampere's Law, Maxwell Equation in matter, Boundary Conditions.

2.2 Poynting theorem and conservation laws
   Continuity Equation, Poynting Theorem, Conservation Law Newton Third law in Electrodynamics

2.3 Wave equation
   Wave equation, wave form Boundary conditions, Reflection and Transmission for a string

2.4 Electro Magnetic Waves in vacuum

Wave equation for E and B, Monochromatic Plane Waves, Energy and Momentum in EM Waves in vacuum

2.5 Electro Magnetic waves in Matter
Propagation in Linear Media, Reflection and Transmission at Normal Incidence Oblique Incidence

2.6 EM wave in conducting surface.

Reference Books :

1. Electrodyamics by David j.Griffiths

UNIT – III
OPTICS (12)

1. Interference by division of wave front (Biprism)
Introduction , Interference of Light Waves, Interference Pattern , Intensity Distribution, Fresnel Biprism

3.2 Interference by division of amplitude (Newton's rings)
Interference by Plane parallel Wave, Cosine Law, Interference by a film with Non-Parallel reflecting surface, Wedge, Newton's Rings.

3.3 Michelson's interferometer
Interference by Plane film illuminated by a point source, Michelson's Interferometer.

3.4 Fraunhoffer diffration (Single slit)
Introduction, Types of Diffraction,Single Slit Frauhoffer Diffraction, Position of Maxima and Minima,Graphical Method for determining roots

3.5 Frauhoffer diffraction Double slit & multiple slits
Double slit Fraunhoffer diffraction by N- Parallel slits

3.6 Diffraction Gratings, Grating and Resolving Power
Diffraction Grating, Construction of Grating, Grating Spectrum, Resolution, Resolving Power of a diffraction Grating

3.7 Fresnel diffraction and Zone Plate
Types of Diffraction, Fresnel diffraction, Fresnel Half Period zones, Zone plate Application of Zone, Lens

3.8 Production of Plane Polarised light & double refraction
Introduction , Polarisation of Light waves, Representation of various types of light, Polarization by Reflection,Brewster's Law, Laws of Malus and proof, Geometry of Calcite Crystal, Double Refraction, Nicol’s Prism, Applications.

3.9 Quarter & Half – wave plate, elliptical & circular polarized lights

Huygen's Theory of Double Refraction, Quarter Wave plate, Half Wave Plate, Elliptically and Circularly Polarised light.

3.10 Production & detection of elliptical & circular Polarised lights

Elliptically polarised Light, Circularly polarised light, Conversion of Elliptically polarized light to Circularly polarised light, Analysis of polarized light of Different Kinds.

3.11 Theory of Laser

Introduction, Spontaneous Emission, Stimulated Emission, Relation between Spontaneous and Stimulated emission Probabilities, Population Inversion, Pumping, Active systems.

3.12 Different kinds of Lasers

Ruby laser Working Semiconductor laser,He-Ne laser ,Application of Laser.

Reference Books :

1. Engineering Physics By Malik and Singh
2. Optics by Ajoy Ghatak
3. Optics by Pedrotti and Pedrotti.

UNIT – IV

QUANTUM MECHANICS (6)

4.1 Failures of classical physics

Limitations of classical physics, Blackbody Radiation, Spectral Lines, Photoelectric Effect, Planck's Quantum Hypothesis, Einstein's Theory of photoelectric Effect, Compton effect, Existence of stationary states, Stern-Gerlach Experiment

4.2 DeBroglie waves & Uncertainity Principle

Introduction, Matter waves Electron Diffraction Experiment Standing waves of an electron in orbit, Uncertainity Principle Single Slit Experiment, Application of Uncertainty Principle.

4.3 Wave function, Schrodinger Equation & probablity interpretation

Time Dependent Schrodinger Equation ,1- D Equation for a free particle, extension to 2-D, Inclusion of forces, Probability current Density

4.4 Operators , expectation values & Time independent Schrodinger Equation

Operators ,Expectation Value, Ehrenfest Theorem, time independent schrodinger Equation and Admissibility Conditions on Wave function.

4.5 Solution for generalised potential

Motion of a particle in a Potential – Classical view .

4.6 Particle in a box

Square well potential with Rigid walls, Energies and Wave functions

Reference Books:

1. Modern Physics by A. Beiser
2. Quantum Mechanics by Aruldhas.

UNIT – V

CONDENSED MATTER PHYSICS (6)

5.1 CRYSTALLOGRAPHY-I

Introduction, Crystal ,Single, poly and Amorphous state, Lattice Points and Space Lattice, Unit cell, Primitive Unit Cell in 2-D ,Non-primitive Unit Cell in 2-D lattice ,Primitive unit cell in 3-D ,Non Primitive unit cell in 3-D,Bravais Lattice and crystal systems, Atomic Packing, Crystal structure

5.2 Crystallography-II

Miller Indices, Positions, Directions, Planes Obtaining Miller indices, Important Cubic crystal structures, SC, BCC, FCC, Closed Packed structures, Packing fraction, NaCl Structure, Diamond , ZnS Structure.

5.3 X-ray diffraction

Introduction, Bragg's Law, Diffraction Direction Experimental Methods of x-Ray Diffraction, Powder method Debye - Scherrer Method Measurement of Bragg Angle

5.4 Defects in crystals

Introduction, Classification of Imperfections, Point Defects, vacancies, Schottky defects, Intersitial, Frenkel defects, Impurities, Colour centres, Line defect Planar Defects, Volume Defects, Thermodynamical consideration for Existence of Defect equilibrium concentration of Schottky defects in metals, Equilibrium concentration of schottky defects in Ionic crystals, Frenkel defect in metals, Frenkel defects in ionic crystals

5.5 Electron theory of metals

Important properties of metals, electron theory of solids, classical free elecrtron theory, DC Electrical Conductivity, Gains of Drude Model, Sommerfeld quantum Model, Fermi Energy, Density of Energy States, carrier Concentration, Drawbacks of Sommerfeld Theroy

5.6 Band theory of solids

Introduction, Formation of Energy Bands in Crystals, Characteristics, Bonding, Classification, Intrinsic and Extrinsic Semiconductors, Band structure, Energy Bands,

Fermi Level and Fermi Energy, Carrier Concentration, Density of electrons in Conduction band, Position of Fermi level, Hall Effect, Applications

Reference Books:

1. Solid state Physics by Dekker
2. Solid state Physics By C.Kittel

MA1101 Mathematics - I

Externals: 60Marks **(L-T)-P-C**

Internals: 40Marks **4-0-4**

Objectives:

- To give a thorough explanation of real sequences and series.
- To introduce the concepts of Euclidean space and the behavior of functions in them.
- To emphasize the applications of differentiation on real functions and their geometrical inferences.
- Introduction to Numerical analysis.
- To Introduce Fourier series and it's applications.

UNIT-I

Sequence: Definition of sequence, convergence, limit of a sequence, divergence, oscillation, bounded and monotonic sequences, Bounded sequences, Sandwich theorem, Algebra of limits, L'Hospital Rule in sequences, subsequences and its limit.

Series: Infinite series, partial sum, convergence, divergence, oscillation, Geometric series, Telescoping series, Algebra of Limits, n^{th}- term test, Comparison test, Comparison test (Limit Form), Integral test, D'Alembert's Ratio test, Cauchy's Root test, Alternating series, Leibnitz's Rule, Absolute convergence, Conditional convergence, Power series, Radius of convergence for a power series.

UNIT-II

Differential calculus: Rolle's theorem, Lagrange's mean value theorem, Cauchy's Mean-value theorem, Taylor's Theorem and Expansion, Maclaurin's Theorem and Expansion, Indeterminate forms and application of L'Hospital Rule. Radius of curvature, Envelope, Increasing and decreasing functions, concavity, convexity and point of inflexion, Asymptotes-Curve Tracing(Sketching)

UNIT-III

Functions of Several Variable Calculus:

Definition of continuity and differentiability in single variable, n-dimensional Euclidean space, Neighborhood of a point in n-dimensional Euclidean space, Functions in n-variables, Functions

in 2 & 3 variables, Interior points, Boundary points, open and closed regions, Limit and continuity, Two-path test, Discontinuities, Partial Differentiation, Clairaut's theorem(for mixed Partial Derivatives), Laplace equation, Homogeneous functions , Euler's theorem for Homogeneous functions, Differentials and derivatives, Derivatives of composite functions, Chain Rule, Jacobians, Taylor's Theorem, Maxima and minima, Lagrange's method of multipliers.

UNIT-IV:

Fourier Series:
Definition of Fourier Series, Fourier Series representation of function, Limit of Convergence of Fourier Series, Even & Odd functions, Gibb's Phenomenon, Sine and Cosine Series, Limit of Convergence of Sine & Cosine Series. Integration and Differentiation of Fourier Series, Bessel's Inequalities, Parseval's Theorem.

UNIT-V

Numerical Methods:

Introduction: True value, Approximate Value, Error, Error percentage, Application of Numerical Analysis in various fields.

Numerical Analysis in solving Algebraic equations: Algebraic equations, Transcendental equations, Bisection Method, Regula -Falsi Method, Newton-Raphson Method.

Numerical Integration: Trapezoidal Rule, Simpson $\frac{1}{3}$ Rule, Simpson $\frac{3}{8}$ Rule

Text Books:

1. Thomas Calculus, Maurice D.Wier, Joel Hass Eleventh Edition, Pearson Education ,2008
2. R.K. Jain & S.R.K.Iyengar, Advanced Engineering Mathematics, Third Edition, Narosa publications, 2007.
3. Erwin Kreyszig, Advanced Engineering Mathematics, 8th Edition, John Wiley & Sons Ltd 2006.

Suggested References:

1. B.S. Grewal and J.S. Grewal, “Higher Engineering Mathematics”,(40th Edition), Khanna Publishers,2007

2. S.S. Sastry ,Introductory Methods of Numerical Analysis ,Third Edition, Prentice Hall India

*L-T-P-C stands for number of lectures, tutorials, practices and credits

CS1101 PROGRAMMING IN C

Externals: 60Marks **(L-T)-P-C**

Internals: 40Marks **4-0-4**

UNIT – I

Introduction to Computer Programming: Computing Environments, Computer Languages, Creating and
Running Programs. Algorithms and Flow charts : Definition of Algorithms, examples, Symbols used in
Flow chart, examples. Introduction to C Language - Background, C Identifiers, Data Types, Operators,
Variables, Constants, Input / Output, Expressions, C Programs, Precedence and Associativity, Evaluating
Expressions, Type Conversion, Statements, Bitwise Operators.

UNIT-II

Selection: Logical Data and Operators, if-else, switch Statements, Standard Functions.
Repetition: loops, while, for, do-while statements, Loop examples, break, continue, go to.
Arrays - Concepts, Using Arrays in C, Array Applications, Two- Dimensional Arrays, Multidimensional Arrays, Linear and Binary Search, Selection, Bubble, Insertion Sorts.

UNIT – III

Functions: Designing Structured Programs, Functions Basics, User Defined Functions, Inter Function Communication, Standard Functions, Scope, Storage Classes-auto, Register, Static, Extern, Scope Rules, and Type Qualifiers. Recursion- Recursive Functions, Preprocessor Commands. Strings - Concepts, C Strings, String Input / Output Functions, Arrays of Strings, String Manipulation Functions.

UNIT – IV

Pointers - Introduction, Pointers to Pointers, Compatibility, void Pointers, Arrays and Pointers, Pointer
constants, Pointers and Strings, Pointers to Functions, Point ers to Constant Objects, Constant Pointers,
Pointer Arithmetic.Call-by-reference: Pointers for Inter-Function Communication, Passing Arrays to a Function.Dynamic Memory Allocation: Memory Allocation Functions, Programming Applications,
Command-line Arguments.

UNIT – V

The Type Definition (type def), Enumerated Types Structure: Definition and Initialization of Structures, Accessing Structures, Nested Structures, Arrays of Structures, Structures and Functions, Pointers to Structures, Self Referential Structures, Unions. Input and Output: Files, Streams, Standard library Input Output Functions, Character Input Output Functions.

Suggested Reading:

1. Rajaraman V, The Fundamentals of Computer, 4th Edition, Prentice Hall of India, 2006
Kernighan BW and Ritchie DM, The C Programming Language, 2nd Edition, Prentice Hall of India, 2006.
2. J.R. Hanly and E.B. Koffman, Problem Solving and Program Design in C, Pearson Education, 2007.

HS1001 English for Communication

Externals: 60Marks **(L-T)-P-C**

Internals: 40Marks **4-0-3**

Objectives:

- To complement the comprehensibility of the Technical subjects in a better way.
- To make them competent to attempt and qualify in various tests.
- To develop the study skills in formal and informal situations.

UNIT-I

A Road Not Taken by Robert Frost: Understanding the Poem- Importance of the poem – Figures of Speech –Simile- Metaphor- Alliteration- Onomatopoeia - Invictus (2009)

UNIT-II

Phonetics: Commonly Mispronounced Words - Consonants - Vowels – Voiced & voiceless - BBC Phonetic Transcription – Syllabification - Word Stress - Tongue Twisters – The King's Speech (2010) – My Fair Lady (1968)

UNIT-III

What's Up? An Excerpt from The Hindu (September 29, 2015) – Binomials and Portmanteau - Common errors in English Usage

UNIT-IV

Malala's Speech: An Excerpt from www.noble.org (10 December 2014): Self-Introduction - One Word Substitutes - Homophones, Homonyms and Homographs - Debate - Group Discussion – Girl Rising (2013)

UNIT-V

The Nightingale and the Rose by Oscar Wilde: - Skimming and Scanning - Dialogue writing: Seeking Permission, Requesting, and Interrupting – Tangled (2010)

UNIT –VI

Anand's Super 30 for IIT - JEE : An Excerpt from The India Today (July 11,15): Letter Writing - Formal Letter - Informal Letter - Notice Writing - Email writing – Freedom Writers (2007)

UNIT –VII

Education and Technology - Burj Khalifa : www.natgeotv.com : Burj Khalifa (Documentary Video)- JAM/PPT Presentations - Essay Writing

UNIT –VIII

A Missile Man – Dr. APJ Kalam: An Excerpt from The Hindu (Sept 25, 2006) – Interviews - Curriculum Vitae or Resume preparation – I am Kalam (2010)

FURTHER STUDIES (SELF STUDY): U-I: Capitalization, Punctuation (commas, full stop, inverted marks) - U-II: Words often Confused, Affixes (Prefixes and Suffixes), Commonly Mispronounced Words, Tongue Twisters - U-III: Articles - Prepositions, Spotting the Error – UIV:

Tenses – U-V: Active and Passive, Direct and Indirect Speech – U-VI: Understanding the rules of spelling Part1&2 – U-VII: Commonly Used Phrasal Verbs & Idioms – U-VIII: Antonyms and synonyms

Suggested References:

*L-T-P-C stands for number of lectures, tutorials, practices and credits

HS1101 Communication Skills- I

Externals: **L-T-P-C***

Internals: **2-0-0-1**

Objectives:

- To improve the English language learning ability of the students by emphasizing on LSRW.
- To complement the comprehensibility of the Technical subjects in a better way.

UNIT-I

Basics of Technical Communication - Introduction - Importance of Technical Communication (2hrs) - **Visual Aids in Technical Communication** - Tables - Graphs - Chart - Drawings and Diagrams - Photographs – Maps - **Non-verbal Communication** - Introduction - Kinesics - Proxemics - Chronemics - Correlating Verbal and Non-verbal Communication - Cross-cultural Variations - Significance of Understanding Culture

UNIT-II

Speaking – JAM - Dialogue conversations - Telephonic Conversations and Etiquette - Telephonic Conversation Practice – Jokes – Proverbs – Quotes

UNIT-III

Writing- Dialogue writing

Suggested References:

1. Technical Communication – Meenakshi Raman & Sangeeta Sharma

EC1701 Network Analysis Lab

Externals: 60Marks **(L-T)-P-C**

Internals: 40Marks **0-3-2**

LIST OF EXPERIMENTS:

1. Study of amplifier using transistor and analysis of harmonic distortion of it.
2. Making of inductor with and without ferrite core and study of its behavior.
3. Study of circuit under Eigen excitation incase of symmetrical and non symmetrical networks.
4. Study of transfer characteristic of circuits containing diodes to find cut-in voltage.
5. Study of relative amplitude of first and second harmonics of half wave rectified output of diode.
6. Maximum Power Transfer Theorem
7. Transient and frequency response of RLC series circuit
8. Measurement of Z, Y, and ABCD parameters of a two port network.

PH 1601 ENGINEERING PHYSICS LAB

Externals: 60Marks **L-T-P-C***

Internals: 40Marks **0-0-3-2**

1. Coupled Pendula
2. Specific rotation - Polarimeter
3. Diffraction Grating
4. Dispersive power of a prism
5. Franck Hertz experiment
6. Photoelectric effect
7. Four probe Experiment
8. Hall effect
9. Ultrasonic Waves

CS1701 Programming in C Lab

Externals: 60Marks **(L-T)-P-C**

Internals: 40Marks **0-3-2**

Objectives:

1. Able to have fundamental concept on basics commands in Linux.

2. Able to write, compile and debug programs in C language.

3. Able to formulate problems and implement algorithms in C.

4. Able to effectively choose programming components that efficiently solve computing problems in real-world

Experiments:

Suggested assignments to be conducted on a 3-hour slot. It will be conducted in tandem with the theory course so that the topics for problems given in the lab are already initiated in the theory class. The topics taught in the theory course should be appropriately sequenced for synchronization with the laboratory. A sample sequence of topics and lab classes for the topic are given below:

1. Familiarization of a computer and the environment and execution of sample programs
2. Expression evaluation
3. Conditionals and branching
4. Iteration
5. Functions
6. Recursion
7. Arrays
8. Structures
9. Files

For the detailed list of programs refer the lab manual.

Note: Any experiment according to the syllabus of CS1101 can be substituted

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